



4th Review: Summary Report

Evidence for Policy and Practice Information and Co-ordinating Centre

What do specialists do in CPD programmes for which there is evidence of positive outcomes for pupils and teachers?

Version 4: 16/4/07: Post PR

The EPPI-Centre is part of the Social Science Research Unit, Institute of Education, University of London.

The Role of Specialists in Continual Professional Development Programmes

Summary

What do specialists do in CPD programmes for which there is evidence of positive outcomes for pupils and teachers?

This was the question at the core of the fourth systematic review of teacher professional development undertaken by the CPD review Group. Specialist input was a common feature of each of the three previous reviews, leading the Review Group to develop a review of research specifically in order to explore the role of the specialist in effective CPD programmes in more detail. A significant number of different Government initiatives have been taken forward with an emphasis upon the importance of collaboration and networking in teacher development. This has led to a substantial increase in in-school, peer-supported professional development. This in turn has generated a desire from policy makers, practitioners and providers for more detailed specification of the contributions of external specialists to CPD – in order to explore how the two might be articulated in the new contexts.

The review was also informed by the research literature, in particular UK evaluations of large scale initiatives (Sainsbury *et al*, 1998, Earl, L *et al*, 2003) and large scale pedagogic strategies (Adey and Shayer, 1994, Shayer *et al*, 1999) where the input of consultants and advisers characterised programmes linked to positive changes in teacher behaviour and enhanced student learning.

Methods

The review followed the detailed procedures for systematic reviewing developed by the EPPI Centre, beginning with the formulation of the review question and the development of a protocol. A systematic search strategy was employed and clearly defined criteria used to screen studies. The studies were keyworded to produce a map of the literature and then assessed for their quality and relevance using transparent and consistent criteria with cross moderation. The results of individual studies which met the criteria were then synthesised to answer the review question. The review was quality assured and peer reviewed by the EPPI Centre.

Results

Impact

The review was designed to report on the role of specialists in CPD which was effective in improving learning and teaching. Of the nineteen included studies, eighteen set out to identify changes in pupil learning and achievement as a means of assessing the impact of new teaching practice. Changes in learning and achievement were reported in the areas of:

- improved knowledge of scientific concepts and problem solving
- improved mathematical skills
- improved literacy skills
- improved engagement with classroom activities

4th CPD Review – summary report

- improved reasoning and problem solving skills
- increased use of ICT

Affective changes among pupils also featured in several studies, and was the core focus of one.

Specialist Input

All the specialists used a CPD model which combined new inputs of knowledge with an extensive programme of support for teachers as they worked together to make changes to their classroom practice. They supported teachers through: modelling, workshops, observation, feedback, coaching and planned and informal meetings for discussion.

The CPD progression varied in the way that inputs were timed and organised: some timed 'input' sessions mostly at the beginning of the study; others spread them over an extended period of time. The quantity of formal 'input' was extensive and sustained.

In addition to 'input' sessions that introduced the teachers to new knowledge and learning content, the specialists in the studies provided support sessions, in which the focus was on helping teachers to make practical changes in their classrooms and evaluate their efforts. In sixteen programs specialists facilitated and encouraged substantial collaboration between the teachers. Specialists also met frequently with teachers. In sixteen studies, this occurred at least monthly across the life of the intervention. Some studies did not explicitly report the amount of additional informal or 'on-call' support that they provided, but all reported regular meetings or scheduled workshops for group discussions and debriefings. In nine studies, the specialists also met teachers on a one-to-one basis. Most studies included at least some activities during school hours and nearly all the specialist support took place on school premises. More than half the CPD involved the specialists in observing teachers and providing feedback and/or debriefing.

Implications

In discussion with policymakers and practitioners the Review Group identified a number of implications arising out of the detailed findings of the review.

Policy

The interventions described in the review involved a complex mix of skills on the part of the external specialists. Teachers were also given an opportunity to develop their skills in supporting colleagues and to assess the impact of their practice on student learning. The CPD programmes had many elements in common, but the patterns of delivery were also tailored to the teachers' learning needs and the contexts in which they worked. These factors raise questions about:

- the need for specific professional development for ASTs, lead practitioners and CPD leaders to develop new knowledge, understanding and skills related to adult professional learning
- the desirability of equipping teachers with the tools and skills necessary to evaluate the impact of new practice on specific groups of pupils
- the development of indicators of successful CPD programmes which would allow providers and funders to assure quality thresholds in funded programmes without imposing formulaic funding criteria.

Practice

A number of implications for practitioners arose from the detailed review findings. These included a need to consider urgently ways of:

- identifying which teachers are best placed to support the professional learning of their colleagues
- using the review process as a means of identifying teacher CPD skills as well as their professional learning needs
- identifying expertise in terms of content and pedagogical knowledge which schools can draw on from their own staff and equipping CPD co-ordinators with the means of judging the quality of that expertise
- developing leadership skills in making judgements about engaging and deploying specialists (either internal or external) in CPD programmes
- developing appropriate forums for schools and CPD providers to work together on professional development opportunities
- deciding on the balance between formal input (content) and activities which sustain ongoing professional learning
- putting the resources in place (designated time, or supply for example) to enable professional learning activities such as peer observation and joint planning to take place.

Further detail for each of these implications is set out at the end of this summary.

REPORT

BACKGROUND

There has been longstanding concern about the nature and adequacy of teachers' subject knowledge and expertise, but the practical details of what levels of specialist expertise and which processes can help teachers extend such knowledge are not well understood.

This is the CPD Review Group's fourth review of the impact of Continuing Professional Development (CPD) on classroom teaching and learning and it arises directly from the findings of the first three reviews. One of the common findings of these reviews is that studies that offer evidence of positive outcomes also show that specialists play an important role in the CPD programmes. The first review found that positive outcomes were associated with "the use of external expertise linked to school based activity". The second review found that all the studies on effective CPD involved input from specialists and that this was sustained throughout the life of the intervention in all but one of the collaborative studies. The third review found that specialists made content or subject-based input to CPD programmes where there was evidence of impacts on students.

This fourth review set out to explore in more detail the role of the specialist in CPD programmes that offer evidence about the outcomes for both pupils and teachers.

There has been an increase in in-school, peer supported professional development since the publication of the first CPD review. There may be a risk that this increasing interest in school-based CPD is perceived as an alternative, rather than a complementary, approach to specialist support. In this context, there is a need to

understand more deeply the skills and contributions of external specialists to effective CPD and to explore how their contribution connects with that of in-school support.

Research background

The finding from the first three reviews that the role of the ‘specialist’ or professional adviser in conjunction with peer support was a prominent feature of effective CPD was recently echoed in a best evidence synthesis carried out in New Zealand (Timperley *et al*, 2006). This identified the utilisation of external expertise as a feature of the professional learning environment in studies that demonstrated outcomes of educational significance for students.

As the first EPPI review of effective CPD pointed out, CPD is a third-order activity and research in this field has to encompass a long chain of dynamically interacting variables, including teacher learning, teacher practice and student learning. This review draws on a range of research and scholarship that extends beyond self-labelled CPD literature.

It is informed by, for example, UK evaluations of large scale government initiatives such as the National Literacy Strategy (Sainsbury *et al*, 1998, Earl, L *et al*, 2003) and large scale pedagogic strategies, such as CASE (Adey and Shayer, 1994) and CAME (Shayer *et al*, 1999) where the input of consultants and advisers characterised programmes linked to positive changes in teacher behaviour and enhanced student learning; evidence on the benefits of teachers’ use of research (Cordingley and Bell, 2002) and teacher enquiry (Elliott, 1991; Stenhouse, 1980); Hargreaves’ (1993) work on teacher development; and Rich’s (1993) work on the learning of beginning and expert teachers. Askew *et al*’s (1997) development of Shulman’s (1986) typology of teachers’ subject knowledge, their pedagogic knowledge and skills, and their pedagogic content knowledge, helped us to explore connections between CPD, teacher knowledge and students’ responses to changes in teaching and learning activities. Desforges’ (1995) work on the difficulties of effecting lasting change in classrooms influenced our decision to focus on sustained CPD. The substantial literature on CPD interventions (Bolam 2003) helped frame our review questions about the nature of ‘specialist’ expertise in the light of evidence about the importance of combining teacher experimentation, feedback and coaching over time (Joyce and Showers, 2002.) We also explored the literature about the transfer of good practice (Fielding *et al*, 2005) and about support for professional learning by school leaders (Cordingley *et al*, 2003; NCSL, 2004).

AIMS

Our aim was to explore and describe how specialist contributions work in CPD programmes where there is evidence of an impact on students’ experiences and learning. The review aimed to find out what actions specialists take that:

- help professional learning
- promote independence and grow capacity
- help to align CPD with school goals and leadership vision and to embed it in classroom practice
- support practitioners through the process of making changes to practice
- ease practitioners’ access to the public knowledge base
- make explicit links between professional learning and pupil learning.

DEFINITIONS

Continuing Professional Development (CPD)

For consistency, we continued to use the definition of CPD we adopted for the first three reviews.

“Professional development consists of all natural learning experiences and those conscious and planned activities which are intended to be of direct or indirect benefit to the individual, group or school and which contribute through these, to the quality of education in the classroom. It is the process by which, alone and with others, teachers review, renew and extend their commitment as change agents to the moral purposes of teaching; and by which they acquire and develop critically the knowledge, skills and emotional intelligence essential to good professional thinking, planning and practice with children, young people and colleagues through each phase of their teaching lives”. (Day 1999; p.4)

Sustained CPD

All the included studies in the review were designed to span at least twelve weeks. For reasons of brevity, from this point on, when we refer to CPD in this report we mean that the CPD is sustained.

Collaborative CPD

We have defined CPD as collaborative where there were specific plans to encourage and enable shared learning and support between at least two teacher colleagues on a sustained basis. Nineteen of the studies included in the in-depth review matched this definition.

Individually oriented CPD

We have defined CPD as individually orientated where there were no explicit plans for the use of collaboration as a significant learning strategy and/or no activities explicitly designed to support and/or sustain such collaboration. Three of the studies included in the in-depth review matched this definition.

REVIEW QUESTIONS

The over-arching question for the fourth review is:

What do specialists do in CPD programmes for which there is evidence of positive outcomes for pupils and teachers?

Our aim was to explore how specialist contributions work in contexts that show evidence of enhanced student learning or positive student experiences.

To structure a detailed interrogation of the studies, we asked a series of sub questions (listed in full in the technical report) that were intended to discover:

1. What is the nature of the specialist contribution?
2. How do specialists enhance the professional development of teachers to enhance pupil learning?
3. What is the impact of specialist contributions to CPD on teachers, teaching and pupils?

4. Are there factors that can change the nature of or impact of the contributions of specialists?

We wanted to find out more about what processes specialists used that helped to make CPD successful in terms of having positive outcomes for both teachers and students.

METHODS

The Review Group is committed to maintaining active teacher and policy maker involvement at an advisory and consultative level and has explored with funding partners the best ways in which this could be achieved. The NUT, DfES and GTC networks were once again used to encourage input from practitioners, parents and governors, and TDA networks were also included. 'Users' in this review included teachers, policy-makers directly concerned in planning CPD resource allocation and strategies, school leaders, CPD coordinators and other 'practitioners' who were concerned with identifying effective CPD in relation to desired outcomes.

The review confined itself to studies which reported on teachers of the 5-16 age group. While this excluded FE and Sixth Form college practitioners, it did not exclude those who taught within the 11-18 age range. All the included studies in the review were designed to span at least twelve weeks ("sustained" CPD). Collaborative CPD for the purposes of this review was defined as CPD where there were specific plans to encourage and enable shared learning and support between at least two teacher colleagues on a sustained basis. The CPD specific keywords were designed to add detail about the nature of the intervention(s) and the type of practice(s) involved. This included processes such as coaching, peer support, teacher research, mentoring, modelling, external expertise and observation.

All citations (titles and abstracts) identified in initial searches were subjected to the application of Stage 1 inclusion criteria. We excluded reports that did not meet any one of the Stage 1 inclusion criteria, but erred on the side of caution and adopted a policy of inclusion where there was any doubt. Once the full-text document was retrieved, the Stage 1 inclusion criteria were re-applied to the full report. All studies passing stage 1 criteria were included in the map, while studies passing stage 2 criteria were subjected to a further criterion of pupil impact data at stage 3 in order to be included in the in-depth review. The inclusion criteria were as follows:

Stage 1 criteria

- 1 Focus on CPD which involves specialist input
- 2 Have set out to measure impact on teaching and/or pupil learning
- 3 Focus on CPD designed to sustain learning for 3 months, one term, or more
- 4 Clearly describe the methods of data collection and analysis
- 5 Focus on CPD which is designed to meet explicit learning objectives
- 6 Focus on teachers of the 5-16 age range
- 7 Were published after 1994
- 8 Are written in English
- 9 Report on the aims and objectives for the research
- 10 Can show how they have used what is known already

Stage 2 criteria

- 11 Provide evidence of impact on teacher behaviour and/or pupil learning (positive or negative)
- 12 Describe the processes of the CPD intervention in some detail including the nature

and content of the CPD activities, the role of the specialist and classroom interventions

13 Evidence of attempts made to establish the reliability and validity of data analysis

Stage 3 criterion

14 Provide evidence of impact on pupil learning (positive or negative)

Our review specific questions were designed to provide as much detail on the processes and input of specialists, and covered the logistics of CPD provision (where? how often? etc), as well as the types of support provided (encouraging collaborative partnerships, identifying starting points etc). We also set out to establish if differences existed depending on type of specialist, although lack of detail prevented us exploring this area in any meaningful way.

Weight of evidence judgements were made on the studies included in the in-depth review to assess their suitability for inclusion in the synthesis. The WOE criteria applied to the studies were:

- WOE A - referring to the internal consistency of the study and whether the reported findings can be trusted in answering the study question.
- WOE B - concerning the appropriateness of the research design for the review question.
- WOE C – concerning the relevance of the focus of the study to the review question.
- WOE D - the overall weight of evidence when A, B and C are combined.

All of the studies in the in-depth review was assessed as either high, medium, or low on each of the WOE criteria. Studies which were judged to have low WOE D were not included in the synthesis.

RESULTS

Mapping of all included studies

We identified 3,421 titles, abstracts and reports in the preliminary searches for this review. We used stage 1 inclusion criteria to narrow this down to 255 studies. Full reports were retrieved for 239 studies and screened to ensure they met stage 1 criteria. The number of studies judged to meet all stage 1 criteria was 76, of which 33 also passed stage 2 filtering. We then applied an additional inclusion criteria that the final selection should include only studies that contained teacher *and* pupil data or pupil data only, so that the evidence related to both teaching and learning. The final number of studies selected for in-depth review was 22.

Characteristics of the studies included in the systematic map (Stage 1 of the Review)

The majority of the 76 studies included in the systematic map came from the USA (N=57), followed by England (N=6). The review covered a range of educational settings, including: primary schools (N=52), secondary schools (N=27), Higher

Education settings (N=13) and some cross phase studies. The curriculum focus of the studies included science (N=23), mathematics (N=17) and literacy (N=12).

Most of the studies involved collaborative (N=58), rather than individually-orientated (N=18) CPD. All of the studies involved specialists working with teachers. Of these, the majority came from outside the schools in the studies, mostly from Higher Education Institutes (HEI) (N=53), some from local authorities (N=13) and some from other backgrounds, such as consultancies or specialist CPD providers (N=15)

The CPD processes used in the studies fell into the following categories:

- specialist mentoring or coaching (N=65);
- formal specialist input (N=64), which often included workshops and/or introduction to the literature;
- mechanisms to encourage peer support (N=58);
- implementing new practice (N=41); and
- research activities (N=11).

Most studies involved more than one intervention and the codes are not mutually exclusive.

Of the specific mentoring / coaching activities keyworded, just under half of the studies reported on ways in which specialists modelled practice (N=31). Observations by specialists as part of the CPD featured in a similar number of studies (N=30). Reviewers needed to be careful only to apply this keyword to studies in which specialists used observation in order to feedback to teachers on their performance, rather than solely as a means of data collection for the research. In addition to carrying out observation and feedback, specialists helped teachers implement new strategies by encouraging experimentation (N=29) and joint planning of schemes of work (N=18). Eleven studies involved teachers in research processes, either as part of an action research project (N=8) or as participants in a post-graduate course (N=3).

About 70% of the studies reported on teacher behaviours (N=49), and a relatively high proportion described enhanced teacher knowledge (N=44) and skills (N=41) as outcomes of the intervention. Comparatively few of the studies appeared to explore affective impact on teachers, such as their beliefs (N=18), motivation (N=17) or their morale (N=10). This is very much in line with the patterns of studies in our third EPPI review of CPD. In this review studies focusing solely on teacher outcomes were more likely than those with pupil data to look for and provide evidence of impact on affective qualities in addition to impact on teacher behaviour. All the final included studies going forward to synthesis contained data about students. The most common area of impact was students' learning (N=27), with eighteen studies reporting gains in achievement and fourteen indicating improvements in knowledge. There was an impact on students' motivation in a moderate number of studies (N=18).

Characteristics of the studies included in the in-depth review

In order to pass all three stages of the inclusion criteria, the studies had to describe the processes of the CPD intervention in some detail, including the nature and content of the CPD activities, the role of the specialist and classroom interventions and meet the criteria outlined above.

Of the 22 studies in the in-depth review, 16 came from the USA. The educational settings included fifteen primary schools, four secondary schools and two special needs schools. The curriculum areas that were most often found to be the focus of the studies in the in-depth review were Literacy (first language) (N=16), science (N=5), ICT (N=4) and mathematics (N=3). 86% (N=19) of the studies in the in-depth review focused on collaborative CPD, compared with 74% of the studies in the map.

Most of the specialists were external: fifteen of the studies used specialists from Higher Education Institutes, and five used specialists from local authorities. Four of the studies also identified using an internal specialist.

Synthesis of findings: Stage 2 of the Review

What do specialists do in CPD programmes for which there is evidence of positive outcomes for pupils and teachers?

The synthesis was drawn from 19 studies which had met all criteria and also had a medium to high overall weight of evidence. Each study had been designed to evaluate the effects of its CPD programme on its target population. This review was designed to report in detail about the role of the specialist within effective CPD programmes.

The aim of the CPD described in the studies was to bring about changes in teachers' classroom practice and to evaluate the impact of these changes on their students. The programmes of CPD were designed to ensure that teachers learned something new and that they could and did put what they had learned into practice in the classroom. Individual study aims varied from improving learning in literacy, mathematics, or science through new teaching approaches and strategies, improving teachers' classroom use of ICT, improving teaching strategies for pupils with SEN and enriching education for young, gifted pupils in urban schools.

The context of the CPD for all the studies included in the synthesis was one in which there was evidence about positive impact on teachers and pupils and the study weight of evidence was judged to be medium to high. We attempted to calibrate the degree of improvement and match this to specific types of specialist input, but because the processes used by specialists shared a great deal in common, this did not prove to be possible. Nevertheless, studies deemed to have a higher impact on pupils tended to report changes in terms of factors such as knowledge, understanding, achievement and skill, whereas studies deemed to have moderate impact tended to report more difficult to measure changes in pupil motivation, engagement or self-esteem.

Connections between specialist inputs and teacher outcomes

The impact of CPD on teachers' knowledge and understanding was referred to explicitly in 13 studies. The areas of knowledge explored included: teaching strategies, theories of learning, the use of technology, subject knowledge and educational policy (for example, curriculum standards).

The CPD had positive effects on teachers' confidence, openness to new teaching approaches and willingness to experiment and take risks. They became able to relinquish a degree of classroom control and to make themselves vulnerable to the scrutiny of their colleagues. Teachers expressed confidence that they could improve their pupils' learning.

Changes in teacher practice resulted from one or more of the following:

- learning more about their subject (eg McCutchen, where teachers learnt phonology and orthography and, with support from the specialist and from each other, changed their teaching accordingly); or
- learning more about learning (eg Cho, where teachers learned about constructivism and cognitive theories and implemented new teaching approaches with support from the specialist and from each other); or
- learning new ways of teaching (eg Lin or Swafford where, with support from the specialist and from each other, teachers' approaches in the classroom became more problem-focused and inquiry oriented.)

Seven studies reported changes in teacher practice following the use of specific strategies designed to meet the needs of teachers and learners in a particular curriculum area. (For example, in Klingner's study teachers aimed to improve literacy learning through collaborative strategic reading.) In twelve studies the teachers implemented more 'generic' teaching practices, with potential for application in other curriculum areas, even when these were introduced within a specific curriculum context. (For example, teachers in Reis's study used advanced thinking skills such as problem solving and creative thinking and they also used more strategies within their classrooms.)

In every case the acquisition of new knowledge, skill and understanding was supported by the specialists implementing additional processes that helped teachers to make sustainable changes to their classroom practice.

Pupil outcomes

Eighteen of the 19 studies set out to identify changes in pupil learning and achievement as a means of assessing the impact of new practice. Changes in learning and achievement were reported in the areas of:

- improved knowledge of scientific concepts and problem solving (Cho, 2002);
- improved mathematical skills (Wilkins, 1997);
- improved literacy skills (Bryant *et al*, 2001; Fine and Kossack, 2002; Greenwood *et al*, 2003; Klingner, 2004; McCutchen *et al*, 2002);
- improved engagement with classroom activities (Boudah *et al*, 2003; Harvey, 1999; Jacobsen, 2001; Lin, 2002; Martin *et al*, 2001; Sawka *et al*, 2002; Zetlin *et al*, 1998);
- improved reasoning and problem solving skills (Jacobson, 2001; Martin *et al*; Reis *et al*, 1998; Swafford *et al*, 1999); and
- increased use of ICT (Ertmer and Hruskocy, 2002; Sandholtz, 2001).

Affective changes among pupils also featured in several studies and was the core focus of the Mink and Fraser study. Improved pupil engagement in classroom activities were interpreted as an outward manifestation of an increase in motivation, but studies also referred explicitly to changes in pupil confidence and self-esteem (Ertmer and Hruskocy, 2002; Wilkins, 1997; Zetlin, 1998), and improved attitudes to learning (Mink and Fraser, 2002).

What was the nature of the specialist contribution to the CPD programmes?

All of the specialists used a CPD model which combined ‘new’ specialist inputs with an ongoing programme of support for the teachers as they began to implement changes in their own classrooms. Types of support included:

- modelling;
- workshops;
- observation;
- feedback;
- coaching; and
- planned and informal meetings for discussion.

It was also clear that the specialists encouraged and guided the teachers in supporting each other in the majority of studies. There were just two studies of individually oriented CPD (Mink & Fraser, 2002; Sawka *et al*, 2002) where structured opportunities for teacher collaboration were not identified as a planned learning strategy. Their facilitation of peer support included enabling and encouraging peer observation, sharing practice, peer coaching, collaborative planning and schemes of work. The time specialists spent with teachers was in most instances divided between *input sessions* and *support sessions*. Input sessions involved introducing teachers to new knowledge and to new ways of doing things. Support sessions involved specialists in working with teachers to interpret and implement this knowledge or skill and to make the consequent changes to their practice.

It is clear from the range of their activities and the extent to which they tailored inputs to contexts that the specialists were ‘experts’ in more than a particular knowledge field. The data show them to have an array of skills, ranging from specialist content knowledge to in-depth knowledge of effective professional development programmes and of evaluation and monitoring. They also acted as coaches and mentors.

The main features of specialist support were:

Extensive time

In the majority of studies the specialist met with teachers on ten occasions or more. The times stated in the studies need to be treated with care. As far as possible reviewers recorded amounts of time spent in formal activities with teachers. What was not clear in the studies was the amount of informal or support or ‘on call’ support provided by the specialists. In most of the studies (N=15), specialist intervention took between one and three terms. In the majority of cases researchers reported sessions between specialist(s) and practitioner(s) lasting longer than two hours.

Making the public knowledge base available to teachers

In all of the studies specialists were instrumental in making teachers aware of available theoretical and empirical knowledge about particular aspects of teaching and learning. For example:

- Theory and evidence on subject-related strategies
 - Literacy (Bryant *et al*, 2003; Greenwood, 2003; Klingner, 2004; Zetlin *et al*, 1998)
 - Science-technology-society (Cho, 2002)
 - ICT (Jacobsen, 2001)
 - Mathematics (Mink and Fraser*, 2002; Swafford, 1999)

- Theory and evidence on cross-curricular strategies
 - Unit Organiser Routine (Boudah *et al*, 1988)
 - Constructivist learning (Lin, 2002; Cho, 2002)
 - Cognitive theory for deaf learners (Martin *et al*, 2001)
 - Enrichment strategies (Reis *et al*, 1998)
 - Emotional and behavioural disorders (Sawka *et al*^{*}, 2002)

Input of new knowledge and skills

As far as the input ('delivery') of new knowledge and skills was concerned, the studies varied considerably. For example, four studies reported mainly front-loaded inputs. Boudah *et al* (2003) - one day plus observation of trainer modelling the teaching strategy; Bryant *et al* (2001) – 3 in-service training days; Klingner (2004) – 1-day workshop and multiple in-class demonstrations for teachers; Martin *et al* (2001) – 3 hour in-service training sessions per day over 3 days. In others the inputs were more widely spread, ranging from 2 one-week training sessions (winter and spring) (Cho, 2002) to 4-week training sessions, 8 one-hour research seminars and 6 half-day seminars per year for 3 years. (Swafford *et al*, 1999)

Facilitating changing practice

Inputs of new knowledge and skill included instruction strategies as an element within initial workshop-based instruction. This element of instruction was consistently contextualised and brought to life, for example through demonstrations and modelling. Eleven studies referred specifically to specialists modelling the teaching strategies as part of their input.

All of the studies reported ways in which the specialists provided follow-on support, intended to be enabling and facilitative, to support teachers in putting what they had learned into practice and directed towards growing teacher autonomy and control.

Contact time with the specialist was spread across the programme, but in the support sessions (as distinct from their inputs of 'new' knowledge) the specialist was concerned with providing teachers with the tools and environment for learning, rather than prescribing the content for learning.

Also consistent was the pattern of frequency: in sixteen studies the specialists met with the teachers at least monthly across the life of the intervention.

Making explicit links between professional learning and pupil learning

A substantial minority of the studies (Bryant *et al*, 2001; Ertmer and Hruskocy, 2002; Jacobsen, 2001; Lin, 2002; McCutchen *et al*, 2002; Sandholtz, 2001; Swafford *et al*, 1999; Zetlin *et al*, 1998) reported explicitly and in detail on the ways in which specialists helped teachers understand and develop their own practice in the light of the impact it was having on their pupils' learning. Several methods of enquiry were described in the studies by which teachers were able to gauge the effects of their practice from the pupil perspective including:

- discussions with teachers about their students before the CPD gets underway
- student test results
- interviews with and by students
- observation and reflection on practice

In other studies data about students were collected but no information is provided about the way or the extent to which this was fed into the CPD. The link between professional learning and pupil learning may have been facilitated by the fact that a large proportion of professional development activity took place on school premises and during school hours, as reported below.

Timing of specialist support

The majority of the studies (N=15) refer to activities held during school hours. This enabled the specialists to support the teachers as they implemented real time changes in their practice and in close connection with their students' responses.

Facilitating and growing independence

The degree to which specialists encouraged and promoted teacher independence in implementing change varied across the studies, and ranged from providing a *framework* in which practitioners take on responsibility for their own learning, to closely controlling input and testing for fidelity of implementation or effective learning. At one end of the spectrum (Jacobsen, 2001) the specialists introduced the CPD, and provided the framework in which professional learning could take place, but the programme itself was designed so that teachers took on leadership of the CPD at an early stage.

In contrast the main aim of the programmes described by Bryant *et al* (2001), McCutchen *et al* (2002), Mink & Fraser (2002), and Sawka *et al* (2002), was to improve teacher knowledge of a subject area / teaching strategy defined by the specialist. The CPD / research design in these studies focused on specialists supporting teachers in faithfully assimilating new knowledge / strategies which the specialists had prescribed.

Taking account of starting points and emotional content of learning

Thirteen studies went on explicitly to report the existence of a research and data collection effort which took into account teachers' individual starting points. For example in one study (Bryant *et al*, 2001) teachers were specifically asked to specify barriers they thought would impede their ability to implement the strategy successfully. In nine of the studies the specialist(s) had clearly paid attention to the teachers' different starting points with regard to the knowledge, skills and/or beliefs they brought with them to the CPD programme. In three cases (Bryant *et al*, 2001; Greenwood *et al*, 2003; Jacobsen, 2001) the specialists interviewed teachers before the CPD to get a sense of their personal knowledge about their students, their skills and beliefs about their teaching. In three programmes (Boudah *et al*, 2003; Klingner, 2004; Lin, 2002) specialists observed teachers implementing new strategies and communicated to them early on what they needed to focus on individually in order to improve their performance. In one study (Sandholtz, 2001) project co-ordinators reviewed teachers' written reflections each morning and made adjustments to the day's training based on the teachers' expressed needs. In other studies (Jacobsen, 2001; Klingner, 2004) the specialist took care not to rush teachers into implementing change before they were ready.

Experimentation

In all CPD programmes, the changes reported imply that experimentation was taking place.

In fourteen of the studies there was explicit reference to specialists encouraging teachers to experiment in their practice and to use colleagues for additional support as a CPD strategy. Examples of experimentation include:

- Jacobsen (2001): 'We're taking our teaching style, we're adapting it and implementing new curriculum ideas, new teaching methodology, but it's all based on where we want to grow from and what we want to do'. 'Teachers were encouraged to prototype ideas and approaches "on the fly" through the onsite support of Galileo teachers'.
- Sandholtz (2002): Experimentation was modelled by trainers "By working in actual classrooms, participants observed the realities of incorporating technology into classroom instruction. In addition to observing innovative teaching strategies that worked smoothly, they saw teachers improvising or abandoning their plans when equipment wouldn't work. A teacher: 'The ability to experiment is really critical. Two years ago, I would not have imagined that I would have the [technology] that I have and the freedom to play with it like I have.'

As these examples illustrate, programmes which encouraged experimentation enabled professionals to adapt the content of the CPD to their individual circumstances. The evidence here also suggests that teachers became more confident in their practice. Experimentation was therefore an important element in facilitating professional learning and connecting it with student learning.

Self directing peer support

Evidence was present in 17 studies that practitioners were working collaboratively within the programme. Of these it was evident in all but two (Boudah *et al*, 2003; Ertmer and Hruskocy, 2002) that the specialist had taken steps to ensure practitioners built up a certain level of autonomy and independence from the specialist in developing their practice.

The following examples illustrate some of the ways in which this was achieved:

- Bryant *et al* (2001); Teachers developed team schedules for implementing the strategy. 'The teachers in each team shared planning and advisory periods and worked collaboratively to address students' needs.'
- Sandholtz (2001): The ACOT program required participants to attend in teams of two to four so that teachers could support one another when returning to their respective schools.

One study (Zetlin *et al*, 1998), which successfully addressed a district-wide problem in the US, illustrates how peer support and specialist support were integrated in a CPD partnership between a HEI and several schools, supported at district level.

Embedding CPD within school goals and leadership

One of our review questions focused on whether the specialist made attempts to embed CPD within school goals and leadership. Eight studies described ways in which this had taken place. Moreover, there were eight studies in which the specialists had aligned their interventions with broader national or regional priorities.

In some cases, the specialist sought the support of school leaders to act as facilitators, either by agreeing for the CPD to take place in their school, or by

providing logistical support, such as cover for colleagues taking part in the programme. In some programmes, headteachers were also involved in the planning of the CPD. However, few of the studies reported attempts by the specialist to embed CPD at a school policy level. Examples of where this did take place include the Primary Science Programme (Harvey, 1999) in which the specialist helped practitioners draft school science teaching policies, and the Galileo Network programme (Jacobsen, 2001) in which project workers collaborated with school staff, parents, and local authority staff, with the aim of creating a learning environment at the school, based on improved use of technology. National and regional priorities included new curriculum initiatives (Cho, 2002; Mink and Fraser, 2002; Harvey, 1999; Wilkins, 1997) concerns about literacy difficulties (McCutchen *et al*, 2002; Zetlin *et al*, 1998) and technological requirements (Jacobsen, 2001; Sandholtz, 2001)

Conclusions from the individual studies

Many of the authors reached conclusions from their *individual* study findings which were consistent with our findings from the review about the dual nature of the specialist contribution – ie input (new knowledge) and support (time, coaching, promoting self directed peer support, on-site activities, real life teaching and learning issues etc). Indeed, the main conclusion authors came to was that for CPD to be successful it was important to pay as much attention to the process and teacher learning and to their needs as to the delivery of new knowledge. As at least two researchers pointed out, this may well represent a challenge for traditional ‘business-as-usual’ CPD programme providers as well as for schools.

What can we learn from this about specialist contribution to effective CPD?

The specialists responsible for the CPD in almost all the studies were also the researchers who were evaluating them, and they invested much time and effort in the CPD programmes. They aimed to produce observable, positive outcomes for both teacher and student learning, and evaluated the success of the CPD programmes based on meeting those aims. To promote teachers’ understanding of how their new knowledge might work in practice, many specialists modelled the new ideas in a classroom setting. To promote teachers’ *use* of their newly acquired knowledge and the development of their skills in the classroom, the specialists supported teachers to make changes in the classroom and invested at least as much in that part of the programme as in the initial acquisition of new knowledge and skills. They did so through sustained mentoring and coaching and often by also setting up mechanisms to help teachers collaborate with and support one another.

Strengths & limitations of the systematic review

Strengths

Despite the difficulties in studying the impact of CPD on both teachers and students, this review has identified six new studies that provide evidence about the connections between CPD and improvements in teaching and learning. It has drawn these together with thirteen similar studies from previous reviews that also provide detailed descriptions of the specialist contribution. The studies encompass a wide variety of CPD contexts, foci and practices. The synthesis has established a consistent pattern of what is involved in specialists’ contribution to professional development when there is evidence of positive outcomes for both teachers and

students. The detailed analysis of the nature of the specialist contributions deepens our understanding of the dual nature of the process in terms of both specialist input and ongoing support.

The review provides extensive detail on the contribution of the specialist to effective CPD. In doing so, it creates a portrait of helpful practical issues relating to, for example, time and timing, of the array of specialist skills and knowledge necessary to facilitate effective CPD, and of the value added by external specialists to the programmes identified in these studies. Policy makers and practitioners have been involved at every stage. This has helped us to identify implications for the UK context using data from mostly non-UK studies.

The CPD Review Group considers that the review has contributed to:

- increasing understanding about the distinction between professional development (content) and professional learning (processes), and the specialist's role in providing and facilitating both; and
- the development of the evidence base about specific processes involved in CPD which are connected with substantial, positive changes in teacher practice and improvements in pupil learning.

Limitations

None of the studies was designed to answer our review question directly, and the data provided in the studies we retrieved was sometimes limited with regard to answering what we wanted to know.

All of the studies involved in the review report positive outcomes. This may mean that studies of CPD which do not have positive outcomes are not reported. It is challenging for researchers to report negative findings when they are also involved in the delivery of the programmes.

The CPD specialists in these studies were also, in most cases, the researchers. They may have had access to additional resources that may not be more generally available. Messages from the review need to be understood against this background.

Six of the studies included in the in-depth analysis were small scale in nature.

There may have been additional data in PhDs and other studies which we were unable to retrieve and explore.

IMPLICATIONS

Implications for Policy

The interventions described in the review studies involved a complex mix of skills on the part of the external specialists. Similarly, when teachers were asked to support their colleagues following support from external specialists they were also given the opportunity to develop their own skills in doing this (eg Wilkins, 1997). Understanding of adult learning was an important part of the mix.

It is currently assumed that ASTs can coach others. But can they? How can programmes for colleagues who are asked to work at the cutting edge of practice and

to support the work of others develop new knowledge, understanding and skills in adult learning? Should there be specific professional development for leading practitioners in training schools, ASTs and CPD leaders that recognises their role as leaders of adult professional learning?’

Eight of the studies in the synthesis reported explicitly and in detail on ways in which specialists helped teachers connect their CPD with their students’ learning and understand its impact. All of the studies involved extensive evaluation of impact which was often integrated into the CPD.

How can CPD be designed so that teacher evaluation of the impact on their pupils is an integral part of the process? Programme-wide evaluation is already a requirement of TDA funded postgraduate professional development. In England the GTC Teacher Learning Academy requires teachers to explore the impact of their learning on students. Is there a need for CPD to enable teachers themselves to acquire the basic tools for evaluating the impact of new practice, focusing on specific groups of pupils to make the task manageable?

The CPD programme designs in the review were complex and variable. In each case, although there were common elements, the programme was designed around the teachers’ learning needs, the contexts in which they worked and the difficulties associated with developing the particular types of new knowledge and skills on which the CPD was focused. The importance of tailoring CPD provision to practitioner needs has also been highlighted by Ofsted (2006). This raises some interesting issues for CPD funders and providers.

Do providers and funders need to consider how best to assure quality thresholds in funded programmes whilst refraining from imposing formulaic funding criteria? How can CPD funders and providers encourage or provide ‘bespoke’, fit-for-purpose and context-specific CPD programmes at the same time as pursuing their overall goals? How will they ensure that they include indicators of successful adult learning?

Implications for Practice

Staff from schools who participated benefited from the CPD and so did their pupils. In some cases people who were involved had an important and positive contribution to make to their colleagues’ CPD by taking on a lead teacher role. But it was clear in the majority of studies that not all eligible teachers were included.

How do you decide which staff will benefit from the CPD? Which members of staff, having taken part in the programme, are best placed to support parallel or follow up professional learning for their colleagues.

How as a practitioner do you ensure that your school CPD co-ordinator is aware of the skills you have to offer? Could you use the review process as a means of identifying your CPD skills, as well as your professional needs?

In all of the synthesis studies the CPD was led by and dependent on the input of external specialists. In two programmes they also set out to develop internal specialists to support practitioner learning. Another programme involved the input of a lead teacher.

Which CPD activities, arranged and implemented by the external specialists could be supported by the internal specialist you identify? In your context how can and should the professional development of internal specialists be organised so that they are prepared for this role?

What expertise in terms of content and pedagogical knowledge can the school draw on from its own staff, and how can CPD co-ordinators judge the quality of that expertise?

In what situations is it more advisable to draw on external expertise to provide the content of CPD? What skills do personnel in leadership roles in schools need to develop in order to make informed judgements about engaging and deploying specialists in CPD programmes?

The specialists described in the review studies brought with them an array of skills and specialist knowledge including: content knowledge; subject-specific pedagogic knowledge, knowledge of effective CPD; evaluation and monitoring skills; and coaching and mentoring skills. We also know from Ofsted (2006) that lack of in-school specialist expertise in some subject areas has led to weaknesses in identifying CPD needs.

How can schools work with potential providers to identify and bring together the skills and resources to optimise professional development opportunities? What fora already exist where this kind of collaboration can take place?

Does your school have an up-to-date network of external experts on which to draw? Would it help to consult subject leaders about the recognised specialists in their field?

How can providers and schools work together to identify in what areas CPD needs to take place, and to prioritise programmes to achieve the biggest return for limited funding?

The studies in this review described CPD programmes which paid a lot of attention to encouraging and facilitating *professional learning*, for example, by encouraging peer support, collaborative learning and experimentation. This complemented the formal instruction in new information and approaches provided by the specialists (*professional development*) and created a robust model to enable change in teacher practice.

What should the balance be between formal input (content) and activities which sustain ongoing professional learning in a given CPD programme? What will providers that you are considering working with do to ensure that teachers are able to take control over their own learning following their input?

What resources (such as designated time and/or supply) are available to ensure professional learning activities, such as peer observation, shared interpretation and joint planning etc, can take place?

Implications for Research

The amount of detail the studies provided on CPD processes varied greatly. For example, some studies described ways in which specialists shared the data they collected with teachers, or provided detail on workshop activities which clarified the nature of the specialist input and peer support. However, in several studies whether and how data were shared remained ambiguous.

Are there important aspects of an intervention programme and/or the interaction between the research process and the intervention which go unreported because the researcher is focussing on the content or impact of a programme? What steps can researchers take to ensure that appropriate information about an intervention, including their parallel roles as researchers and CPD specialists, reaches all potential audiences?

The effectiveness of the CPD in the various studies was evaluated using an array of different methods. This made it difficult to determine the relative merits of one CPD programme against another. However, publicly funded CPD programmes increasingly require evaluation of their effectiveness to make value for money judgements, and schools are all anxious to understand the return of what is often a large investment. Ofsted (2006) pointed to the lack of effective evaluation as the weakest link in the chain.

Is there scope for researchers to come together to share the relative merits of different evaluation processes as a basis for further methodological development in this area? How can the research community support practitioners in developing practice and effective ways of evaluating the impact of professional development programmes in their schools?

The CPD programmes described in the review were resource intensive in terms of the time the specialists spent arranging and facilitating the programmes, yet none of the studies provided an indication of the financial costs of the programmes. This may in part be due to the fact that they were incorporated into a broader research programme. However, this information is important for professionals who are looking to replicate or adapt approaches to CPD so they have a clearer idea of its value for money.

In what ways can researchers provide information on the resources required for a particular programme in a way which gives a clear indication of the costs of a particular approach? Is it feasible to separate the costs of providing the CPD from the overall research budget within intervention programmes?

REFERENCES

Studies included in synthesis

Boudah D, Blair E, Mitchell V (2003) Implementing and sustaining strategies instruction: Authentic and effective professional development or "Business as Usual"? In: *Exceptionality* 11: 3-23.

Bryant D, Linan-Thompson S, Ugel N, Hamff A, Hougren M (2001) The effects of professional development for middle schools general and special education teachers

on implementation of reading strategies in inclusive content area classes. *Learning Disability Quarterly* **24**: 251-264.

Cho J (2002) The development of an alternative in-service programme for Korean science teachers with an emphasis on science-technology-society. *International Journal of Science Education* **24**: 1021-1035.

Ertmer P, Hruskocy C (1999) Impacts of a university-elementary school partnership designed to support technology integration. *Educational Technology Research and Development* **47**: 81-96.

Fine J, Kossack S (2002) The effect of using rubric-embedded cognitive coaching strategies to initiate learning conversations. *Journal of Reading Education* **27**: 31-37.

Greenwood C, Tapia Y, Abbott M, Walton C (2003) A building-based case study of evidence-based literacy practices: Implementation, reading behavior, and growth in reading fluency, K-4. *The Journal of Special Education* **37**: 95-100.

Harvey S (1999) The impact of coaching in South African primary science InSET. *International Journal of Educational Development* **19**: 191-205.

Jacobsen D (2001) Building different bridges: technology integration, engaged student learning, and new approaches to professional development. Paper presented at the Annual Meeting of the American Educational Research Association, Seattle, WA: April 10-14.

Klingner J, Vaughn S, Arguelles M, Tejero Hughes M, Leftwich S (2004) Collaborative Strategic Reading: "Real-world" lessons from classroom teachers. *Remedial and Special Education* **25**: 291-302.

Lin S (2002) Improving science teaching through teacher development group: a case study of elementary teachers. Paper presented at the Annual Meeting of the National Association for Research in Science Teaching, New Orleans, LA: April 7-10.

Martin D, Craft A, Sheng Z (2001) The impact of cognitive strategy instruction of deaf learners: an international comparative study. *American Annals of the Deaf* **146**: 366-378.

McCutchen D, Abbott R, Green L, Beretvas S, Cox S, Potter N, Quiroga T, Gray A (2002) Beginning literacy: Links among teacher knowledge, teacher practice, and student learning. *Journal of Learning Disabilities* **35**: 69-86

Mink D, Fraser B (2002) Evaluation of a K-5 mathematics program which integrates children's literature: classroom environment, achievement and attitudes. Paper presented at the Annual Meeting of the American Educational Research Association, New Orleans, LA: April.

Reis S, Gentry M, Maxfield L (1998) The application of enrichment clusters to teachers' classroom practices. *Journal for the Education of the Gifted* **21**: 310-334.

Sandholtz J (2001) Learning to teach with technology: a comparison of teacher development. *Journal of Technology and Teacher Education* **9**: 349-374.

Sawka K, McCurdy B, Mannella M (2002) Strengthening emotional support services: An empirically based model for training teachers of students with behavior disorders. *Journal of Emotional and Behavioral Disorders* **10**: 223-232.

Swafford J, Jones G, Thornton C, Stump S, Miller D (1999) The Impact on instructional practice of a teacher change model. *Journal of Research and Development in Education* **32**: 69-82.

Wilkins C (1997) *Effects of a resident mentor teacher on student achievement in mathematics*. Report of a study carried out with the support of the Mid-South Educational Research Foundation.

Zetlin A, MacLeod E, Michener D (1998) Professional development of teachers of language minority students through university-school partnership. Paper presented at the Annual Meeting of the American Educational Research Association, San Diego, CA: April.

Studies included in in-depth review but not synthesis

Fortino C, Gerretson H, Button L, Johnson S (2002) Using literacy integration for communicating scientifically: Research results on teacher efficacy and student achievement. Report of a study carried out to evaluate the effectiveness of Using Literacy Integration for Communicating Scientifically program.

Harwell S, Gunter S, Montgomery S, Shelton C, West D (2001) Technology integration and the classroom learning environment: Research for action. *Learning Environments Research* **4**: 259-286.

Rodrigues S, Marks A, Steel P (2003) Developing science and ICT pedagogical content knowledge: A model of continuing professional development. *Innovations in Education and Teaching International* **40**: 386-394.

Other references used in the text of the report

Adey P, Shayer P (1994) *Really Raising Standards: Cognitive Intervention and Academic Achievement*. London: Routledge.

Askew M, Brown M, Rhodes V, Johnson D, William D (1997) *Effective Teachers of Numeracy: Report of a Study Carried Out for the Teacher Training Agency*. London: King's College, University of London.

Bolam, R (2003) Presidential Address. Paper presented at the International Professional Development Association Conference, 31st October-1st November 2003.

Cordingley P, Bell M (2002) *Literature and Evidence Search: Teachers' Use of Research and Evidence as they Learn to Teach and Improve their Teaching*. London: TTA.

Cordingley P, Bell M, Rundell B, Evans D (2003) The impact of collaborative CPD on classroom teaching and learning. In: *Research Evidence in Education Library*. London: EPPI-Centre, Social Science Research Unit, Institute of Education, University of London.

Day C (1999) *Developing Teachers: The Challenges of Lifelong Learning*. London: Falmer Press.

Desforges C (1995) How does experience affect theoretical knowledge for teaching? *Learning and Instruction* **5**: 385–400.

4th CPD Review – summary report

Earl, L, Watson L, Levin B (2003) *Watching and learning 3: final report of the external evaluation of England's National Literacy and Numeracy Strategies* London: DfES.

Elliott J (1991) *Action Research for Educational Change*. Milton Keynes: Open University Press.

Fielding M, Bragg S, Craig J, Cunningham I, Eraut M, Gilinson, Horne M, Robinson C, Thorp J (2005) *Factors Influencing the Transfer of Good Practice*. Research Report RR615. Annesley, Nottingham: DfES Publications.

Hargreaves DH (1993) A common-sense model of the professional development of teachers. In: Elliot J (ed.) *Reconstructing Teacher Education: Teacher Development*. London: Falmer, pages 86–92.

Joyce B, Showers B (1988) *Student Achievement Through Staff Development*. London: Longman.

National College for School Leadership (NCSL) (2004) *Learning-centred leadership: a new suite of materials to help improve learning and teaching in your school*. Available at: http://www.ncsl.org.uk/research_and_development/research_activities/randd-lcl-index.cfm

Ofsted (2006) *The logical chain: continuing professional development in effective schools*. London: HMI.

Rich I (1993) Stability and change in teacher expertise. *Teachers and Learning* **9**: 137–141.

Sainsbury M, Shagen I, Whetton C, Hagues N, Minnis M (1998) *Evaluation of the National Literacy Project – Cohort 1 (1996-1998)* Slough: NFER

Shayer M, Johnson DC, Adhami M (1999) Does 'CAME' Work? Report on Key Stage 3 results following the use of Cognitive Acceleration in Mathematics Education, CAME Project in Years 7 & 8. Proceedings of the British Society for Research into Learning Mathematics Conference, St Martin's College, Lancaster: 5 June.

Shulman LS (1986) Those who understand: knowledge growth in teaching. *Educational Researcher* **15**: 4–14.

Stenhouse L (1980) *Curriculum Research and Development in Action*. London: Heineman.

Timperley H, Fung I, Wilson A, Barrar H (2006) *Professional learning and development: a best evidence synthesis of impact on student outcomes*. Paper presented at AERA Annual Conference. San Francisco, California, April 2006.