Systematic research review

December 2005

The impact of networks on pupils, practitioners, organisations and the communities they serve.

Review question:

What is the impact on pupils of networks that include at least three schools? What additional benefits are there for practitioners, organisations and the communities they serve?

Networked Learning Group (NLG) and the Centre for the Use of Research and Evidence in Education (CUREE)

curee

Networked Learning Communities
learning from each other   learning with each other   learning on behalf of each other

List of abbreviations

AERA	American Educational Research Association
AAER	Association for the Advancement of Educational Research
ACER	Australian Council for Educational Research
ASSIA	Applied Social Sciences Index and Abstracts
Becta	British Educational Communications and Technology Agency
BEI	British Education Index
BERA	British Educational Research Association
CERUK	Current Educational Research in the UK
CUREE	Centre for the Use of Research and Evidence in Education
DfES	Department for Education and Skills
ERIC	Educational Resources Information Centre (US)
ESRG	Electronic Systems Research Group
IQEA	Improving the Quality of Education for All
ITE	Initial Teacher Education
ITT	Initial Teacher Training
NCSL	National College for School Leadership
NfER	National Foundation for Educational Research
NLG	Networked Learning Group
SCRE	Scottish Research in Education Centre

Contents

This report has been produced in four sections. The first contains a two-page list of the key messages which emerged from the synthesis of the evidence and which can be used as a stand-alone introduction to the review findings. The second is a summary of the key findings from the synthesis of the evidence with some illustrations from the studies which can also be used on its own as an overview. The third, main section of the report contains full methodological details and findings from the review, including the map of the literature (Ch3) and the full synthesis (Ch4). The fourth section, the appendices, contains examples of some of the tools used in the review plus some illustrative examples from the studies.

Key messages

Key Messages

1. Impact

The systematic review provides evidence that networks can be a highly effective vehicle for improving teaching, learning and attainment.

2. Network features

Key network features linked to positive impact were:

- CPD, which was the principal means of effecting transfer of knowledge and practice within networks. This encompassed:
    - introducing something new
    - use of external expertise
    - creating self-sustaining capacity over time
- collaboration, which was both an important means of achieving network breadth and the principal means of achieving in-depth transfer
- specific focuses – the majority of the networks were structured around a set of clearly defined aims
- ownership of the network's goals and processes which seemed to be an important element in sustaining the collaborative activities

3. Transfer of knowledge and practice

Our questions included a focus on the transfer of knowledge and practice and the answers all related to CPD. There are five key points.

- Peer-to-peer collaboration was an effective means and was the most prevalent vehicle for supporting the transfer of knowledge and practice.
- External expertise and facilitation were important elements in initiating and sustaining effective networks and facilitating knowledge transfer.
- Face-to-face contact was more widely reported than ICT or printed communications.
- Half of the networks made use of events. This included both more and less effective networks.
- ICT did not have a primary role in networks that did not have technology as a focus.

4. Other messages arising from the data

A range of issues arose from the evidence that went beyond our initial questions.

- More effective networks had more specific and narrower aims than less effective networks.
- Networks can be a highly effective means of achieving specific improvement goals but there is evidence that networks are less effective when the goals are not clearly specified. The network's effectiveness is difficult to evaluate when there is no clear focus too.
- Most of the more effective networks targeted socially excluded, minority or underachieving students. The involvement of parents or businesses and community organisations was a noticeable feature of effective networks.
- Parents emerged as key network partners – or targets, particularly in projects involving at-risk, minority or SEN children.
- From the evidence in the review it is difficult to see how some of these goals could have been achieved without networks and it is apparent that schools can not tackle intractable issues such as social inclusion effectively in isolation.
- All except one of the more effective (high and medium impact) networks were sustained over periods lasting from two–five years, with the majority continuing for three–four years.
- The size of the networks appeared to bear little relation to their effectiveness, suggesting that it is the quality of the collaboration between local clusters within networks upon which effectiveness may turn.

Networked Learning Communities

5. Added value – what networks add to what schools or other organisations can do on their own to improve pupil learning

Networks:

- provided access for practitioners to new ideas
- offered opportunities to initiate and embed new practices
- offered access to external expertise and support
- attracted additional sources of funding
- provided multiple avenues of professional development
- developed inclusive cultures

Although these activities could have taken place within individual schools, they were reported in the studies as arising, or taking expanded and more useful forms in the context of the network rather than as a product of in-school development.

Note

1. Although we attempted to identify and analyse evidence about leadership, this was hard to come by. The studies rarely focused directly on leadership of the networks. One pattern that does emerge is that where there is evidence about how networks are led, the trend seems to be that schools dominate the agenda with parents and communities.

2. Although we have reported evidence about knowledge transfer separately, most of the relevant material was in fact embedded within the CPD.

Networked Learning Communities

Systematic review: summary of findings

Systematic review: summary of findings

Introduction

For a number of years government policy initiatives have been supporting networking *between* schools – examples of which would include TVEI, Beacon schools, Specialist schools and Advanced Skills Teachers – and also networks *of* schools (examples of which include Education Action Zones, Leading Edge Partnerships, LIG Collaboratives and Networked Learning Communities). Often these initiatives have been set uneasily alongside other policies which appear to encourage school autonomy, competition and the centre as the principal source of knowledge, rather than other schools.

Despite all this activity, there remains ambiguity and uncertainty about the effect of networks, the knowledge-base surrounding them and their merit as an improvement strategy at scale. Proponents argue for the evidence of success from successive programmes. Others still question their efficacy. What, for example, makes a good network? How do we avoid networks becoming more social rather than rigorous? What is the cost benefit of network activity?

If these questions are not challenging enough in themselves, the dominant concern surrounds the most vexing issue of all: *What is the evidence that networks make a difference to pupil achievement?*

It is, of course, exactly the right question. However, it is also the most problematic for network advocates to answer because tracking the chain of causality and attribution from network-based activity down to the level of individual pupil outcomes is notoriously vexed.

The National College has, for four years between 2002 and 2006, supported the Networked Learning Communities (NLCs) programme. Both internally and through external research and evaluation there is a growing body of evidence from public attainment data that schools in NLCs have achieved greater gains than those not in NLCs. However, there are pressing reasons why we would wish to support that evidence with empirical findings from other studies. Partly because it is a natural direction of travel from previous policies, and partly because of the influence of the NLC and EiC programmes in particular, recent policy initiatives are serving to enshrine 'hard' school-to-school networks within the permanent landscape –Federations and Education Improvement Partnerships in particular – and are seeking to take 'soft' networks to scale – Primary Strategy Learning Networks and Every Child Matters collaborations.

For all these reasons, the National College for School Leadership was keen to add weight to its own evidence-base by commissioning CUREE, the independent research organisation with most experience in the field of systematic reviews to undertake a Systematic Research Review. This study was designed to look at the international evidence – from evaluation studies in particular – into the impact of networks of schools on pupils, practitioners and schools.

The review question

The review set out to try and find answers to the following question:
- **What is the impact on pupils of networks that include at least three schools?[1] What additional benefits are there for practitioners, organisations and the communities they serve?**

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[1] Initially the question focused on networks which included at least one school. However, as the review progressed this was amended to three schools.

It also explored the following sub-questions:
- **What are the characteristics of effective networks in relation to the impact of the networks?**
- **How do networks transfer knowledge and practice from one context to another, either within or beyond the network?**
- **What do networks add to what schools and/or other organisations can do on their own to improve pupil learning? How do they do this?**

It was extremely difficult to find data to answer the fourth sub-question in any meaningful way.
- **What do participants stop doing or do less as a result of working in networks?**

The studies

All of the 19 studies in the in-depth review involved networking between 3 or more schools (as a requirement of the review) plus, in most cases, a range of other partners. In order to be included in the in-depth review, studies had to be evaluations. It was mostly not possible to discover whether the researchers had been involved in the design or implementation of the networked projects which they were evaluating. In most cases the studies set out to evaluate the overall impact of the intervention – ie did the network achieve its aims?

The aims of the networks evaluated in the studies

The aims of the networked projects evaluated in the studies ranged from very specific pupil learning outcomes, such as Zetlin's focus on a networked programme for enhancing literacy for minorities, to a broader focus on building social capital through promoting children's social and academic achievement by means of community networks. Two networks targeted specific pedagogical change – respectively, technology skills and thinking skills. A high proportion – 6 out of the 14 networks – was directly targeted at improved outcomes for at-risk, SEN or minority children. Their focuses ranged from improved progression and employment rates to enhanced literacy development. Just five studies aimed to get a better understanding of the potential contributions made by the networks themselves.

The nature of the data

The researchers used a wide spread of data collection methods including pre- and post-tests, national test data, student and teacher surveys, field notes, teacher and student narratives, observations, questionnaires, teacher journals and interviews. A wide range of data analysis methods was also reported, including ANOVA, QSR NUD*IST, SPSS, Mann-Whitney tests, multiple-regression analysis, t-tests, normal curve equivalent scores, value added assessment, simple comparative studies, coded observation schedules etc. Studies that did not involve comparison or control groups tended to use a much wider battery of data and approaches to validity and reliability.

Key findings: impact

Overall, all the studies reported evidence of impact on teachers, although indirectly (and sometimes negatively in one case), and all except three reported evidence of impact on students, although this was modest in three cases. Eight studies reported evidence of impact on schools or other organisations and nine studies reported impact on other participants, such as parents, HEI staff, leaders and community workers.

Pupil impact

Eleven studies investigated and reported pupil impact. From the reported data, each of the studies was analysed for the weight of evidence and impact. A high score for weight of impact required both triangulated data and data that pointed to clearly identified and measured changes. A low score for weight of impact indicated modest changes or weaker evidence about impact.

This produced a set of groupings for the network studies:

Weight of impact high   Weight of impact low
Triangulated data and clearly identifiable   Perception data only
changes in   or inferred or modest changes in
behaviour/skills/knowledge/attitude   behaviour/skills/knowledge/attitude
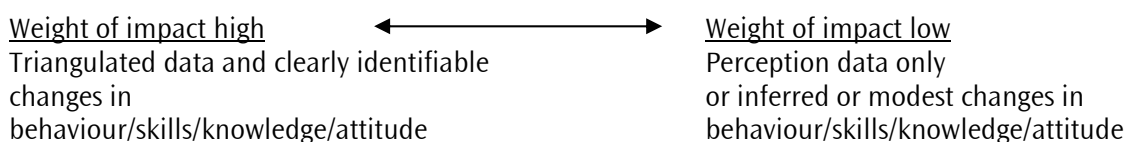
Table 1

Pupil impacts	High	Medium	Low
Attainment	Number of studies		
Public test score increases	2	1	1
Attainment in core subjects (eg literacy) or general changes in student learning outcomes	2		2
Narrowed attainment gap between minority and non-minority students and between economically disadvantaged and non-disadvantaged		1	
Achievement and engagement			
Engagement, motivation, self-confidence, independence as learners	2	1	
Students graduating from high school/attending college	2		
Pupil progression and full-time employment rates	1		
Higher order thinking skills and problem-solving skills developed; reflective and responsible learners	1	1	1
Leadership skills	3		
Social skills	2		
Skills in interviewing and report-writing	1		
Technology use	1		
Involvement in school clubs and after-school activities		1	
Attendance and attitude to school		1	1

This grid gives an indication of the areas in which the studies reported evidence of pupil impact. Some studies reported impact in more than one category. Further details are given below.

Evidence of high impact (six studies)
Using this scale we found six studies where the networks' impact on pupil attainment or achievement and engagement was high. Five of these were targeted at improvements for SEN, at risk or minority students. Attainment gains included significant improvements in pupil progression and employment rates, overall public test score increases, increased academic achievement in core subjects and gains for project students in reading, language and mathematics.

Findings relating to student engagement and achievement included:

- greater numbers of students taking college entrance exams
- development of higher order thinking skills
- students assuming roles as teachers or leaders and demonstrating increased engagement, motivation and independence as learners
- increased technology use
- growth and improvements in students' motivation for reading and writing
- improved social skills and group leadership skills, and skills in interviewing and report- writing

Evidence of medium impact (three studies)

Two studies were found to have medium attainment impact. In one, the network narrowed the gap between minority and non-minority students and between economically disadvantaged and non-disadvantaged pupils. The other found student achievements were mixed, but included a 'steady increase' in performance in maths and science, steady improvement in grade scores on non-verbal tests and an increase in students' reflection and responsibility for their work. In terms of achievement and engagement, one study found greater pupil involvement in school clubs and after-school activities, an increase in pupil self-confidence and self-esteem, an improved attitude to school and increased attendance.

Low impact or none reported (five studies)

One study found modest improvements in national test scores, another one found little evidence of improvement in student attainment and one found it was 'too early' to claim gains in student learning. Two studies were concerned with network and practitioner level impact and referred to pupil learning only indirectly. In terms of achievement and engagement, one study found modest improvements in network schools in relation to the project goals of accountable talk and rigour in a thinking curriculum (Principles of Learning). Interestingly, despite evidence of increased student attainment and of improved student perceptions of education, one study reported that student absenteeism and drop-out rates had not decreased as a result of project reform efforts. A third study found students became increasingly reflective about and responsible for their work, according to teacher perceptions.

Teacher impact

Using the same impact scale as for pupils, we found six studies with evidence of high teacher impact, and five studies were assigned a medium level.

Evidence of high teacher impact (six studies)

All six of the high teacher impact studies reported gains in teacher skills, knowledge and understanding as a result of the networked interventions. Amongst other things, teachers developed greater knowledge and understanding of:
- inclusive practice and classroom-level skills, communication and networking skills
- integrated reading, language and the arts
- the learning process

Changes in teachers' knowledge and understanding were linked to clearly identifiable behaviour and practice changes. These were extensive and broad reaching in some high-impact studies (eg less didactic and more facilitative teaching, enhanced use of technology, teachers teaching teachers) and rather more tightly focused in others (eg advances in understanding of inclusive environments leading to changes in practice, connecting content to previous lessons or developing new approaches and materials for language-arts instruction). They also included working with parents, business or community organisations and sharing training with business and industry.

The interventions also influenced teacher attitudes, and motivation, confidence and morale including increased teacher confidence and more positive attitudes. For example in one study, attitudes to parental involvement changed and fear of inclusion decreased. Collegial interaction increased and relations with other teachers developed.

Evidence of medium teacher impact (five studies)

These studies all reported evidence of changes in knowledge and understanding and in behaviour. Examples included:

- In terms of their knowledge, understanding and skills, teachers in one study became more informed about school policies, learned from colleagues' ideas and developed action research skills.
- Another reported that teachers found new ways of identifying and serving the needs of rural or geographically isolated students, developed growth in insights into students' learning styles and needs and understanding of conditions which support students learning.
- In other studies, teachers deepened their understanding of content and pedagogy, improved skills for teaching reading, were able to see themselves as learners and to recognise how their behaviour impacts on learning. They developed new skills in using research and analytical tools to measure the impact of new activities. They also developed leadership skills.

In terms of changes in *behaviour* and *practice*, one study reported that teachers learned to 'hold more than one position and valued their links within, between and outside school'. In other studies teachers changed the way they supported students to succeed, used shared ideas and expertise, used a greater variety of teaching approaches and developed strategies for working with students with diverse learning styles. Teachers also used greater interaction with parents and made greater efforts to elicit student input and develop student skills.

There was also evidence of changes in *teacher attitude, motivation and morale* in two of these studies. For example, the teachers in one study stayed at their schools longer than teachers in non-network schools, and improved self-esteem, confidence and more positive attitudes were reported in another.

Evidence of low teacher impact (three studies)

In one study, teachers were reported to have developed greater understanding of the benefits of family collaboration and networking. Survey data revealed that they developed communication skills – phone calls, community newsletters, letters to parents, postcards to family and community members – and increased collaboration with parents and families. The second study found greater impact on principals than teachers through the implementation of the Principles of Learning (POL) programme. Increased confidence of principals and motivation of staff were reported. A third study found that teachers exhibited distrust and reluctance to commit to externally imposed goals. There was little impact on classroom practice.

School Impact

Nine studies reported specific evidence about benefits at the level of the schools in the networks. The benefits included increased community liaison, the development of professional learning communities and skills in importing new ideas. They also included changes in school and classroom organisation and management structures.

Parents and community

Nine of the studies reported increased parental involvement and, in some cases, partnerships with parents. The nature of the involvement ranged from becoming involved in goal setting, assessment and support, to greater involvement by parents in school decision-making and more participation in the project's parent mentorship programme.

Network Characteristics

What did the studies tell us about networks' characteristics in relation to their impact?

We have divided the characteristics into structural features of the networks (eg size and duration) and network processes (eg CPD). A few examples are included in this summary. More details and examples of all of these can be found in Appendix 5.

Structural features of the networks included in the synthesis studies

Size, scale, spread and duration
The networks in the review studies varied hugely in their size (number of organisations involved), scale (resources and infrastructure) and geographical spread (local, district, state etc). They ranged in number of partners from 3 to over 200 and in scale from 1 school district to countrywide. The size and scale of the networks appear not to have been significant in relation to their effectiveness.

All but three of the networks had been in place for two years or more at the time of the evaluation. The duration of these networks may be linked with their effectiveness. The following high-impact studies report on networks that had been running for:

Table 2

Studies	No. years network running
Adler	5 years
Thurlow	4 years
Greenberg, Montgomery	3 years
Bielefeldt	2 years
Zetlin	1 year

Key processes
The majority of the networks (12 out of 14) involved CPD. CPD was the principal means of effecting transfer of knowledge and practice and many of the key network processes were generated by the design of the CPD.
Characteristics of the CPD and the networks were:
- collaboration
- specific focuses
- ownership

Continuing Professional Development (CPD)

Continuing professional development (CPD) was at the heart of 12 of the 14 networks in the studies reviewed. This made it very difficult to separate the sub-questions relating to characteristics such as collaboration from those about knowledge transfer mechanisms. In most cases these mechanisms operated interdependently and dynamically. CPD by nature is concerned with the development of new knowledge and skills.

While collaboration was one means by which the networks secured buy-in from a wide range of partners, it was also built into the CPD as the principal means by which networks achieved depth – through the effective transfer of knowledge and skill. Peer-to-peer collaboration, in combination with specialist expertise – most often provided through HEIs and Local Authorities – was the dominant pattern within the CPD programmes. (See Appendix 5 for examples of the CPD models)

Collaboration

Most of the networks involved partnerships between schools and other outside organisations or groups, notably parents, who were involved in nine studies. Nine school networks in the studies reviewed were in partnership with HEIs. Five networks also worked with Local Authorities and local community organisations. One worked with a national agency (NFIE) and one worked extensively with a large number of local businesses. One of the most effective networks (Greenberg) looked at long-term school-university partnerships and an attempt to create a collaborative environment with genuine community-inclusive support and ownership, using co-ordinators who worked with parents and teaching staff and facilitated linkages to health and social services. Collaboration was facilitated by frequent meetings among teaching staff and with the parent advisory boards.

Another of the most effective networks (Adler) involved a partnership operated by a regional agency. Schools worked with many different businesses as well as HEI partners and community organisations. Additional support agencies were also involved, including the National Council on Ageing, the California Employment Development Department and local chambers of commerce.

Examples of collaborative activities included:
- sharing the learning experiences as a site team (teachers teaching teachers), applying the experiences in the school and community, exploring the learning with others and repeating the shared training (the conference workshops) each year
- participation in collaborative meetings and recording and analysing critical incidents in narrative accounts of significant classroom events
- action research-based professional development involving a commitment to reciprocity and the creation of structures for sharing learning
- project staff working with district partners, an inclusion mentorship programme and a three-day training institute each summer
- peer teams providing opportunities for sharing and mutual support through training, with further mentoring support coming from university staff

The diagram below is designed to given an illustrative overview of the comparative relationship between pupil impact and the range of collaboration between network partners. Collaboration has been classified by examining the information given in the studies about how many of the network's intended partner organisations or groups were involved in collaboration (breadth) and how many people from the organisations involved (depth), such as parents or local businesses.

For example, Greenberg supplied evidence of multi-level collaboration involving teachers, parents and communities and so appears in the top right hand corner, whereas Adler characterised some of the partnerships with businesses in terms of 'co-operative liaison' and 'strong ties' which do not suggest the same degree of collaboration. Kahne appears towards the bottom left of the diagram because the study authors felt that it was too early to show evidence of pupil impact, and while it had found some evidence of collaboration between network schools and community institutions, formal collaborative partnerships had not been fostered between schools and community institutions.

Table 3

Collaboration, pupil impact and network size

- *Collaboration on multiple levels* (top)
- *Uneven collaboration* (bottom)
- *Low pupil impact* (left)
- *High pupil impact* (right)

Plotted items: Greenberg, Adler, Thurlow, Montgomery, Peters, Sanders, Gettinger, Howley-Rowe, Zetlin, Riley, Bielefeldt, Reyes, Pinon, Kahne

Network size key
- Large network (orange)
- Medium network (white)
- Small network (light blue)
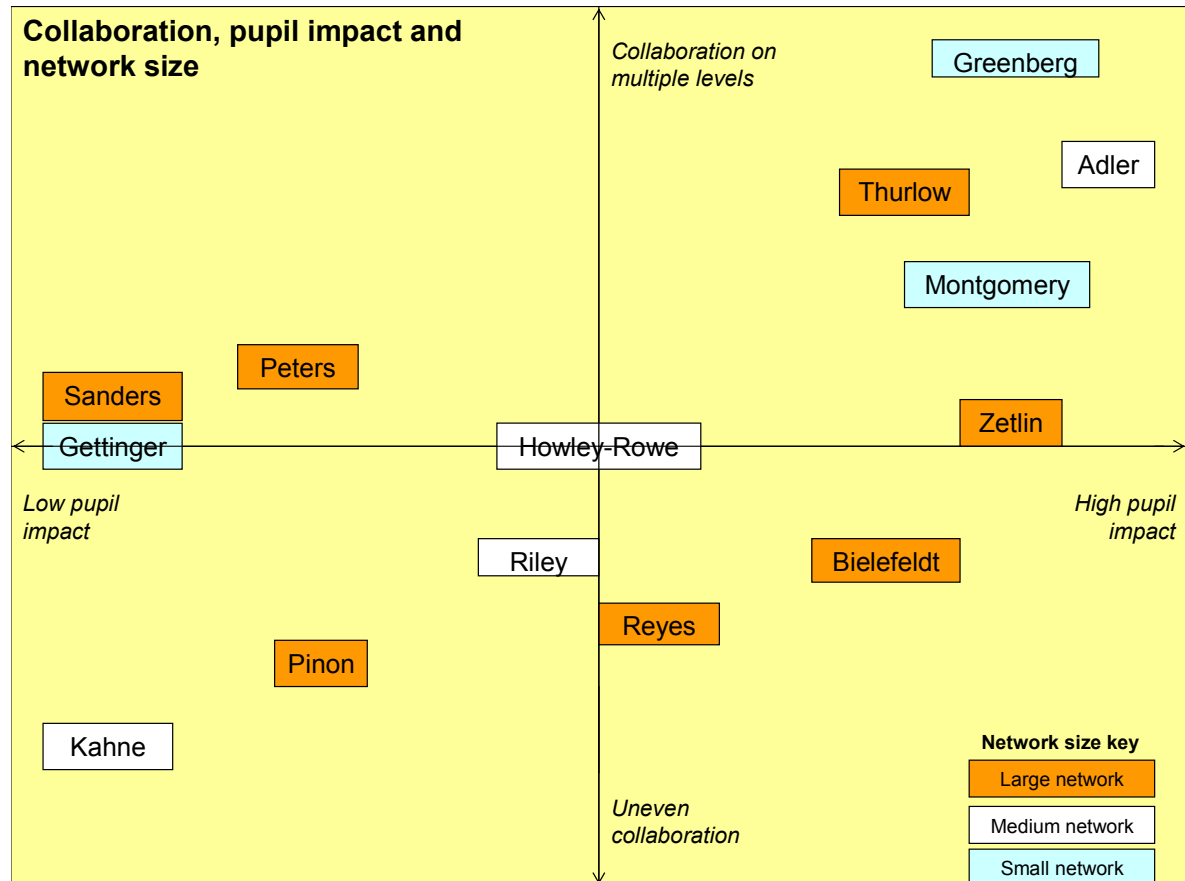
Focus

Most of the studies reviewed concentrated on networks which foster commitment and coherence by focusing on a limited number of objectives and interventions, although this does not mean that the focuses were not ambitious. It is noticeable that the most effective networks had a very specific focus that involved identification of a target group. Five of the six networks demonstrating high pupil impact focused on targeted interventions to improve outcomes for at risk, SEN or minority children (Montgomery, Zetlin, Adler, Thurlow, Greenberg), while the sixth (Bielefeldt) focused on achieving pedagogical change through developing pupils' technology skills. The evidence from this review is that the networks with broader aims were not associated with high levels of impact on pupils.

Most networks used specific CPD interventions, usually introduced and supported by external expertise, and theory to ground their activity. In some cases this encouraged the creation of shared purpose and ownership around the network focus or focuses. (See section on aims, above)

Ownership

Ownership of the network's goals and processes seemed to be an important element in sustaining the collaborative activities. The networks used a range of processes to encourage shared ownership in both practitioners and students. Bielefeldt, for example, identified teachers teaching teachers as a powerful form of widening ownership, but also reported lack of buy-in among teachers not directly involved in network teams.

One study (Kahne) warned that difficulties occurred when network and school goals were not aligned. Principals were wary of committing themselves to criteria which they felt did not reflect their own school's contexts and this factor caused some tension in establishing trust

between the principals and local officials. Another study (Zetlin) highlighted the importance of a personalised approach to teacher learning in order to build capacity and ownership.

Challenges
These included contextual constraints such as the limited time frame, the complexity of the situations in which participants worked and external accountability mechanisms.

Transfer

How do networks transfer knowledge and practice from one context to another, either within or beyond the network?

An important finding from this review was the prevalence of various types of interpersonal contact (as opposed to print or electronic communications) as the principal means of transferring knowledge. Many of these were integral aspects of the CPD interventions. They included the peer support noted above plus:
- expert input
- events

Expert input
Nearly all of the studies cited evidence of strategic advice, training, coaching, facilitation or mentoring being provided by a combination of external and internal expertise. Mentoring was a feature of four studies (Adler, Bielefeldt, Pinon, Thurlow). Nine studies reported on formal partnerships with HEIs (Adler, Gettinger, Greenberg, Peters, Pinon, Reyes, Riley, Thurlow, Zetlin).

Examples of experts included:
- partners from business and career specialists (Adler) who worked with teachers on the vocational elements of the programme
- teacher mentors – Bielefeldt reported that a teacher mentor was attached to each of the network's 22 sites
- HEI research partners – Gettinger reported on how PARDI (Preschool Action Research and Development Initiative) used a collaborative partnership model with researchers working with teachers on two components
- HEI trainers – Zetlin reported that schools received one year of ongoing university support in an initiative which provided approximately ten hours of professional development to develop awareness of the theory and pedagogy for implementation of a comprehensive language programme
- parents – Greenberg cited the use of Parent Advisory Boards
- district teams – Montgomery reported the creation of an Educational Assistance Team, consisting of a director, three itinerant resource specialists and two education assistants to implement programme instructional activities in the network's schools

Events
Seven studies explicitly referred to the use of conferences, symposia and other formal meetings and training events as vehicles for widening the number of colleagues involved in the development of new knowledge and practice. In many cases these, too, were built in to the design of the CPD interventions.
These included:
- 19 days of training and workshops over the course of one programme's two- year development cycle
- an annual leadership conference

- extensive use of conferences, rallies, scholars' colloquia and summer symposia
- summer institutes at which teacher workshops were held, plus two-week summer schools for teachers and administrators from network schools

ICT

None of the networks highlighted the use of ICT as an effective networking process although the use of email and websites to facilitate knowledge transfer is referred to in passing in a small number of the studies. This doesn't necessarily mean that it was not used. All we can be certain of is that it was not particularly remarked. Bielefeldt was the only study explicitly to focus on ICT – increased technology use was one of the programme's objectives. However, use of both personal email and discussion areas declined during the course of the programme. The emphasis on personal communication plus the relative lack of emphasis on ICT suggests that ICT may not be a primary facilitator of knowledge transfer in networks that do not have technology as a focus. Face-to-face exchange was preferred in the study which did have ICT as a focus.

Added Value

What do networks add to what schools and/or other organisations can do on their own to improve pupil learning? How do they do this?

The studies are rarely explicit about what the networks they examine have contributed to what schools and others do to improve pupil learning. From the data in the review, studies identified five widely shared and often overlapping benefits of networking. They are:
- facilitating collaboration (see above)
- accessing external expertise (see above)
- securing funding
- facilitating professional development (see above)
- developing inclusive cultures

Implications

Users of this review will draw implications from the findings for their own contexts and purposes. Broad implications for practice, research and policy were identified and discussed at a seminar hosted by the NLG as review sponsors. The seminar was attended by academics and policy-makers from a number of different national agencies. The implications are listed below.

Implications for practitioners
The review found that all the studies in the synthesis reported evidence of impact on teachers.
- *Schools should consider how their membership of networks could support and enhance teacher CPD opportunities through cross-organisational collaboration.*

Implications for research
The findings from this systematic review have led to a number of suggestions for further research:
- *This review has focused specifically on the nature of the impact of networks. It has not therefore been possible to engage deeply with process since studies of impact tend to collect less data about process and vice versa. A second review could develop and expand on the findings by investigating the practical aspects of networking processes in more detail.*

- *Because this was intended to be a rapid review, the 119 studies that focused on ITT were excluded during the filtering stages because of time. These excluded studies have all been logged on the database and researchers, national agencies or CPD/ITE providers should find them a rich resource for further exploration of networking in the context of initial teacher education.*
- *Inclusion has emerged as a key focus for many of the most effective networks in this review. More research needs to be done into the role of networks in promoting inclusion.*
- *The evidence from the review showed improved engagement with parents. Again, more research is needed into the role of networks in promoting parental engagement.*

Implications for policy

There is evidence in this review that networks can have a positive impact on teachers, pupils, schools and other organisations.

Specifically:
The findings from the review show that networking can be an effective way of supporting vulnerable pupils. Policy-makers should consider these findings in relation to the ECM agenda:

- The most effective networks have a clear focus, usually one that can be related to the needs of a specific sector of the community. The evidence also suggests that failure to identify a focus that makes sense to everyone involved is linked to weaker outcomes. Those involved in establishing networks need to consider the process for clarifying and agreeing a focus and the possibilities of clarifying a focus by relating it to specific groups.
- The evidence shows that continued opportunities for sustained collaboration encouraged improvements in teaching, learning and achievement. Policy-makers need to consider how to exploit the benefits of networking.
- The opportunities that are being created and promoted need to be sustained over time.
- The evidence shows that collaborative CPD and learning are the principal vehicles for knowledge transfer, for building network ownership and securing depth of involvement. Policy-makers supporting and promoting networks should pay particular attention to using networks to expand CPD possibilities and expectations and to ensuring that CPD is also harnessed strategically to build and sustain networks.

Technical report:
the impact of networks on pupils, practitioners and the communities they serve

Technical report: impact of networks on pupils practitioners and the communities they serve

1. Background

Aims and rationale for current review

The Networked Learning Group (NLG) has significant experience of supporting networked learning communities. This rapid systematic review of the evidence relating to effective networking provides an opportunity for NLG to structure and enhance its knowledge of how experience relates to existing theory and evidence in this area.

Definition and conceptual issues

The group has adopted the following definitions of networks:

'Groups or systems of interconnected people or organisations (including schools) whose aims and purposes include the improvement of learning and whose structure and organisation include explicit strategies designed to achieve these aims.'

(See Appendix 3 for a full list of the definitions used in the review)

Policy and practice background

For a number of years government policy initiatives have been supporting networking *between* schools (examples of which would include TVEI, Beacon schools, Specialist schools and Advanced Skills Teachers) and also networks *of* schools (examples include Education Action Zones, Leading Edge Partnerships, LIG Collaboratives and Networked Learning Communities). Often these initiatives have been set uneasily alongside other policies which appear to encourage school autonomy, competition and the centre as the principal source of knowledge, rather than other schools.

Despite all this activity, there remains ambiguity and uncertainty about the effect of networks, the knowledge-base surrounding them and their merit as an improvement strategy at scale. Proponents argue for the evidence of success from successive programmes. Others still question their efficacy. What, for example, makes a good network? How do we avoid networks becoming more social rather than rigorous? What is the cost benefit of network activity?

If these questions are not challenging enough in themselves, the dominant concern surrounds the most vexing issue of all: *What is the evidence that networks make a difference to pupil achievement?*

It is, of course, exactly the right question. However, it is also the most problematic for network advocates to answer because tracking the chain of causality and attribution from network-based activity down to the level of individual pupil outcomes is notoriously vexed.

The National College has, for four years between 2002 and 2006, supported the Networked Learning Communities (NLCs) programme. Both internally and through external research and evaluation there is a growing body of evidence from public attainment data that schools in NLCs have achieved greater gains than those not in NLCs. However, there are pressing reasons why we would wish to support that evidence with empirical findings from other studies. Partly because it is a natural direction of travel from previous policies, and partly because of the influence of the NLC and EiC programmes in particular, recent policy initiatives are serving to

enshrine 'hard' school-to-school networks within the permanent landscape (Federations and Education Improvement Partnerships in particular) and are seeking to take 'soft' networks to scale (Primary Strategy Learning Networks and Every Child Matters collaborations).

For all these reasons, the National College for School Leadership was keen to add weight to its own evidence-base by commissioning CUREE (the independent research organisation with most experience in the field of systematic reviews) to undertake a Systematic Research Review. This study was designed to look at the international evidence – from evaluation studies in particular – into the impact of networks of schools on pupils, practitioners and schools.

Research background

There has been much debate recently regarding the use of qualitative research in systematic reviews. In relation to the health field, Thomas and Harden argue that: '[a] recent editorial accepted that qualitative research should be included in systematic reviews…the conclusion of reviews may be substantially altered by the inclusion of qualitative data, which is more likely to reflect the experiences of the target groups for intervention' (Thomas & Harden, 2004, 1010, 1012). This is especially true of education, where the nature of the intervention, the context and processes require exemplification if they are to carry meaning for practitioner and policy audiences.

Prior to this review there existed a wide range of data sources on networks, although they are often limited in terms of the extent and range of the evidence-base on student impact. Current and recent external evaluations of network-based innovations in education in the UK offered opportunities for comparing different initiatives in terms of key successes and failures. However, they often failed to address the role the process of networking itself plays in these successes and failures. On the other hand, accounts from those working within networks tended to be discursive, with a focus on process rather than outcomes. Practitioners were thus reluctant to make strong claims of any direct link between a network and an improvement in achievement or attainment. International accounts suffer from similar limitations, but they do allow comparisons to be made across a broad range of contexts – education systems, cultures and nations. Consequently, they help identify endemic or consistent problems and issues within networks.

In the context of the knowledge–base, early in 2005 NLG identified a need to carry out a systematic review based on research and evaluations which have used trustworthy impact measures and have also made critical and realistic attempts to infer the significance of key networking processes and structures. Owing to the varying nature of networks, which often have 'soft' boundaries and operate at multiple levels, measuring the impact of any single network activity was acknowledged as highly problematic. But it was proposed that a systematic review would have the potential to unearth consistent findings across multiple forms of networks in a variety of contexts, while also highlighting specific or unique characteristics which have played a key role. Two-thirds of the way through the development of the NLG programme the systematic review presented an opportunity to review the gaps within the existing knowledge-base.

Audience - Networked Learning Communities (NLCs)

The audience for this review includes all those involved in establishing and supporting networked learning in multidisciplinary environments, such as those in the PNS networks or in Local Authorities implementing new partnership arrangements for children's services as a result of the Every Child Matters agenda.

Review Questions

The over-arching review question is:

- **What is the impact on pupils of networks that include at least three schools? What additional benefits are there for practitioners, organisations and the communities they serve?**

The related sub-questions which the review addressed were:

- **What are the characteristics of effective and less effective networks?**
- **How do networks transfer knowledge and practice from one context to another, either within or beyond the network?**
- **What do networks add to what schools and/or other organisations can do on their own to improve pupil learning? How do they do this?**
- **What do participants stop doing or do less as a result of working in networks?**

2.   Methods used in the review

User involvement

This review was conducted collaboratively between CUREE (Centre for the Use of Research and Evidence in Education) and NLG (Networked Learning Group). Colleagues from both organisations were involved in drawing up the question and sub-questions, and the criteria for inclusion in the review. The NLG's expertise in school networks and CUREE's experience of carrying out systematic and other literature reviews were combined in carrying out the review.

Identifying and describing studies

The following section shows how relevant studies were defined and how they were sourced and screened for the review.

Defining relevant studies: inclusion and exclusion criteria

In order to answer the review question and sub-questions a set of inclusion criteria was drawn up so that only studies judged to have the potential to address the review question would be included in the review. Because this was a rapid review, limits were also set on the publication dates and the language of the studies. The inclusion criteria were split into stages so that all studies passing the first stage were keyworded and included in the map, which gave a broad overview of studies on networked contexts. Those studies which met the second stage and third stage criteria were analysed in depth.

The first stage criteria were:

1.   *clearly stated aims and objectives*
2.   *studies published in the last ten years: ie from 1995 –2005*
3.   *only studies produced in English (with the possibility of restricting studies to include only UK, Australia, North America, New Zealand and Europe if the number of studies found is significantly greater than feasible within the remit of this rapid review)*
4.   *studies which build on the existing literature*
5.   *studies of networks which include at least one school*
6.   *studies of network initiatives that aim to enhance pupil learning or aspects of wellbeing known to affect learning*

In addition to these first-stage criteria, we applied a further criterion that excluded studies which focused on trainee or pre-service teachers. These studies (N = 119) are labelled as focusing on teacher training (TT) in the rapid review database (see Appendix 5).

The second stage criteria were:

7.   *clear description of policy and practice context*
8.   *clear description of methods, including approaches to data collection and data analysis*
9.   *evidence of attempts made to establish a trustworthy approach to data analysis*
10.   *studies which are evaluations that have set out to explore the effects or answer a question – either naturally occurring or researcher-manipulated – or make use of pre- and post- or experimental comparisons*
11.   *studies covering networking between partners which include at least one public sector organisation*

> 12. *studies providing evidence of the impact of the network(s) on pupils or practitioners, organisations and communities*

A large number of studies passed stage 2 (N=40). To keep the review manageable we narrowed the the inclusion criteria by adding a third-stage criterion:

> 13. *studies that include at least three schools, and in which the setting of the study is in schools*

This cut the number of studies in the review down from 40 to 19, which was more manageable in the time available for data extraction and synthesis of the studies. The addition of the extra criterion also meant that there was a closer focus on schools. It may be helpful to investigate the patterns in the studies that were excluded at this stage at a later date and compare them to see if they are very different to those included in the review.

Identification of potential studies: search strategy

As this was intended to be a rapid review, we set limits to the search for studies for the review to save time, but we nonetheless tried to retain the systematic nature of the search. The complex nature of networks and the fact that they are used as a means to a wide range of ends meant that the searching stage was more wide ranging and complex than intended. Studies were identified from the following resources:

Bibliographic databases: AEI, BEI, ERIC, ASSIA

Citation searches of key authors and papers: an interim literature review by NLG, Hadfield et al, 2005, *The Impact of networking and collaboration: the existing knowledge base,* was scanned for studies which had already been uncovered. Also, the NfER literature review, Kerr et al, 2003, *Review of Networked Learning Communities,* was used to source further information on networks.

Key websites:
- Association for Science Education http://www.ase.org.uk/.
- British Educational and Communications Technology Agency (BECTA) http://www.becta.org.uk/.
- British Educational Research Association http://www.bera.ac.uk/.
- Campbell Collaboration http://www.campbellcollaboration.org/.
- CERUK http://www.ceruk.ac.uk/ceruk.
- Department for Education and Skills http://www.dfes.gov.uk/index.htm.
- European Commission Education and Culture Directorate General http://europa.eu.int/comm/dgs/education_culture/index_en.htm.
- Institute of Education of the University of London http://libserv.ioe.ac.uk/uhtbin/webcat.
- IQEA (Improving the Quality of Education for All) http://www.iqea.com/.
- National Foundation for Educational Research http://www.nfer.ac.uk/.
- Regard http://www.regard.ac.uk.
- Renewal.net (NRU) http://www.renewal.net/.
- Scottish Council for Research in Education http://www.scre.ac.uk/.
- Standards Site http://www.standards.dfes.gov.uk/.

Personal contacts: The NLG already had knowledge and experience of networked learning and highlighted some key studies that hadn't been retrieved through other searches.

Searches of these sources were limited to retrieving studies that had been published between 1995 and 2005. Only studies in English were searched due to the time and cost constraints for translation. Owing to the nature of the review, we did not carry out any handsearching of journals. We did not feel this would have a great impact on the review, as studies from the mid-1990s onwards are largely covered by electronic databases.

A database system (Reference Manager®) was set up to keep track of studies found whilst searching and to weed out duplicates retrieved from different databases. Titles and abstracts were imported directly from bibliographic databases, and other references were added manually.

Search strings

Subject headings were used for searching according to which database was being used. After pilot testing the search terms, it was found that a relatively small set of key terms could be used in the attempt to be as inclusive yet as focused as possible in retrieving studies relevant to the review. The ERIC database enabled us to limit the studies retrieved by the study format, eg books, journal articles, conference papers, thus we could exclude inappropriate resources such as ERIC digests and data sets early on. The other databases used (AEI, BEI and ASSIA) did not have the facility to limit by study type, but the searches could be limited to English-language-only studies and the years of publication. It is difficult to say which database was most successful in retrieving the results as ERIC was the first database used, and subsequent duplicates from the other databases were excluded. However, productive search strings included: "school AND partnership", "school AND learning communit$" (the $ sign was used as a wildcard to allow different permutations of the word *community* to retrieve results) and "school AND network".

We found that the word *network* was problematic in that it often included computer networks, which often were not related to the type of network we were searching for. However, it was difficult to exclude technology as some school networks did use ICT as a part of their network intervention.

The terms used are listed below:

Network	School	School improvement	Teacher
Partnership	Community		Student (exploded to include pupil)
Collaboration			

It should be noted that permutations of these terms were also included through the use of wildcards. For example, "teach$" was used to retrieve results including teach, teacher, teachers, and teaching.

Screening studies: applying inclusion and exclusion criteria

Inclusion and exclusion criteria were applied successively to (i) titles and abstracts and (ii) full reports. Full reports were obtained for those studies that appeared to meet the criteria or where we had insufficient information to be sure. The inclusion and exclusion criteria were re-applied to the full reports. Those that still met the criteria were included and those not meeting the inclusion criteria were excluded.

Characterising included studies

All studies judged to have met the first stage inclusion criteria were keyworded using a schema designed especially for the review (see Appendix 2). Keywords included describing the network focus, the make-up of networks including the numbers of organisations and individuals involved, and details about the

types of intervention described in the study. All keywords were then added to a relational Access database designed especially for the review so that keywords could be counted and cross-tabulated.

Studies included in the review: quality assurance process

Initially 20 studies were assessed for meeting inclusion criteria "double blind" for quality assurance and consistency. One in ten studies was screened by CUREE to ensure that criteria and keywords had been applied consistently.

In-depth review

Studies included in the in-depth review were those judged systematically to have met the second and third stage inclusion criteria.

Reviewers made judgements about the weights of evidence of the individual studies in relation to:
- the soundness of studies (internal methodological coherence), based upon the study only
- the appropriateness of the research design and analysis used for answering the review question
- the relevance of the study topic focus (from the sample, measures, scenario or other indicator of the focus of the study) to the review question
- an overall weight, taking into account all the above points

Detailed description of studies in the in-depth review: data extraction

The data extraction questions were tailored specifically to answer the question and sub-questions of the review. Data extractions were completed by one reviewer from CUREE paired with one reviewer from NLG. Each pair of reviewers then reconciled their versions, and the final version of the data extraction was inputted into the review database for further interrogation.

Synthesis of evidence

We began by running comparisons and counts of answers to the data extractions in order to identify the patterns emerging from the studies and in response to our sub-questions. We used questions emerging from this analysis to generate further data tables and to extend our analysis of synthesised studies. We recorded both the broad patterns of findings and potential explanations for them that we found in the data.

In-depth review: quality assurance process
For all data extractions, pairs of reviewers conducted individual data extractions and then reconciled their versions. Any disagreements were resolved with the help of a third party.

3. Characteristics of the studies included (systematic map)

This section of the report presents the results of the search, the application of the inclusion criteria and a description of the studies included at stage 1 of the review – those studies that passed the first set of criteria.

Table 3.1 Studies identified at each stage of the review

Studies	N
Total number of titles, abstracts and reports identified	4,670
Number of abstracts meeting inclusion criteria	426
Number of reports retrieved by the cut-off date	383
Number of full reports meeting stage 1 criteria	133
Number of full reports meeting stage 2 criteria	40
Number of full reports meeting stage 3 criteria	19
Number of full reports meeting the inclusion criteria for the in-depth review	14

Figure 3.1 Studies included in and excluded from the review

Abstracts and titles
sourced and screened
N = 4,670

✕ Abstracts excluded
N = 4,244

✓ **Papers included**
N = 426

✕ Papers not retrieved
before deadline
N=43

**Full document
screened stage 1**
N = 383

✕ Papers excluded on
stage 1 criteria*
N = 250

**Map:
Studies included
stage 1**
N = 133

**Full document
screened stage 2**
N=133

✕ Papers excluded on
stage 2 criteria
N = 93

✓ **Studies included stage 2**
N = 40

Criterion 7**
N = 8

Criterion 8**
N = 57

Criterion 9**
N = 67

Criterion 10**
N = 40

Criterion 11**
N = 6

Criterion 12**
N = 32

**Full document
screened stage 3**
N = 40

✕ Papers excluded on
stage 3 criteria
N = 21

Synthesis
studies included
N = 19

In-depth review
studies included
N = 14

✕ Studies excluded
N = 5
(Low WoE)

* Only the first criterion for rejection was noted at stage 1, therefore figures will not give a reliable overall picture of which criteria studie
not meet.
** All criteria for rejection were recorded at stage 2

A map of the keyworded studies

This section of the review presents the keyworded characteristics of the 133 studies passing the stage 1 inclusion criteria. The characteristics of the schools, pupils, organisations, communities and networks are presented in both tabulated and graphical format. These figures include the studies included at stages 2 and 3 of the review. The keywords for those studies included at stage 3 are extrapolated for comparison purposes in the next chapter.

Network aims

Given the topic of the review, it is hardly surprising that 83 (62%) of the studies that met stage 1 criteria focused directly on networking and collaboration. The goals of the networks were fairly evenly spread across the curriculum, professional development and school improvement, among others. Goals identified as 'other' ranged from health education and inclusion to peer coaching and bilingualism.

Table 3.2: Network aims

Topic focus	N
Networking/collaboration	83
Curriculum	46
Professional development	38
Other (please specify)	35
Skills	34
School reform/improvement	33
Raising attainment	32
Teaching	30
Community improvement	27
Policy initiative	13

Note: Given the scale of investment demanded by networks, many networks sought to secure value for money by pursuing more than one goal.

The specific curriculum areas for the 46 studies which were classified as relating to curriculum are included in the table below. The core curriculum themes were dominant, with literacy (first language) featuring in 18 studies, and maths, science and ICT also featuring in a high proportion of studies.

Table 3.3: Curriculum focus

Curriculum/subjects	N
Literacy - first language	18
Maths	13
Science	13
ICT	11
Other - please specify	11
Cross-curricular	5
Arts	3
PSE	3
Humanities	2
Literacy - further languages	2
Citizenship	1
Business studies	1

Curriculum/subjects	N
Key skills	1

Note: Some studies focused on more than one curriculum area targeted by the networks.

Goals relating to skills

The specific skills and non-curriculum themes which were the subject of 33 studies were classified as investigating these areas. They are presented in Table 3.4 below. The most popular areas were equal opportunities (N=16), behaviour/motivation (N=11), and vocational learning (N=11), closely followed by employability, environment, and leadership and management.

Table 3.4: Skills

Skill	N
Equal opportunities	16
Other - skills	13
Behaviour / motivation	11
Vocational learning	11
Employablility	9
Environment	7
Leadership and management	7
Speaking and listening	6
Attendance	4
Problem solving	4
Thinking skills	3
Active citizenship	1
Combating racism	1
Creativity	1
Emotional intelligence	1
Multiple intelligences	1
Transfer and transition	1

Note: Some studies focused on more than one skill.

Other skills which were noted by reviewers included health (N=2) and social or cultural skills (N=3). Further skills mentioned included CPD, decision-making, inclusion, language skills, practical science skills, retention to FE and special needs.

Size of the networks

Number of organisations

Where the studies stated how many organisations were involved, the networks tended to include relatively small numbers of organisations. However, six of the studies focused on networks involving over 100 organisations.

Chart 3.1: Number of organisations in the networks
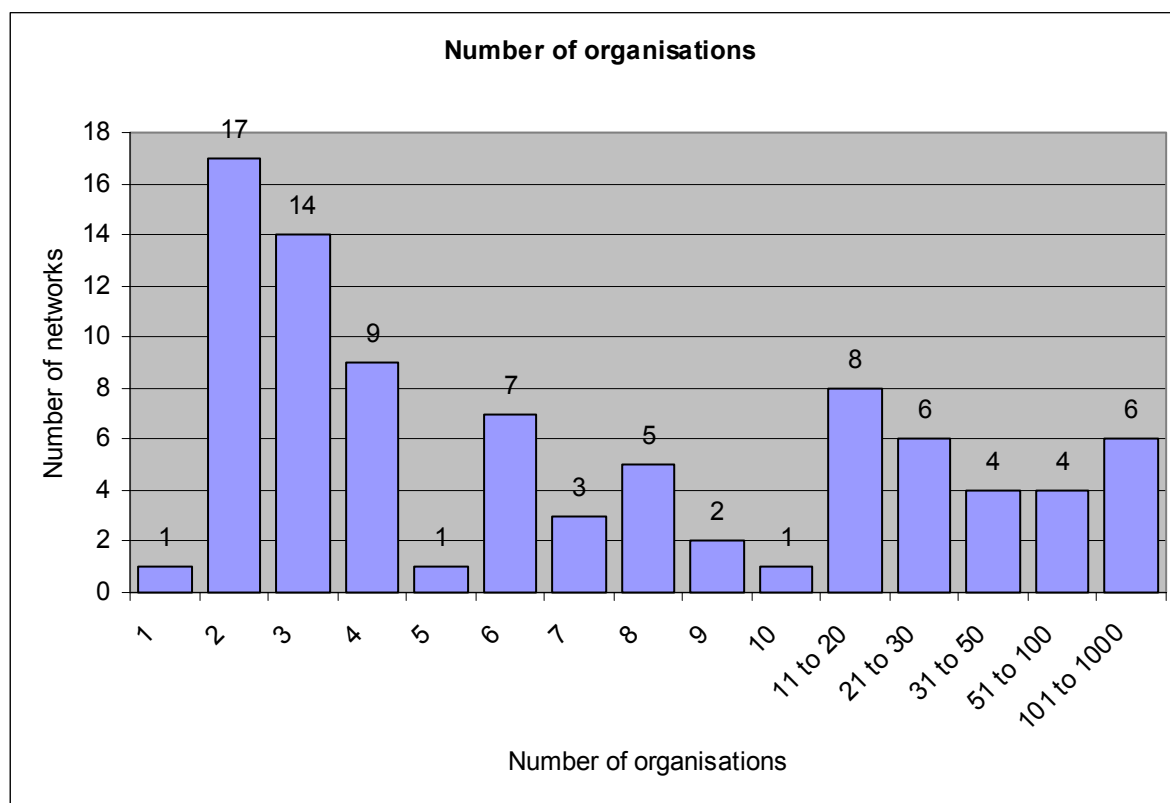
Note: Number of networks where the number of organisations was not stated or unclear = 45

Geographical spread

In terms of geographical spread, a high proportion of the studies (55) involved networks at county or Local Authority or school district level. Less frequently, similar numbers of studies concentrated on networks operating at national (24) or neighbourhood (24) levels, with 20 studies focusing on rural areas and 19 focusing on networks in urban contexts. Only three of the studies featured international networks.

Table 3.6: Geographical spread of the network

Geographical spread	N
Local Authority/county level	55
Country level	24
Neighbourhood level	24
Rural	20
Urban	19
Town/city level	17
Not stated/unclear	14
International level	3

Note: Some studies covered more than one geographical category.

Population focus

Unsurprisingly 93 studies (70 per cent) featured teachers, followed by learners (pupils) as the focus of networks in 73 studies (55 per cent). Parents were also part of the target population in a significant number of studies (43). Headteachers were included as targets by 29 studies. 'Other' included administrators, SEN co-ordinators and colleagues, Local Authorities and university departments.

Table 3.7: Population focus of the networks

Population focus	N
Teachers	93
Learners (pupils)	73
Parents	43
Other	33
Headteachers	29
Community-based professionals	18
Local government	9
Health and social services	9
Not stated/unclear	8
School leaders excluding headteachers	7
TA (teaching assistants)	6
Careers	4
Other non-education professions (eg artists, musicians, sports professionals etc)	4
Governors	3
Managers	1
Police	1
Volunteers	1

Note: Many studies had more than one population focus.

Setting

There was a fairly even split between studies: primary schools (45), secondary schools (34) and cross-phase (35). The predominance of USA-based studies accounted for the relatively high number of middle school settings (25). Seventeen studies featured HEIs as settings – more than feature nursery schools (N=9), for example.

Table 3.8: Setting of the networks

Setting	N
Primary school	45
Schools (general)	35
Secondary school	34
Middle school	25
HEI	17
Other	16
Nursery school	9
Workplace	7
Local Authorities	7
Home	5
Voluntary agency/charity	5
Not stated/unclear	4
Post-compulsory education institution (eg 6th form college/FE)	2
Community centre	2
Special needs school	2
Other Local Authority	2

Setting	N
Independent school	1

Note: Some studies had multiple settings.

Network partners

Sixty-six of the studies featured networks of schools. A similar number of networks (67) involved schools working with HEIs. A much smaller number of networks (28) focused on schools working with community or voluntary organisations. Partners specified under 'other' included commercial organisations, families, museums and libraries.

Table 3.9: Network partners

Type of network	N
HEI	67
Schools	66
Other	40
Community/voluntary organisation(s)	28
Local government	18
Not stated/unclear	5

Participation in intervention

Relatively few of the studies indicated whether there were incentives for participants in the networks. The overwhelming proportion of studies explored networks in which participation was voluntary (77 per cent).

Table 3.10: Participation in the intervention

Participation	N
Not stated/unclear	85
Voluntary	37
Incentivised	10
Compulsory	1

Enrichment or extra-curricular activities

Thirty-eight of the studies referred to the network providing enrichment or extra-curricular activities. Enrichment activities mentioned ranged from after-school computer sessions and homework clubs to theatre arts and community-based activities. Ninety-five (71 per cent) of the networks either did not provide or did not refer to enrichment activities.

Table 3.11: Enrichment or extra-curricular activities in the network

Enrichment	N
No	51
Not stated/unclear	44
Yes	38

Type of study

Since the object of the review was to explore the impact of networks, most of the studies were attempts to describe and evaluate the effects of network-related interventions and activities. Of the 133 studies in the systematic map 53 were naturally occurring evaluations, with a further 20 relating to research-manipulated evaluations of interventions. Forty-two studies were, by contrast, descriptions of activities or interventions that did not, in the end, include a clear evaluative framework.

Table 3.12: Study type

Type of study	N
Evaluation – naturally occurring	53
Description	42
Evaluation – research manipulated	20
Exploration	6
Not stated/unclear	6
Review	6
Controlled trial (non-randomised)	4
Pre- and post-test	4
Randomised controlled trial (RCT)	2

Type of intervention

The studies covered a range of interventions which are classified in the table below. Many of the studies combined more than one of the elements described. Fifty-nine of the studies featured joint CPD programmes or training, and a similar number of studies (56) featured cross-organisation working. Significant numbers of studies featured research and enquiry, seminars, conferences and events, out of school learning and specialist coaching or support.

Table 3.13: Type of intervention

Intervention	N
CPD programmes/training – joint	59
Cross-organisation working	56
Research / enquiry	38
Seminars / conferences / events	37
Out of school learning	29
Specialist coaching / support	28
Other - please specify	27
Strategy sharing	27
ICT	26
Intervisitations / visits	24
Peer coaching / support	23
Mentoring	23
Adult / pupil exchange	22
Formalised communications	22
Creation of new materials – joint	22
Resources sharing	20
Observation	17
Pupil voice / participation	14
Sub-groups	12
Counselling	7
Work shadowing	6
Policy document sharing	3
Timetabling – joint	3

Note: Many studies referred to more than one type of intervention.

Outcomes

Outcomes for adults were dominant, with learning, attitudes and beliefs, knowledge, skills and understanding being noted in the highest proportion of studies. Pupil learning featured in 44 studies. The most significant network outcome was 'network understanding' which was specified in 39 studies, a similar frequency to that of a number of pupil outcomes – motivation, skills, achievement, and attitudes and beliefs. Unsurprisingly, outcomes beyond the network were the least likely to occur, but it is also interesting to note that leader-level outcomes were also cited relatively infrequently.

Table 3.14: Network outcomes

Outcome	Total	Audience					
		Adult	Beyond the network	Leaders	Network	Organisation	Pupils
Learning	186	59	2	20	29	32	44
Understanding	168	53	3	15	39	34	24
Knowledge	159	53	2	15	33	31	25
Attitudes / beliefs	157	61		11	25	24	36
Skills	132	51	2	8	14	20	37
Motivation	103	42	2	7	6	9	37
Achievement	94	10		3	23	20	38
Morale / self-esteem	60	26		5	6	8	15

Note: All studies had multiple outcomes.

Programme name

There is little overlap among the programmes featuring in the studies. Five related to the Professional Development School, four to Quest (a large-scale US programme for continuous school improvement, with staff trainers from the Appalachia Educational Laboratory), three to the National Network of Partnership Schools, and two to LAMP (Lansing Area Manufacturing Partnership – a school to career partnership based in Michigan, USA) and to the Networked Learning Communities programme (set up by the National College of School Leadership). There was no overlap among the remaining studies. Of the 88 other named programmes, there were no two with the same name.

Table 3.15: Programme name

Programme	N
PDS Professional Development School	5
Quest	4
National Network of Partnership Schools	3
LAMP	2
NLC	2

Pupils

Table 3.16 below indicates that there was a fairly even split in the studies between networks involving primary (N=74) and secondary age pupils (N=71), with a significant proportion of cross-phase settings. A much smaller proportion of studies also covered pre-school and post-compulsory education (Total N=46). Given that Table 3.17 shows that it is unlikely that any of the networks were networks of single sex schools, the sex of the pupils was not a significant issue in networks.

Table 3.16: Age of network pupils

Age of pupils	N
5–10	74

Age of pupils	N
11–16	71
Not stated/unclear	32
17–18	25
0–4	21

Note: Some of the studies covered multiple pupil age ranges.

Table 3.17: Sex of network pupils

Sex of pupils	N
Not stated/unclear	90
Mixed sex	43

Countries in which the studies were conducted

USA was the dominant setting for the studies – 106 (80 per cent) of the total. The UK was a long way behind with 9 studies (7 per cent), followed by Australia and Finland. Obviously, the requirement for studies to be written in English has had a major impact here.

Table 3.18: Countries in which the studies were conducted

Country	N
United States	106
United Kingdom	9
Australia	7
Finland	3
Canada	2
Scotland	2
Sweden	2
Israel	2

Databases used

All of the reports judged to have met the stage 1 inclusion criteria were found by searching electronic databases. ERIC was the most productive database, identifying 80 per cent of the studies that passed stage 1 and 84 per cent of the 19 studies reviewed in depth.

Table 3.19: Databases used to retrieve the studies

Database	N
ERIC	107
ASSIA	14
BEI	6
Citation	3
AEI	3

Conclusion

This chapter of the review has presented the information collected from the keywording of the 133 studies passing the stage 1 inclusion criteria. A number of key trends in the data have emerged from the mapping, including:

- The majority of the studies were from the USA.
- Networking or collaboration between school–school and school–HEI was the primary pattern of partnership of the majority of the studies.
- The population of the studies was predominantly teachers and learners (pupils).
- The majority of the studies were set in schools with primary schools being slightly more predominant.
- CPD programmes or training and cross-organisation working were the most common forms of intervention.
- The outcomes reported predominantly affected the adults involved in the interventions.

These findings are further analysed and investigated in the following chapters of this review.

4.   Findings for the studies analysed in depth

Selecting studies for the in-depth review

Forty studies were originally judged to have met the stage 1 and stage 2 inclusion criteria. This number of studies was much larger than anticipated and too large to be data extracted under the remit of the rapid review. It was agreed that a stage 3 filter be added to narrow the focus of inclusion to include only those studies of networks which included at least three schools. This brought the final number of studies for in-depth review to 19. Chapter 6 provides the full bibliographic details of these studies.

In this chapter of the review these 19 studies, which were reviewed in-depth are compared with the 133 studies included in the systematic map (see Chapter 3).

Comparing the studies selected for the in-depth review with the total studies in the systematic map

The following tables report on the features of the 19 studies passing the stage 3 inclusion criteria. This is compared to the features of the total studies included in the systematic map (133 studies passing the stage 1 inclusion criteria). The 19 studies were found to be representative of the studies in the systematic map in most respects. Where there were differences they are identified below.

Network aims

The network aims of the 19 studies were consistent with those of the studies in the systematic map with networking or collaboration being the most common focus, followed by raising attainment and school reform or improvement.

Table 4.1 Network aims (N=19)

Topic focus	N	Study
Networking/collaboration	15	Adler ,Caniff, Clinard, Gettinger, Gilbert, Greenberg,Howley-Rowe, Montgomery, Norwich, Peters, Pinon, Riley, Sanders, Thurlow, Zetlin
Raising attainment	9	Carlos, Gilbert, Greenberg, Howley-Rowe, Kahne, Peters, Reyes, Thurlow, Zetlin
School reform/improvement	8	Bielefeldt, Carlos, Gettinger , Kahne, Howley-Rowe, Pinon, Riley, Sanders
Teaching	8	Caniff, Clinard, Gettinger, Gilbert, Greenberg, Peters, Pinon, Thurlow
Curriculum	7	Adler, Carlos, Gilbert, Kahne, Montgomery, Sanders, Zetlin
Professional development	7	Caniff, Clinard, Gettinger, Gilbert, Peters, Reyes, Zetlin
Skills	6	Adler, Bielefeldt ,Carlos, Gettinger, Greenberg, Sanders, Thurlow
Community improvement	5	Adler, Kahne, Montgomery, Riley, Sanders
Policy initiative	2	Peters, Pinon
Other (please specify)	6	Adler, Bielefeldt, Carlos, Gettinger, Montgomery, Norwich, Pinon, Sanders

Note: Some studies combined more than one focus.

Curriculum focus

There was a reasonably even spread between the curriculum and subjects with literacy and ICT being the most common in the 19 studies. This was slightly different from the systematic map in which literacy, maths and science were the most frequent curriculum and subject themes.

Table 4.2 Curriculum/subjects (N=19)

Curriculum / subjects	N	Study
Literacy - first language	4	Gilbert, Kahne, Montgomery, Zetlin
ICT	3	Adler, Bielefeldt, Gilbert
Other - please specify	3	Carlos: focus on giving all students access to 'high quality curriculum through restructuring curriculum and grouping strategies'. Relates to development of performance standards. Montgomery: core subjects, music, drama, dance. Norwich: special needs
Arts	2	Kahne, Montgomery
Cross-curricular	2	Norwich, Sanders
Business studies	1	Adler
Citizenship	1	Montgomery
Key skills	1	Adler
Science	1	Montgomery
Maths	1	Gilbert
Literacy – further languages	1	Zetlin

Goals relating to skills

Behaviour and motivation, employability and leadership and management were identified as the most common skills or non-curriculum themes reported in the 19 included studies, closely reflecting a similar spread among the studies in the systematic map. A number of studies were recorded in the 'other' option. These included inclusion, social capital, cultural, social and personal growth and development.

Table 4.3 Skills/non-curriculum themes (N=19)

Skills / non-curriculum themes	N	Study
Equal opportunities	6	Thurlow M; Montgomery D; Zetlin, AG; Gettinger M; Adler L; Greenberg KH
Other - skills - please specify	6	Carlos L; Gettinger M; Kahne J; Montgomery D; Norwich B; Sanders MG
Behaviour/motivation	3	Adler L; Sanders MG; Zetlin AG
Leadership/management	3	Adler L; Montgomery D; Thurlow M
Employablility	2	Adler L; Gilbert WS
Vocational learning	2	Adler L; Gilbert WS
Attendance	1	Adler L
Active citizenship	1	Sanders MG
Environment	1	Thurlow M
Thinking skills	1	Gilbert WS

Number of organisations

There was a broad range in the number of organisations involved in the study which grouped into four categories: 3–50, 200+, 1000 and not stated or unclear. The majority of studies fell into the 3–50 number of organisations range. This was the case both for the 19 included studies and the studies in the systematic map.

Table 4.4 Number of organisations involved in the network (N=19)

No. organisations	N	Study
3	1	Canniff
4	2	Greenberg, Montgomery
6	1	Zetlin
7	1	Gilbert
9	1	Gettinger
12	1	Kahne
19	1	Riley
20	1	Reyes
22	1	Bielefeldt
23	1	Carlos
41	1	Clinard
114	1	Peters
202	1	Sanders
247	1	Adler
Not stated/unclear	3	Howley-Rowe, Pinon, Thurlow
1000	1	Norwich

Population focus

The primary population focus of the studies was teachers followed by learners, parents and headteachers.

Table 4.5 Population focus of the network

Population focus	N	Study
Teachers	15	Bielefeldt, Canniff, Clinard, Gettinger, Gilbert, Greenberg, Howley-Rowe, Kahne, Norwich, Peters, Pinon, Reyes, Riley, Sanders, Thurlow, Zetlin
Learners (pupils)	12	Adler, Bielefeldt, Carlos, Gilbert, Greenberg, Howley-Rowe, Montgomery, Reyes, Riley, Sanders, Thurlow, Zetlin
Parents	11	Adler, Carlos, Gilbert, Greenberg, Howley-Rowe, Kahne, Montgomery, Reyes, Riley , Sanders, Thurlow
Headteachers	6	Carlos, Howley-Rowe, Pinon, Riley, Sanders, Thurlow
Community-based professionals	4	Bielefeldt, Carlos, Kahne, Sanders
Local government	3	Carlos, Sanders, Thurlow
TA (teaching assistants)	2	Carlos, Thurlow
Health and social services	2	Carlos, Kahne
School leaders excluding heads	2	Carlos, Kahne
Governors	1	Thurlow
Managers	1	Thurlow
Carers	1	Carlos
Others	8	Bielefeldt, Canniff, Carlos, Clinard, Gettinger, Howley-Rowe, Norwich, Riley

Note: Some of the studies had more than one population focus.

Setting

Schools were the predominant setting of the studies. In the systematic map, 25 of the studies were set in middle schools, while the 19 studies reviewed in depth included only one middle school.

Table 4.6 Setting of the network

Setting of the study	N	Study
Schools (general)	9	Bielefeldt, Canniff, Clinard, Gettinger, Howley-Rowe, Pinon, Reyes, Sanders, Thurlow
Primary school	8	Carlos, Greenberg, Kahne, Montgomery, Norwich, Peters, Riley, Zetlin
Secondary school	6	Adler, Kahne, Montgomery, Norwich, Peters, Riley
HEI	2	Canniff, Clinard
Voluntary agency/charity	1	Howley-Rowe
Workplace	1	Adler
Local Authorities	1	Thurlow
Home	1	Sanders
Nursery school	1	Riley
Middle school	1	Carlos
Post-compulsory education institution (eg 6th form college/FE)	1	Gilbert
Special needs school	1	Norwich
Other	1	Bielefeldt – community (not centre)

Note: Some studies had more than one setting.

Geographical spread

There was a balance between the urban and rural locations of the studies. The majority of the 19 included studies were conducted at the Local Authority or county level (13) whilst four studies were spread across the country. This reflected the geographical distribution of studies in the systematic map.

Table 4.7 Geographical spread of the network

Geographical spread	N	Study
Local Authority/county level	13	Adler, Canniff, Carlos, Clinard, Gettinger, Gilbert, Howley-Rowe, Montgomery, Peters, Pinon, Reyes, Thurlow, Zetlin
Urban	5	Gettinger, Greenberg, Kahne, Thurlow, Zetlin
Country level	4	Carlos, Greenberg, Norwich, Sanders
Rural	4	Gettinger, Gilbert, Montgomery, Thurlow
Neighbourhood level	3	Bielefeldt , Riley, Sanders
Town/city level	2	Kahne, Riley

Note: Some studies were included in more than one geographical category.

Network partners

The most common forms of networks explored in the 19 final included studies were school–school and school–HEI. This reflects the findings from the systematic map.

Participation in intervention

The majority of the studies did not explicitly state whether those involved in the network did so voluntarily or participated as a result of incentives or even compulsion. This was the case for the 19 included studies and for those in the systematic map.

Table 4.9 Participation in intervention (N=19)

Incentives	N	Study
Not stated/unclear	13	Adler, Canniff , Clinard, Gettinger , Gilbert, Greenberg, Kahne, Montgomery, Norwich, Peters, Pinon, Riley, Thurlow
Voluntary	5	Carlos, Howley-Rowe, Reyes, Sanders, Zetlin
Incentivised	1	Bielefeldt

Enrichment or extra-curricular activities

There was an even split between the studies of networks which did involve enrichment or extra-curricular activities (7) and those which did not (7), consistent with the studies in the systematic map.

Table 4.10 Enrichment/extra curricular activities in the network (N=19)

Enrichment/extra curricular activities	Enrichment	Study
Yes	7	Adler, Carlos, Gilbert, Kahne, Montgomery, Sanders, Riley
No	7	Canniff, Clinard, Gettinger, Howley-Rowe, Peters, Pinon, Zetlin
Not stated/unclear	5	Bielefeldt, Greenberg, Norwich, Reyes, Thurlow

Type of study
All the included studies were required to be evaluations.

Table 4.11 Type of study

Study type	N	Study
Evaluation – naturally occurring	13	Bielefeldt, Canniff, Carlos, Clinard, Gilbert, Howley-Rowe, Kahne, Norwich, Peters, Pinon, Reyes, Riley, Sanders
Evaluation – researcher manipulated	5	Adler, Gettinger, Montgomery, Thurlow, Zetlin
Controlled trial (non-randomised)	2	Adler, Greenberg
Pre- and post-test	2	Howley-Rowe, Reyes
Description	1	Howley-Rowe
Exploration	1	Reyes

Note: Some studies fell into more than one study type category.

Type of intervention

There was a broad range of types of intervention featured in the studies with CPD programmes or training – joint (10), cross-organisation working (9) and seminars, conferences and events (9) being the most common. This is consistent with the systematic map.

Table 4.12 Type of intervention

Intervention(s)	N	Study

CPD programmes/training – joint	11	Bielefeldt, Clinard, Gettinger, Montgomery, Peters, Pinon, Reyes, Riley, Sanders, Thurlow, Zetlin
Cross-organisation working	9	Adler, Clinard, Kahne, Norwich, Peters, Reyes, Riley, Thurlow, Zetlin
Seminars / conferences / events	9	Bielefeldt, Canniff, Gilbert, Greenberg, Howley-Rowe, Kahne, Pinon, Reyes, Thurlow
Peer coaching / support	7	Adler, Canniff, Clinard, Gilbert, Kahne, Thurlow, Zetlin
Mentoring	7	Adler, Bielefeldt, Canniff, Clinard, Pinon, Thurlow, Zetlin
Research / enquiry	6	Canniff, Clinard, Gettinger, Gilbert, Howley-Rowe, Peters
Creation of new materials – joint	6	Howley-Rowe, Montgomery, Reyes, Riley, Bielefeldt, Thurlow
Strategy sharing	6	Howley-Rowe, Norwich, Peters, Reyes, Sanders, Thurlow
Out-of-school learning	5	Adler, Kahne, Reyes, Riley, Sanders
Intervisitations / visits	5	Gilbert, Kahne, Pinon, Reyes, Zetlin
Formalised communications	4	Howley-Rowe, Pinon, Sanders, Zetlin
Observation	4	Gettinger, Greenberg, Howley-Rowe, Kahne,
Sub-groups	4	Canniff, Gettinger, Montgomery, Pinon
Specialist coaching / support	3	Montgomery, Riley, Zetlin
ICT	3	Adler, Bielefeldt, Gilbert
Mentoring	2	Adler, Clinard
Resources sharing	2	Norwich, Reyes
Pupil voice / participation	1	Howley-Rowe
Counselling	1	Adler
Work shadowing	1	Adler
Not stated / unclear	1	Reyes
Policy document sharing	1	Norwich
Other	3	Bielefeldt: activities supporting the use of technology; Carlos: investigating relationship between development of curriculum standards & systematic restructuring & reform – how challenging curricula can be taught to all students; Gilbert: teacher training

Note: Some of the studies involved more than one type of intervention.

Outcomes

As in the studies in the systematic map, outcomes for adults were dominant among the 19 final included studies, followed by pupils and then networks. Adult learning, attitudes and beliefs, knowledge and skills were the most common outcomes from the network collaborations.

Table 4.13 Outcomes

Outcome	Total	Adult	Leaders	Network	Organisation	Pupils
Learning	30	13 Adler, Bielefeldt, Canniff, Carlos, Gettinger, Howley-Rowe, Montgomery, Norwich, Pinon, Reyes, Riley, Thurlow, Zetlin	2 Carlos, Sanders	4 Canniff, Gilbert ,Greenberg, Kahne	4 Canniff, Carlos, Greenberg, Howley-Rowe	7 Bielefeldt, Gilbert, Greenberg, Kahne, Reyes, Riley, Zetlin
Knowledge	32	10 Canniff, Carlos, Gettinger, Howley-Rowe, Peters, Pinon, Reyes, Riley, Thurlow, Zetlin	4 Carlos, Pinon, Reyes, Sanders	8 Canniff, Carlos, Greenberg, Pinon, Reyes, Sanders, Thurlow, Zetlin	7 Canniff, Carlos, Greenberg, Kahne, Pinon, Thurlow, Zetlin	3 Gilbert, Reyes, Zetlin
Skills	31	12 Bielefeldt, Carlos, Clinard, Gettinger, Greenberg, Montgomery, Peters, Pinon, Reyes, Riley, Thurlow, Zetlin	2 Carlos, Pinon	4 Clinard, Gilbert, Pinon, Thurlow	7 Bielefeldt, Carlos, Clinard, Greenberg, Pinon, Riley, Thurlow	6 Adler, Bielefeldt, Greenberg, Howley-Rowe, Thurlow, Zetlin
Attitudes / beliefs	27	11 Canniff, Clinard, Gettinger, Montgomery, Peters, Pinon, Reyes, Riley, Sanders, Thurlow, Zetlin	2 Pinon, Reyes	3 Canniff, Gilbert, Reyes	5 Canniff, Clinard, Gilbert, Howley-Rowe, Riley	6 Adler Bielefeldt, Howley-Row, Reyes, Riley, Sanders
Understanding	25	10 Adler, Bielefeldt, Clinard, Gettinger, Greenberg, Peters, Pinon, Riley, Thurlow, Zetlin	2 Pinon, Riley,	4 Canniff, Gilbert, Greenberg, Reyes	7 Canniff, Gilbert, Greenberg, Kahne, Reyes, Sanders, Zetlin	2 Greenberg, Reyes
Motivation	19	7 Clinard, Howley-Rowe, Norwich, Reyes, Riley, Sanders, Thurlow	1 Reyes P	2 Reyes Riley	2 Reyes, Riley K	7 Adler, Gilbert, Montgomery, Reyes, Riley Sanders MG; Zetlin AG;
Achievement	18	0	2 Bielefeldt, Sanders	4 Gilbert, Greenberg, Riley, Zetlin	3 Greenberg, Reyes, Sanders	9 Adler, Bielefeldt, Greenberg, Howley-Row Montgomery,; Reyes, Riley, Thurlow, Zetlin
Morale / self-esteem	16	6 Clinard, Norwich, Peters, Reyes, Riley, Sanders	3 Pinon, Reyes, Riley	1 Gilbert	2 Reyes, Riley	4 Bielefeldt, Reyes, Riley, Sanders

Programme name
The keywording recorded the names of any formal programmes as follows:

Table 4.14 Programme name

Programme
A National Survey of Collaborative Groups in SEN
Every Student Succeeds – investigated through the Students at Risk Programme by the Far West Laboratory for Educational Research & Development
Houseton Annenberg Challenge (HAC)
Leadership Excellence Achievement and Performance (LEAP)
Los Angeles Area Business/Education Partnership
Preschool Action Research and Development Initiative (PARDI)
Principles of Learning Implementation
Professional Development of Teachers of Language Minority Students Through University-School Partnership
Quest
Road Ahead Program
Strengthening and Sustaining Teachers
The Cognitive Enrichment Network Education Model
The Innovative Links Project
The School, College and University Partnership (SCUP)
TWB Together We're Better
University California-Irvine Partnership
Woolwich & Plumstead Pathfinder (Excellence in Cities) Action Zones (WRaPP)

Note: Not all studies had a programme name.

Ages of network pupils

The studies were evenly split between the age groups of 11–16 and 5–10, consistent with the map.

Table 4.15 Age of network pupils

Age	N	Study
11–16	14	Adler, Bielefeldt, Carlos, Gilbert, Howley-Rowe, Kahne, Montgomery, Norwich, Peters, Pinon, Reyes, Riley, Sanders, Thurlow
5–10	14	Bielefeldt, Carlos, Greenberg, Howley-Rowe, Kahne, Montgomery, Norwich, Peters, Pinon, Reyes, Riley, Sanders, Thurlow, Zetlin
17–18	7	Adler, Howley-Rowe, Kahne, Montgomery, Reyes, Riley, Thurlow
0–4	4	Pinon, Reyes, Riley, Thurlow
Not stated/unclear	3	Caniff, Clinard, Gettinger

Note: Some of the research involved pupils in a number of the age groups.

Sex of network pupils

The sex of the network pupils was split between mixed and not stated or unclear. There were no studies which involved a single sex cohort among the included studies or those in the systematic map.

Table 4.16 Sex of network pupils (N=19)

Sex of pupils	N
Mixed	11
Not stated/unclear	8

Countries in which the studies were conducted

The majority of the studies reviewed in-depth were from the USA (16). Two were from the UK and one was from Australia. These findings were consistent with those shown in the systematic map in which 103 studies were from the USA, 11 UK and 7 Australia.

Table 4.17 Countries in which the studies were conducted (N=19)

Country	N
United States	16
United Kingdom	2
Australia	1

Conclusion

The key themes to emerge from the mapping of these 19 studies were consistent with those represented in the full systematic map. These included:
- The majority of the studies were from the USA.
- Networking or collaboration between schools–schools and schools–HEIs were the most common forms of network.
- The main population focuses of the studies were teachers and learners (pupils).
- The most popular forms of intervention were CPD programmes or training, cross-organisation working, and seminars, conferences and events.

The outcomes for the 19 studies were representative of those of the systematic map, with adult outcomes being the most common followed by pupil and network outcomes.

Systematic Review: synthesis of findings

The review question

The review set out to try and find answers to the following question:

What is the impact on pupils of networks that include at least three schools? What additional benefits are there for practitioners, organisations and the communities they serve?

and sub-questions:

- **What are the characteristics of effective networks in relation to the impact of the networks?**
- **How do networks transfer knowledge and practice from one context to another, either within or beyond the network?**
- **What do networks add to what schools and/or other organisations can do on their own to improve pupil learning? How do they do this?**

It was extremely difficult to find data to answer the fourth sub-question in any meaningful way.

- **What do participants stop doing or do less as a result of working in networks?**

The studies

Three studies were eliminated from the synthesis of findings because of low weight of evidence judgements. All of the fourteen remaining studies in the in-depth review involved networking between three or more schools (as a requirement of the review) plus, in most cases, a range of other partners. In order to be included in the in-depth review, studies had to be evaluations. It was mostly not possible to discover whether the researchers had been involved in the design or implementation of the networked projects which they were evaluating. In most cases the studies set out to evaluate the overall impact of the intervention, ie did the network achieve its aims?

The aims of the networks evaluated in the studies

The aims of the networked projects evaluated in the studies ranged from very specific pupil learning outcomes, such as Zetlin's focus on a networked programme for enhancing literacy for minorities, to a broad, general focus on building social capital through promoting children's social and academic achievement by means of community networks (Kahne). A segment – six out of the fourteen networks (Montgomery, Zetlin, Adler, Gettinger, Thurlow, Greenberg) were directly targeted at improved outcomes for at-risk, SEN or minority children. Their focuses ranged from improved progression and employment rates to enhanced literacy development. Just five studies aimed to get a better understanding of the potential contributions made by the networks themselves (Peters, Kahne, Howley-Rowe, Gettinger and Sanders). Two networks (Bielefeldt and Pinon) targeted specific pedagogical change – respectively, technology skills and thinking skills.

The nature of the data

The researchers used a wide spread of data collection methods including pre- and post-tests, national test data, student and teacher surveys, field notes, teacher and student narratives, observations, questionnaires, teacher journals and interviews. A wide range of data analysis methods was also reported, including ANOVA, QSR NUD*IST, SPSS, Mann-Whitney tests, multiple-regression analysis, t-tests, normal curve equivalent scores, value added assessment, simple comparative studies, coded observation schedules etc. Studies that did not involve comparison or control groups tended to use a much wider battery of data and approaches to validity and reliability.
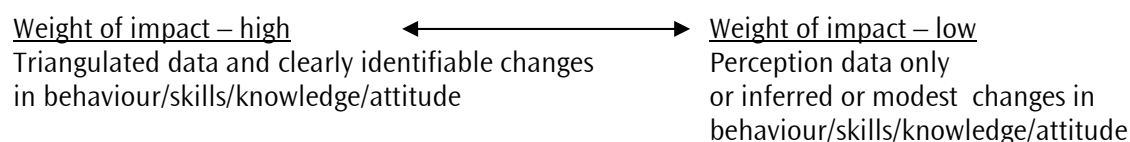
Key findings: impact

All the studies reported evidence of impact on teachers (although indirectly and sometimes negatively in one case) and all except three reported evidence of impact on students, although this was modest in two cases. Eight studies reported evidence of impact on schools or other organisations and seven studies reported impact on other participants, such as parents, HEI staff, leaders or community workers.

Evidence of pupil impact

Eleven studies investigated and reported pupil impact.

From the reported data, each of the studies was analysed for the weight of evidence and impact. A high score for weight of impact required both triangulated data and data that pointed to clearly identified and measured changes. A low score for weight of impact indicated modest changes or weaker evidence about impact. This produced a set of groupings for the network studies:

Weight of impact – high   ⬅➡   Weight of impact – low
Triangulated data and clearly identifiable changes in behaviour/skills/knowledge/attitude   Perception data only or inferred or modest changes in behaviour/skills/knowledge/attitude

Pupil impacts	High	Medium	Low
Attainment			
Public test score increases	Montgomery, Greenberg	Howley-Rowe	Riley
Attainment in core subjects (eg literacy) or general changes in student learning outcomes	Zetlin, Bielefeldt		Peters, Kahne
Narrowed attainment gap between minority & non-minority students and between economically disadvantaged & non-disadvantaged		Reyes	
Achievement & engagement			
Engagement, motivation, self-confidence, independence as learners	Bielefeldt, Zetlin	Riley	
Students graduating from high school/attending college	Adler, Montgomery		
Pupil progression & full-time employment rates	Adler		
Higher order thinking skills and problem-solving skills developed, reflective & responsible learners	Bielefeldt	Howley-Rowe	Pinon

	Thurlow, Zetlin, Bielefeldt		
Leadership skills	Thurlow, Zetlin, Bielefeldt		
Social skills	Thurlow, Zetlin		
Skills in interviewing and report-writing	Thurlow		
Technology use	Bielefeldt		
Involvement in school clubs and after-school activities		Riley	
Attendance and attitude to school		Riley	Reyes

This grid gives an indication of the areas in which the studies reported evidence of pupil impact. It shows that, for example, in the area of public test score increases, Montgomery and Greenberg showed evidence of high impact, Howley-Rowe showed evidence of medium impact and Riley indicated evidence of low impact. Further details are given below.

Evidence of high pupil impact

Attainment
- **Greenberg and Montgomery** reported significant gains in student attainment. These studies shared a contained focus on at risk or minority children and were studies of relatively small networks. Bielefeldt targeted technology skills. Montgomery and Bielefeldt also found improvements in student achievement (skills and progression).
- **Montgomery** used eight different sets of data (quantitative: test scores, numbers of applications made to college, Likert evaluation surveys, qualitative: interviews with students and project staff, student narratives, observation notes) to determine the success of LEAP project in promoting academic success and college entrance or progression. It established that project students showed an overall increase in ACT/SAT scores.
- **Greenberg** used a series of pre- and post-tests on cohorts of students from experimental and comparison schools. They found greater gains for COGNET pupils in reading, language and mathematics in three schools, compared with comparison pupils in two schools; significant gains for COGNET pupils in one school in reading and mathematics. The percentage of COGNET pupils scoring below average in two COGNET schools decreased dramatically in reading, language and maths compared with comparison pupils.
- **Bielefeldt** used surveys, interviews and site visits to establish student learning gains and found increased academic achievement in core subjects.

Achievement and engagement
- **Adler** used treatment and control group interview data plus other qualitative and quantitative data from 550 students to establish impact of the LA Business/Education partnership. The study found that a significantly higher proportion of treatment students graduated from high school than did students in the control group (92 per cent as against 66 per cent); 68 per cent of the treatment group attended college as against 44 per cent of the control group; 87 per cent of the treatment group in were in full-time employment as against 64 per cent of the control group.
- **Montgomery** found greater numbers of ninth and tenth graders taking college entrance exams.
- **Bielefeldt** found higher order thinking skills, plus students were assuming roles as teachers or leaders and demonstrated increased engagement, motivation and independence as learners. Students had also increased their technology use.
- **Zetlin** used a combination of teacher interviews, observations and teacher questionnaires to establish that low-achieving students benefited from individual

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conferencing in reading and writing. Teachers reported 'tremendous' growth and improvements in students' motivation for reading and writing.

- **Thurlow** used interviews, surveys and debriefing notes to establish that students involved in the TWB (Together We're better) programme attained social skills, contributing to class. Students running focus groups developed group leadership skills, and skills in interviewing and report writing.
- **Adler** found significantly improved rates of graduation and progress to further education and employment.

Evidence of medium pupil impact

Studies identified as the middle of the range were:

Attainment

- **Reyes** used student achievement data in reading and mathematics plus retention and attendance data to investigate whether the HAC had accomplished its goals. In elementary schools the HAC narrowed the gap between minority and non-minority students; middle schools narrowed the gap in reading and mathematics. Overall, the achievement gap narrowed between economically disadvantaged and non-disadvantaged pupils.
- **Howley-Rowe** used a variety of data sources (Innovation configuration checklist, questionnaire, pre- and post-test survey, CAT scores) to evaluate QUEST project. The findings included mixed student achievement, but a 'steady increase' in performance in maths and science and steady improvement in grade scores on non-verbal tests. Students had increasingly become more reflective and responsible about their work, according to teachers.

Achievement and engagement

- **Riley** was the only study which reported reduced absences in project primary schools, but the decrease was not quantified. The study also reported greater pupil involvement in school clubs and after-school activities, an increase in pupil self-confidence and self esteem, an improved attitude to school and increased attendance, although the detailed data are not provided.
- **Howley-Rowe** found students became increasingly reflective about and responsible for their work, according to teacher perceptions.

Low pupil impact

Attainment

- **Riley** used school visits, classroom observations, pupil questionnaires, staff interviews, school attendance patterns and test scores to establish modest student achievement gains at KS2 maths. KS1 writing remained the same while the borough average went down.
- **Peters** found little evidence of improvement in pupil learning outcomes. Only small numbers of teachers felt confident that there had been changes to any great extent in students' learning outcomes (8.7 per cent), attitudes to learning (2.9 per cent) or relationships with other students (4.3 per cent), although approximately a third indicated that change had occurred to some extent.
- **Kahne** found that it was too early to claim gains in pupil learning.
- Sanders and Gettinger were concerned with network and practitioner level impact and referred to pupil learning only indirectly.

Achievement and engagement

- **Pinon:** used survey, interview and observation data to establish the degree of impact on pupils of the implementation of the principles of learning (accountable talk, rigour in a thinking curriculum, clear expectations). It found that 16 schools rated as weak (in terms of student checklist), 8 moderate and 5 strong at the beginning, and end.
- **Reyes** found that despite its evidence of increased student attainment and of improved student perceptions of education, student absenteeism and dropout rates had not decreased as a result of project reform efforts.

Evidence of teacher impact

Eleven studies reported changes in teacher *skills* and *knowledge* as a result of the networked interventions. In most studies changes in teachers' knowledge and understanding led to clearly identifiable *behaviour changes* (eg working with parents, business or community organisations). These were extensive and broad reaching in some studies (eg Bielefeldt: less didactic and more facilitative teaching, enhanced use of technology, teachers teaching teachers), and rather more tightly focused in others (eg Gettinger: advances in understanding of inclusive environments, leading to changes in practice). The interventions also influenced *teacher attitudes* (Thurlow), skills (Gettinger and Zetlin), and motivation, confidence and morale, including increased teacher confidence (Gettinger, Peters and Pinon) and more positive attitudes (Peters). Seven studies provided evidence of impact on classroom practice.

Using the same approach to identify impact for pupils, we identified six studies with evidence of high teacher impact, five studies were assigned a medium level and three were categorised as low. The range we identified for the studies are:
- high (6)
- medium (5)
- low (3)

High teacher impact

Adler found teachers shared responsibility, redesigned curricula, shared training with business and industry and gained deeper understanding of the vocational aspects of learning
Bielefeldt (see introductory example)
Gettinger (see introductory example)
Greenberg found teachers gained understanding of mediated learning, understood the significance of teaching and learning concepts, developed new teaching skills; changed practice to ensure that students were paying attention and increasingly connected content to previous lessons
Thurlow found teachers became aware of the mechanics of change and of the role of the community. They exhibited:
- changes in attitude to parental involvement
- greater knowledge and understanding of inclusive practice and classroom level skills
- better communication and networking skills
- improved school and classroom organisation
- greater family and community involvement;
- reduction in compartmentalisation
- a decrease in fear
- improvements in attitudes

Zetlin found teachers gained:
- new knowledge and understanding about integrated reading, language and arts programme
- advances in their understanding of the learning process

- awareness of approaches and materials for language–arts instruction
- skills in implementing the literacy programme
- an increased emphasis on collegial interaction
- relationships with other teachers
- changes in curricula and instructional activities

Medium teacher impact

Howley-Rowe found teachers were more informed about school policies, learned from colleagues' ideas and developed action research skills.
Montgomery found teachers discovered new ways of identifying and serving rural or geographically isolated students, learned to 'hold more than one position' and valued their links within, between and outside school.
Peters found teachers developed growth in insights into students' learning styles and needs, understanding of conditions which supported students' learning, changed the way they supported students to succeed, used shared ideas and expertise, used a greater variety of teaching approaches, improved self-esteem and confidence and developed more positive attitudes.
Reyes found teachers' knowledge and skills were cultivated by:
- deepening their understanding of content and pedagogy
- improving skills for teaching reading
- developing strategies for working with students with diverse learning styles

Teachers used greater interaction with parents and made greater efforts to elicit student input and develop student skills. Teachers stayed at their schools longer than teachers in non-network schools. But there was some evidence of lack of collaboration.
Riley found teacher knowledge and understanding about the different learning needs of pupils developed, teachers were able to see themselves as learners and to recognise how their behaviour impacted on learning. They developed new skills in using research and analytical tools to measure the impact of new activities and leadership skills.

Low teacher impact

Kahne reported that teachers exhibited distrust and reluctance to commit to externally imposed goals. There were also reports of little impact on classroom practice.
Pinon identified greater impact on principals than teachers. They developed understanding of the Principles of Learning. Observational data from classrooms showed variability in the quality and degree of implementation of Principles of Learning (47 per cent weak, 24 per cent moderate, 15 per cent strong). Increased confidence of principals and increased motivation of staff was reported.
Sanders found greater understanding of the benefits of family collaboration and networking. Teachers developed, to a modest degree, communication skills (phone calls, letters to parents, postcards to family and community members, community newsletters). Increased collaboration with parents and families was also reported.

School impact

Most of the studies concentrated their reporting on the outcomes relating to the networks' aims, and most of those focused on students or teachers or both, rather than schools and other network organisations. It was not therefore possible to categorise levels of impact, and in this and the following sections we report on what we found in the studies without trying to assign different weightings to the reported impact and identify evidence. There is, in any case, a question about how meaningfully school, pupil and teacher impact can be separated. If

students are achieving more and teachers are better motivated and implementing more effective classroom strategies as reported in many of the review studies, there will certainly be an impact for the school. The converse is also true.

Nonetheless nine studies reported that the schools in the networks had benefited. The benefits ranged from increased community liaison to the development of professional learning communities and the import of new ideas to changes in school and classroom organisation and management structures.

Parents and community

Parents emerge as key network partners, or targets, particularly in projects involving at-risk, minority or SEN children. Nine of the studies reported increased parental involvement and, in some cases, partnerships with parents. Four of the six most effective studies contained evidence of increased parental involvement. In most cases this was part of an attempt to increase their involvement with the wider community. This was an unanticipated finding, with some detailed examples below. There may be a connection here with the finding from Desforges' review of research that parents enjoyed networking with other parents.

- **Adler** reported that businesses took on a shared responsibility for training the students and that parents became involved in assessment, goal setting and support.
- **Greenberg** reported evidence of increased parental awareness of their children's education and ways in which they could motivate and assist their children in learning in one of the project's four schools. Collaboration between schools and parental advisory boards was also held to be crucial in the network's success.
- **Howley-Rowe** cited evidence that efforts to include parents more meaningfully in the school had been successful.
- **Kahne** reported that parents were represented on the board of the foundation funding the project and that schools offered general education development for parents.
- **Montgomery** reported that developing parental awareness and involvement was one of the project's objectives and project parent training was rated 'good' to 'excellent'. Informing and involving parents was found to have achieved greater support for their children's educational progress and continuation in school.
- **Reyes** reported schools using a range of methods to create partnerships with parents including outreach centres, classes for adults and developing volunteer tutoring programmes. As a result of this and other measures, isolation between schools and the community was significantly reduced.
- **Riley** found that although evidence of the project's impact on parents was limited, several schools reported a detectable increase in parental awareness of, and interest in, the learning processes undergone by their children, as well as improved parent-school communication regarding pupil absences.
- **Sanders** reported increased parent participation and support and improved communication and integration with parents and other community members.
- **Thurlow** reported greater involvement by parents in school decision-making and more participation in the project's parent mentorship programme. An awareness of the need for a gradual expansion of inclusion to the broader community was evident in the input from those districts that had been partners in the programme the longest.

Network characters

What did the studies tell us about networks' characteristics in relation to their impact?

We have divided the characteristics into structural features of the networks (eg size and duration) and network processes (eg CPD).

1. Structural features of the networks included in the synthesis studies

Size, scale, spread and duration
The networks in the review studies varied hugely in their size (number of organisations involved), scale (resources and infrastructure) and geographical spread (local, district, state etc). So that we can look across these variables in relation to the impact and characteristics of the network, we have represented them in tabular form below. In the context of the aims of this review we have categorised them as small, medium or large, based on the number of participating schools, irrespective of the extent of other organisational involvement. Note that the studies were frequently unforthcoming about the level of resources for the networks.

Study*	Size	Geographical Spread	Category**	Duration	Funding	Phase
<u>Adler</u>	4 community colleges, 3 state universities, 200 businesses, 40 community-based organisations	7 school districts in California	Small/Med (community colleges have multi-site campuses)	5 years	Unclear	Secondary
<u>Bielefeldt</u>	22 school-community partnerships	15 states	Large	2 years	Five member teams with grants of $30,000 from the National Foundation for the Improvement of Education spread over 2 years It is not stated but reviewers assumed that it was funded as part of the Road Ahead programme (by Bill Gates).	Schools (general)
Gettinger	38 teachers, 9 early childhood programmes, 22 classrooms	State-wide, Wisconsin	Small	2 years	The Wisconsin Department of Public Instruction (DPI) provided financial support.	Schools (general)
<u>Greenberg</u>	4 schools and university staff	State-wide	Small	3 years	The research was conducted with funds from the US Department of Education (reviewer inferred).	Primary
Howley Rowe	Large number (unstated) high and elementary schools	3 West Virginian Districts	Medium	4 years	Sponsored by Office of Educational Research and Improvement, US Dept of Education (contract RJ6006001)	Schools (general)
Kahne	11 elementary schools 1 high school half a dozen community institutions youth organisations	District-wide	Medium	Initially founded for 10 years	Supported by the Jones Family Foundation Grants from: • Steans Family Foundation • The Spencer Foundation • The Chicago Annenberg Research Project • The Centre for Urban Educational Research and Development at UIC	Primary and secondary school
<u>Montgomery</u>	Initiated in four high schools	4 separate school districts	Small	3 years	Project LEAP – A Javits Grant provided funding for a direct service research and demonstration project to resolve the problems in identifying and meeting the needs of under-represented gifted populations	Primary and secondary school
Peters	14 universities worked with 100 schools for the National ILP project. This study looked at one group within that national project: 2 primary, 4 secondary, 2 university schools of education	South Australia	Large	3 years	It was unclear how the study was funded but the project was funded on a year by year basis until early 1997.	Primary and secondary school
Pinon	78,000 school students and staff from the University of Pittsburgh	District-wide – Austin Independent School District	Large	1 year	The study funding was unclear. The AISD-IFL partnership for 2001–2002 received $235,000 from a variety of sources. ASID received $110,000 from the Coca Cola staff development fund. RGK Foundation provided $125,000 to the Austin Public Education Fund to help fund the cost of partnership	Schools (general)

* High impact studies are underlined
** Under 10 schools small, under 20 medium etc.

Study*	Size	Geographical Spread	Category**	Duration	Funding	Phase
					with IFL; $87,000 contract for Contact Focused Coaching component as part of the state's Academics 2000 Cycle 8 grant funds to ASID; $60,000 from US department of Education Office of Research and Improvement to fund technology-based programme known as Netlearn; $75,000 from Wallace-Reader's Digest foundation for AISD's participation in a think tank with other districts that have established partnership with the IFL.	
Reyes	HEIs, businesses and schools. Started with 11 schools and grew to 20	Expanded from 5 to 6 districts	Medium	5 years	(Reviewer inferred) In 1993 President Clinton made a private pledge of half-billion dollars to Walter H. Annenberg with the intention of the money being used for 'poor children living in big cities' (p2). In 1998 Annenberg officials solicited proposals from Texas universities to conduct a three-year research and evaluation study of the reform initiative.	Schools (general)
Riley	17 schools (2 nursery, 2 secondary, 13 primary), the Local Authority (Greenwich) and London University	One EAZ in South London	Medium	3 years	Funding came from the Excellence in Cities (EiC) initiative within the EAZ. "Each EiC Action Zone was entitled to receive £250,000 – with the possibility of £50,000 matched funding." Some work on accelerated learning was funded by the Literacy Strategy.	Nursery, primary and secondary schools
Sanders	202 schools in 1996	National	Large	1 year	The study was funded by the US Department of Education, Office of Educational Research and Improvement and the Dewitt Wallace-Readers Digest Fund. National network of Partnership Schools requires each member school to allocate an annual budget, create an Action Team of 6-12 persons, eg teachers, family members, admin, community reps and senior students. Budgets for activities ranged from $100 to $70,000. Average was $4,065	Schools (general)

* High impact studies are underlined
** Under 10 schools small, under 20 medium etc.

Study*	Size	Geographical Spread	Category**	Duration	Funding	Phase
Thurlow	All the general educational schools in four districts	4 districts in Minnesota	Large	4 years	In 1987, the US Department of Education began funding a state-wide systems change priority to assist states in finding ways to move their schools toward the inclusion of students with severe disabilities in general education settings. Minnesota received one of these grants in 1992. The TWB (Together We're Better) project was funded by part of this grant.	Schools (general)
Zetlin	5 inner city elementary schools and a university	District	Small	1 year	Part funding for the research is acknowledged from the "Office of Educational Research and Improvement of the US Department of Education through a grant to the National Center on Education in the Inner Cities at the Temple University Center for Research in Human Development and Education" Additional sources of funding are not specified.	Primary school

* High impact studies are underlined
** Under 10 schools small, under 20 medium etc.

2. Key processes

The majority of the networks – twelve – involved CPD. Hence many of the key network processes were generated by the design of the CPD. CPD was also the principal means of effecting transfer of knowledge and practice.
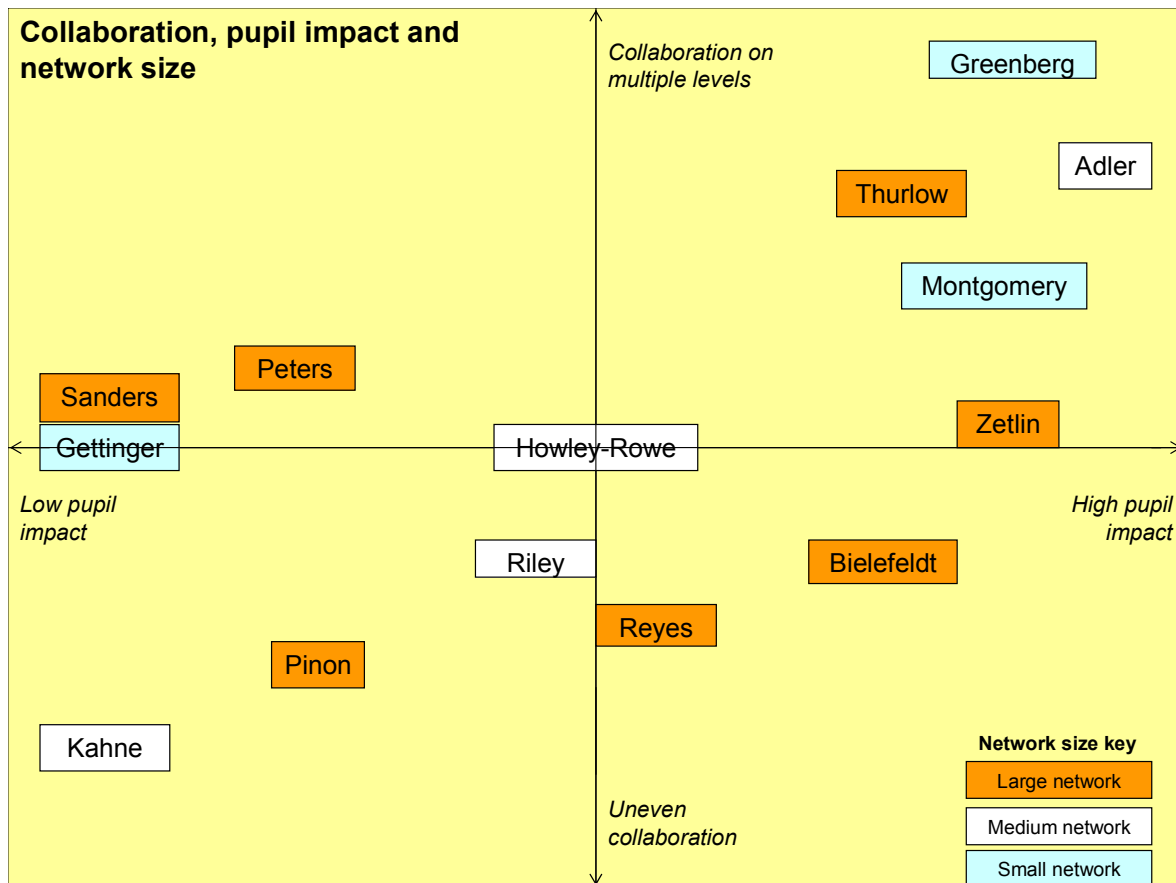The three key aspects of CPD in the networks were:
- collaboration
- specific focuses
- ownership

Collaboration

The majority of school networks in the studies reviewed – nine – were in partnership with HEIs. Five also worked with Local Authorities and local community organisations. One worked with a national agency (NFIE) and one worked extensively with a large number of local businesses. Most of the studies also involved partnerships between schools and other outside organisations or groups, notably parents, who were involved in nine studies. For example, one of the most effective networks (Greenberg) looked at long-term school-university partnerships and an attempt to create a collaborative environment with genuine community-inclusive support and ownership, using co-ordinators who worked with parents and teaching staff and facilitated linkages to health and social services. Collaboration was facilitated by frequent meetings among teaching staff and with the parent advisory boards.
Another of the most effective networks (Adler) investigated a partnership operated by a regional agency. Schools worked with many different businesses as well as HEI partners and community organisations. Additional support agencies were also involved, including the National Council on Ageing, the California Employment Development Department and local chambers of commerce.

The diagram below is designed to given an illustrative overview of the comparative impacts of the networks studied in terms of pupil impact and range of collaboration between network partners. Collaboration has been classified by examining the information given in the studies about how many of the network's intended partner organisations or groups were involved in collaboration (breadth) and how far this collaboration extended among those, such as parents or local businesses, involved (depth). For example, Greenberg supplied evidence of multi-level collaboration involving teachers, parents and communities whereas Adler characterised some of the partnerships with businesses in terms of 'co-operative liaison' and 'strong ties' which do not suggest the same degree of collaboration. Kahne appears towards the bottom left of the diagram because the researcher felt that it was too early to show evidence of pupil impact, and while it had found some evidence of collaboration between network schools and community institutions, formal collaborative partnerships had not been fostered between schools and community institutions.

Collaboration, pupil impact and network size

Collaboration on multiple levels

Greenberg

Adler

Thurlow

Montgomery

Peters

Sanders

Gettinger — Howley-Rowe — Zetlin

Low pupil impact

High pupil impact

Riley

Bielefeldt

Reyes

Pinon

Kahne

Network size key

Large network
Medium network
Small network

Uneven collaboration

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Continuing Professional Development (CPD)

Continuing professional development (CPD) was at the heart of 12 of the 14 networks in the studies reviewed. This made it very difficult to separate the sub-questions relating to characteristics (such as collaboration) from those about knowledge transfer mechanisms. In most cases these mechanisms operated interdependently and dynamically. CPD by nature is concerned with the development of new knowledge and skills.

While collaboration was one means by which the networks achieved a wide spread across partners, it was also built into the CPD as the principal means by which networks achieved depth – through the effective take-up of knowledge and skill. Peer-to-peer collaboration, in combination with specialist expertise (most often provided through HEIs and Local Authorities) was the dominant pattern within the CPD programmes. (See Appendix 5 for examples of the CPD models)

The range of activities under the CPD umbrella was wide, as the following examples demonstrate:
- sharing the learning experiences as a site team (teachers teaching teachers), applying the experiences in the school and community, exploring the learning with others and repeating the shared training (the conference workshops) each year (Bielefeldt)
- participation in collaborative meetings and recording and analysing critical incidents in narrative accounts of significant classroom events
- action research-based professional development involving a commitment to reciprocate and the creation of structures for sharing learning (Peters)
- project staff working with district partners, an inclusion mentorship programme, a three-day training institute each summer (Thurlow)

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- peer teams providing opportunities for sharing and mutual support through training, with further mentoring support coming from university staff (Zetlin)

All the studies reported that professional development was characterised by peer-to-peer support, rather than using courses outside the network. External expertise tended to be valued in an advisory role, in collaboration with the network.

Focus

Most of the studies reviewed concentrated on networks which fostered commitment and coherence by focusing on a limited number of objectives and interventions, although this does not mean that the foci were not ambitious. It is noticeable that the most effective networks had a very specific focus that involved identification of a target group. Five of the six networks demonstrating high pupil impact focused on targeted interventions to improve outcomes for at-risk, SEN or minority children (Montgomery, Zetlin, Adler, Thurlow, Greenberg), while the sixth (Bielefeldt) focused on achieving pedagogical change through developing pupils' technology skills. The evidence from this review is that the networks with broader aims were not associated with high levels of impact on pupils.

Most networks used specific CPD interventions, usually introduced and supported by external expertise and theory to ground their activity. In some cases this encouraged the creation of shared purpose and ownership around the network focus or focuses (see section on aims, above).

Ownership

Ownership of the network's goals and processes seemed to be an important element in sustaining the collaborative activities. The studies used a range of processes to encourage shared ownership in both practitioners and students. Bielefeldt, for example, identified teachers teaching teachers as a powerful way of widening ownership, but also reported lack of buy-in among teachers not directly involved in network teams.

Building capacity

Networks used a range of processes to build capacity (ie self-sustainability) and extend the perspectives of network members. Once again CPD and peer-to-peer working, including tutoring and mentoring were some of the most commonly cited processes. One study (Kahne) warned that difficulties occurred when network and school goals were not aligned. Principals were wary of committing themselves to criteria which they felt did not reflect their own school's contexts, and this factor caused some tension in establishing trust between the principals and local officials. Another study (Zetlin) highlighted the importance of a personalised approach to teacher learning in order to build capacity.

Challenges

Kahne and Peters were the two studies which reported the greatest number of challenges to effective networked learning. These included contextual constraints, the limited time frame and the complexity of the situations in which they worked. Kahne found transforming educational institutions to be enormously difficult. He noted that widespread distrust among relevant actors and the prevalence of external accountability mechanisms appeared to have constrained the impact in his study. Thurlow found that the systems change skills that were developed were generally limited to members of the core planning team.

(See Appendix 5 for more detailed examples of network processes.)

Transfer

How do networks transfer knowledge and practice from one context to another, either within or beyond the network?

An important finding from this review was the prevalence of various types of interpersonal contact (as opposed to print or electronic communications) as the principal means of distributing knowledge across a group of colleagues, enabling them to take command of new knowledge and share skills. Many of these were integral aspects of the CPD interventions. They included the peer support, usually through CPD, plus:

- expert input
- events

Expert input

Nearly all of the studies cited evidence of strategic advice, training, coaching, facilitation or mentoring being provided by a combination of external and internal expertise. Mentoring was an explicit feature of four studies (Adler, Bielefeldt, Pinon, Thurlow). Nine studies reported on formal partnerships with HEIs (Adler, Gettinger, Greenberg, Peters, Pinon, Reyes, Riley, Thurlow, Zetlin).

Examples of experts included:

- partners from business and career specialists (**Adler**) who worked with teachers on the vocational elements of the programme
- teacher mentors: **Bielefeldt** reported that a teacher mentor was attached to each of the network's 22 sites.
- HEI research partners: **Gettinger** reported on how PARDI (Preschool Action Research and Development Initiative) used a collaborative partnership model with researchers working with teachers on two components.
- HEI trainers: **Zetlin** reported that schools received one year of ongoing university support in an initiative which provided approximately ten hours of professional development to develop awareness of the theory and pedagogy for implementation of a comprehensive language programme.
- parents: **Greenberg** cited the use of Parent Advisory Boards.
- district teams: **Montgomery** reported the creation of an Educational Assistance Team, consisting of a director, three itinerant resource specialists and two education assistants, to implement programme instructional activities in the network's schools.

(See Appendix 5 for more detailed examples)

Events

Seven studies explicitly referred to the use of conferences, symposia and other formal meetings and training events as vehicles for widening the number of colleagues able to describe and use new knowledge. In many cases these, too, were built in to the design of the CPD interventions.
They included:

- 19 days of training and workshops over the course of the programme's two years (**Bielefeldt**)

- an annual leadership conference (**Greenberg**)

- extensive use **of conferences, rallies, scholars' colloquia and summer symposia (Howley-Rowe)**

- summer institutes at which teacher workshops were held, as well as two-week summer schools for teachers and administrators from network schools (**Kahne**)

(See Appendix 5 for more detailed examples of the use of events.)

ICT

It is worth noting that none of the networks highlighted the use of ICT as an effective networking process although the use of email and websites to facilitate the exchange of ideas is referred to in passing in a small number of the studies. This doesn't mean necessarily that it was not used; we just don't know from the reports. Bielefeldt was the only study explicitly to focus on ICT – increased technology use was one of the programme's objectives. The study reported that teacher use of the ICT network increased in 16 of the 22 sites and student use increased in 12 sites. However, use of both personal email and discussion areas declined during the course of the programme. The emphasis on personal communication plus the relative lack of emphasis on ICT suggests that ICT may not be a primary source of knowledge transfer in networks that do not have technology as a focus. Face-to-face exchange was preferred in the study which did have ICT as a focus.

Added value

What do networks add to what schools and/or other organisations can do on their own to improve pupil learning? How do they do this?

The studies are rarely explicit about what the networks they examined have contributed to what schools and others do to improve pupil learning. From the data, the review studies identified five widely-shared and often overlapping benefits of networking. They are:
* facilitating collaboration (see above)
* accessing external expertise (see above)
* securing funding
* facilitating professional development (see above)
* developing inclusive cultures

Securing funding

Few of the studies provided exact details of additional funding but it was clear from nine of them that additional funding was part of the networked arrangements. Sources ranged from government grants to individual schools (see table on page 54).

Developing inclusive cultures

Five studies reported the development of an increased sense of inclusiveness as a result of networked initiatives. Three of these (Greenberg, Montgomery, Thurlow) are among the six initiatives associated with interventions focusing on at-risk, underachieving or minority students. It appears that shared moral purpose or values in the network focus also help to build a sense of ownership. Peters and Reyes, whose focus was school-university partnership and raising pupil attainment, also provided evidence of a greater sense of empowerment and a reduced sense of isolation among network members as a result of collaborative working processes.

* **Greenberg** found that the parent/school partnership programme helped parents and schools to work together more closely in ways that met specific community needs to ensure children's success through education. While the study did not explicitly state that the project fulfilled its aims to achieve '*genuine community-inclusive support and ownership, both top-down and bottom-up'*, there was evidence that the foundations for such a partnership had been laid.
* **Montgomery** reported that the initiative was designed to increase the involvement and identification of Indian students in educational services for gifted students. The results of the project, however, suggested ways to identify and serve all rural or geographically isolated students

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who were gifted and faced other challenges, such as limited English proficiency, having disabilities, or being a minority, culturally diverse or economically deprived. Also, the study found that the boundaries that typically separated students in the gifted programme from those who were not involved diminished in importance.

- **Reyes** found some evidence that networked schools had narrowed the achievement gap between economically disadvantaged and non-disadvantaged students and that schools had significantly reduced isolation within schools, between schools, and with the community by forming substantive partnerships.

- **Thurlow** found that the programme's emphasis on inclusion extended to the integration of an inclusive schooling content in personnel development and graduate training programmes, and research and dissemination focused on the role of educators in creating and supporting inclusive school practice. There was also evidence that ownership was being shared through developments such as school personnel taking responsibility for setting meeting agendas and sharing ideas about how to make inclusion work.

5. Implications

Users of this review will draw implications from the findings for their own contexts and purposes. Broad implications for practice, research and policy were identified and discussed at a seminar hosted by the NLG as review sponsors and attended by academics and policy-makers from a number of different national agencies.

Implications for practitioners

The review found that all the studies in the synthesis reported evidence of impact on teachers.
- *Schools should consider how their membership of networks could support and enhance teacher CPD opportunities through cross-organisational collaboration.*

Implications for research

The findings from this systematic review have led to a number of suggestions for further research:
- *This review has focused specifically on the nature of the impact of networks and has not engaged deeply with process. Therefore, a second review could develop and expand on the findings by investigating the practical aspects of networking processes in more detail.*
- *Because this was intended to be a review, the 119 studies that focused on ITT were excluded during the filtering stages because of time. These studies have all been logged on the database, and researchers, national agencies or CPOD providers should find them a rich resource for further exploration of networking in the context of initial teacher education.*
- *Inclusion has emerged as a key focus for many of the networks in this review. More research needs to be done into the role of networks in promoting inclusion.*
- *The evidence from the review showed improved engagement with parents. Again, more research is needed into the role of networks in promoting parental engagement.*

Implications for policy

There is evidence in this review that networks can have a positive impact on teachers, pupils, schools and other organisations.
Specifically:

The findings from the review show that networking can be an effective way of supporting vulnerable pupils. Policy-makers should consider these findings in relation to the ECM agenda:

- The most effective networks have a clear focus, usually one that can be related to the needs of a specific sector of the community. The evidence also suggests that failure to identify a focus that makes sense to everyone involved is linked to weaker outcomes. Those involved in establishing networks need to consider the process for clarifying and agreeing a focus and deciding whether it should relate to specific groups.
- The evidence shows that continued opportunities for sustained collaboration encouraged improvements in teaching, learning and achievement. Policy-makers need to consider how to exploit the benefits of networking.
- The opportunities that are being created and promoted need to be sustained over time.
- The evidence shows that collaborative CPD and learning are the principal vehicles for knowledge transfer, for building network ownership and securing depth of involvement. Policy-makers supporting and promoting networks should pay particular attention to using networks to expand CPD possibilities and expectations and to ensuring that CPD is also harnessed strategically to build and sustain networks.

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Appendices

Appendices

Appendix 1: Inclusion / exclusion criteria

The first stage criteria were:

- *clearly stated aims and objectives*
- *studies published in the last ten years: ie from 1995–2005*
- *only studies produced in English (with the possibility of restricting studies to include only UK, Australia, North America, New Zealand and Europe if the number of studies found is significantly greater than feasible within the remit of this rapid review)*
- *studies which build on the existing literature*
- *studies of networks which include at least one school*
- *studies of network initiatives that aim to enhance pupil learning or aspects of well-being known to affect learning*

In addition to these first stage criteria, we excluded studies which focused solely on trainee or pre-service teachers.

The second stage criteria were:

- *clear description of policy and practice context*
- *clear description of methods, including approaches to data collection and data analysis*
- *evidence of attempts made to establish a trustworthy approach to data analysis*
- *studies which are evaluations that have set out to explore the effects of or answer a question, either naturally occurring or researcher-manipulated or make use of pre- and post- or experimental comparisons*
- *studies covering networking between partners which include at least one public sector organisation*
- *evidence of the impact of the network(s) on pupils and practitioners, organisations and communities*

We found that there was a large number of studies passing stage 2 (N=40) so we were able to focus the inclusion criteria even further by adding a third stage of criteria:

- *studies that include at least three schools, and the setting of the study is in schools*

Appendix 2: Keywording sheet for NCSL rapid review

Name of reviewer: _____

Question: What is the impact on pupils of networks that include at least one school? What additional benefits are there for practitioners, organisations and the communities they serve?

Title: _____
Author(s): _____
Journal: _____
Date: _____   Volume: _____   Number: _____   Pages: _____

Stage 1 criteria met?   Yes ☐ No ☐   If no, state the first rejected criterion: _____
If the study fails to meet stage 1 inclusion criteria, do not progress beyond this question.
Stage 2 criteria met?   Yes ☐ No ☐   If no, state all rejected criteria: _____

Tick all that apply in each section as networks can cover a range of people, places and interventions

1.   What was/were the topic focus/focuses of the study?
☐ Community improvement
☐ Curriculum?* (*answer Q2 if yes*)
☐ Networking/collaboration
☐ Policy initiative
☐ Professional development
☐ Raising attainment
☐ School reform/improvement
☐ Skills* (*answer Q3 if yes*)
☐ Teaching
☐ Other – please specify: _____

2.   *Curriculum/subjects
☐ Arts
☐ Business studies
☐ Citizenship
☐ Cross-curricular
☐ Design and technology
☐ Humanities
☐ ICT
☐ Key skills
☐ Literacy – first language
☐ Literacy – further languages
☐ Maths
☐ PSE
☐ Philosophy
☐ Physical education
☐ Religious education
☐ Science
☐ Other – please specify: _____

3.   *Skills/non-curriculum themes
☐ Active citizenship
☐ Attendance
☐ Behaviour/motivation
☐ Combating racism
☐ Creativity
☐ Emotional intelligence
☐ Employability
☐ Environment
☐ Equal opportunities
☐ Leadership/management
☐ Multiple intelligences
☐ Problem solving
☐ Speaking and listening
☐ Thinking skills

☐ Transfer/transition

☐ Vocational learning
☐ Other – please specify: _____

4.   In which country/ies was the study carried out?
_____

5.   Programme name eg Beacon schools / NLCs
_____

6.   Age of network pupils
☐ A   0–4
☐ B   5–10
☐ C   11–16
☐ D   17–18
☐ E   Not stated/unclear

7.   Sex of network pupils
☐ Female only
☐ Male only
☐ Mixed sex
☐ Not stated/unclear

8.   How many organisations were involved in the study? _____   ☐ Not stated/unclear

9.   How many individuals were involved in the study? _____   ☐ Not stated/unclear

10.   What was the population focus of the study?
☐ Carers
☐ Community-based professionals
☐ Governors
☐ Headteachers
☐ Health and social services professionals
☐ Learners (pupils)
☐ Local government
☐ Managers
☐ National government
☐ Parents
☐ Police
☐ School leaders excluding headteachers
☐ TA (teaching assistants)
☐ Teachers
☐ Volunteers

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☐ Other non-education professionals eg artists, musicians, sports professionals etc
☐ Not stated/unclear
☐ Other – please specify: _____

☐ Other – please specify: _____

14. Participation in intervention
☐ Compulsory
☐ Incentivised
☐ Voluntary

15. Does the study include enrichment/extra curricular activities? (eg homework clubs, sports)
☐ Yes – please specify: _____
☐ No
☐ Not stated/unclear

11. What was the setting of the study?
☐ Community centre
☐ Correctional institution
☐ HEI
☐ Home
☐ Local Authorities
☐ Other Local Authority
☐ Policy environment
☐ Post-compulsory education institution eg 6th form college/FE
☐ Voluntary agency/charity
☐ Workplace
☐ Nursery school
☐ Middle school
☐ Primary school
☐ Pupil referral unit
☐ Secondary school
☐ Special needs school
☐ Independent school
☐ Residential school
☐ Schools (general)

☐ Not stated/unclear
☐ Other – please specify: _____

12. What was the geographical spread of the study?
☐ A Neighbourhood level
☐ B Town/city level
☐ C Local Authority/county level
☐ D Country level
☐ E International level
☐ F Rural
☐ G Urban
☐ H Not stated/unclear

13. Type of network – schools and…
☐ Schools
☐ HEI
☐ Local government
☐ Community/voluntary organisation(s)
☐ Not stated/unclear

16. Which type of study does this report describe?
☐ A Description
☐ B Evaluation – naturally occurring
☐ C Evaluation – research-manipulated
☐ D ☐ Controlled trial (non-randomised)
☐ E ☐ Randomised controlled trial (RCT)
☐ F Exploration
☐ G Review
☐ H Pre and post test
☐ I Not stated/unclear

17. Type(s) of intervention
☐ Adult/pupil exchange
☐ Counselling
☐ CPD programmes/training – joint
☐ Creation of new materials – joint
☐ Cross-organisation working
☐ Formalised communications
☐ ICT
☐ Intervisitations/visits
☐ Mentoring
☐ Observation
☐ Out of school learning
☐ Pupil voice/participation
☐ Peer coaching/support
☐ Research/enquiry
☐ Seminars/conferences/events
☐ Policy document sharing
☐ Strategy sharing
☐ Resources sharing
☐ Specialist coaching/support
☐ Sub-groups
☐ Timetabling – joint
☐ Work shadowing
☐ Not stated/unclear
☐ Other – please specify: _____
☐ Not stated/unclear

Outcomes

	18. Adult	19. Pupil	20. Leaders	21. Organisation/ school	22. Network	23. Beyond the network*
Achievement	☐	☐	☐	☐	☐	☐
Attitudes/beliefs	☐	☐	☐	☐	☐	☐
Knowledge	☐	☐	☐	☐	☐	☐
Learning	☐	☐	☐	☐	☐	☐
Morale/self-esteem	☐	☐	☐	☐	☐	☐
Motivation	☐	☐	☐	☐	☐	☐
Skills	☐	☐	☐	☐	☐	☐
Understanding	☐	☐	☐	☐	☐	☐

* Please specify: _____

Appendix 3: Definitions and conceptual issues.
The following definitions and synonyms were provided for the terms used in the question, sub-questions and inclusion criteria:

<u>Aspects of well-being known to affect learning</u>

These included confidence, lack of sleep, drug abuse, attendance at school, mental health, disability, diet, external responsibilities. The factors included in the Every Child Matters (ECM) strategies (http://www.everychildmatters.gov.uk) are: being healthy, staying safe, enjoying and achieving, making a positive contribution, and achieving economic well-being. The priority national targets and other indicators include, for example, half days missed through absence and re-registrations on the child protection register.

<u>Characteristics</u>

Characteristics will be defined through a set of keywords, taking into account physicality, structure, process and purpose.

<u>Communities-they-serve</u>
Identifiable people and groups who share characteristics (such as geographical proximity, professional interests or client base), interests or concerns, for whom a network is responsible
Synonyms: neighbourhood, school catchment area, patient base for a health centre

<u>Effective networks</u>
Effective networks are defined as those that either fulfilled their stated aims or achieved positive outcomes not originally anticipated. Effective networks are those which have a positive impact on learning or aspects of well-being known to affect learning.

<u>Impact</u>
For the purpose of this review, impact is defined as affecting personal, social, affective or cognitive development.
Synonyms: effect, improvements, sustainability, capacity, achievement, attainment, influence, enhancement, change

<u>Ineffective networks</u>
Ineffective networks are defined as those that do not fulfil their original objectives or secure any other significant achievements for people, organisations, practitioners or communities.

<u>Learning</u>
For the purposes of this review, learning is defined as positive development, processes and outcomes in relation to personal, social, moral, affective, cognitive, professional or organisational activities.
Synonyms: study, education, skills, practice, knowledge, understanding

<u>Networks</u>
For the purposes of this review, a network means groups or systems of interconnected people or organisations (including schools) whose aims and purposes include the improvement of learning and whose structure and organisation include explicit strategies designed to achieve those aims.
Synonyms: partnerships, consortia, collaboration, alliance

<u>Organisations</u>
For the purposes of this review, the word *organisations* is intended to refer to structural units within neighbourhoods, such as schools, hospitals and other health services, social services, police authorities, and the formally constituted public, voluntary and private sector agencies which serve the needs and interests of individuals and communities.

Synonyms: institution, group, establishment, body, agency, club, association, society

Practitioners
For the purposes of this review, we are regarding practitioners as those who work in schools – specifically teachers, teaching assistants, headteachers and those who hold leadership positions within the school and any others shown to have a direct connection with learning.
Synonyms: teachers, LSAs, professionals, headteachers, health workers, TAs, technicians

Pupils
For the purposes of this review we are regarding pupils as all children and young people in school between nursery schools and classes (3 years old) and sixth form (18 years old).
Synonyms: children, students, learners, young people

Schools
Formally constituted organisations, either state or privately funded, which are recognised as places where children are taught and learn
Synonyms: educational institution, academy, college

Transfer
Transferring knowledge means learning or understanding a theory, or set of data, or facts, well enough to apply them in a range of contexts that may be disconnected from the setting in which they were first encountered.

Transferring practice means learning a new skill, process or activity through watching it modelled, making mistakes, improving and making refinements, and understanding it well enough to deploy it in a range of contexts that may be disconnected from the setting in which it was first encountered.

Appendix 4: weight of evidence

Authors	Evidence A – Taking account of all quality assessment issues, can the study findings be trusted in answering the study question(s)?	Evidence B – Relevance of particular focus of the study (including conceptual focus, context, sample and measures) for addressing the question of this review	Evidence C – Appropriateness of research design and analysis for addressing the question of this rapid review	Evidence D – Taking into account quality of execution, appropriateness of design and relevance of focus, what is the overall weight of evidence this study provides to answer the question of this review?
Adler	Medium/High	Medium/High	Medium/High	Medium/High
Bielefeldt	Medium	Medium	Medium	Medium
Canniff	Medium/Low	Medium/Low	Medium/Low	Low
Carlos	Medium	Low	Low	Low
Clinard	Medium/Low	Medium/Low	Medium/Low	Medium/Low
Gettinger	Medium	Medium	Medium/Low	Medium
Gilbert	Medium/Low	Medium/Low	Medium/Low	Medium/Low
Greenberg	Medium	High	Medium/High	Medium/High
Howley-Rowe	Medium	Medium	Medium	Medium
Kahne	Medium	Medium	Medium/Low	Medium
Montgomery	Medium/Low	High	Medium	Medium
Norwich	Medium/Low	Medium/Low	Medium/Low	Medium/Low
Peters	Medium/High	Medium/High	Medium	Medium
Pinon	Medium/High	Medium	Medium	Medium
Reyes	Medium	Medium/High	Medium/High	Medium
Sanders	High	Medium/Low	Medium	Medium
Thurlow	Medium	Medium	Medium	Medium
Zetlin	Medium	Medium	Medium/High	Medium
Riley	Medium/High	High	Medium/High	Medium/High

Appendix 5: Detailed examples
Key processes and characteristics

Collaboration

The majority of school networks in the studies reviewed (nine) were in partnerships with HEIs (Adler, Gettinger, Greenberg, Peters, Pinon, Reyes, Riley, Thurlow, Zetlin). Five worked with Local Authorities and local community organisations (Kahne, Montgomery, Pinon, Reyes, Thurlow). One worked with a national agency (NFIE - Sanders) and one worked extensively with a large number of local businesses (Adler). Most of the studies also involved partnerships between schools and other outside organisations or groups, notably parents, who were involved in nine studies (see section x).

Seven studies indicated that collaboration or partnership were explicit objectives of the initiatives they were investigating:

- **Greenberg** examined an attempt to create a collaborative environment on multiple levels with genuine community-inclusive support and ownership, using co-ordinators who worked with parents and teaching staff and facilitated linkages to health and social services. Collaboration was facilitated by frequent meetings among teaching staff and with parent advisory boards. Collaboration with parents is reported to have reinforced classroom activities, as well as increasing parental involvement in schools.
- **Thurlow** found that increased collaboration was associated for team members, school staff, and the larger community with a strong, pervasive commitment to an inclusive philosophy. Paraprofessionals became more closely involved in the education of children, and staff members were more involved in decision-making at all levels both in school and at district level.
- **Zetlin** reported on a school-university professional development partnership in which the university acted as a catalyst in providing the supportive infrastructure for teacher change to occur through training. While university staff reported increased understanding and knowledge of 'real world' problems, schools tended to view them as experts rather than collaborators.
- **Sanders** focused on how the National Network could better guide districts, states and schools in creating the programmes of partnership that bring families, schools and communities together for students' academic, social and personal growth and development. The study found well-implemented partnership programmes which were linked to school improvement goals, and encouraged collaboration by reaching all families.
- **Peters** examined a school-university research and development project focusing on the extent to which school–university research and development partnerships can meet the professional development needs of teachers and academics in teacher education through collaborative enquiry. While increased use of collaborative approaches was reported, some participants indicated that they had expected to experience more opportunities for collaborative learning.
- **Gettinger** reported that the partnership focused on teacher-researcher collaboration about inclusive practices in early childhood settings and was clear that the programme's emphasis on collaborative enquiry had a positive impact on teachers' professional development by encouraging critical reflection and thoughtful practice. However, the study did not report on the impact on the researchers involved.
- **Pinon** reported on the strengths and challenges involved in the district-university partnership to implement Principles of Learning, emphasising two-way accountability without providing detailed evidence of how this worked.

A further four studies reported a strong collaborative dimension to their initiatives:

- **Adler** investigated a partnership operated by a regional agency. Schools worked with business as well as HEI partners and community organisations to offer support beyond that which is traditionally offered by high schools. Additional support agencies were also involved, including the National Council on Ageing, the California Employment Development Department and local chambers of commerce.
- **Montgomery** reported that the project built on existing linkages and used the expertise of an Educational Assistance team to help to establish collaboration with and between students, parents and communities.
- **Howley-Rowe** reported on the Quest initiative to invigorate efforts for continuous school improvement through creating learning communities in local schools and collaborative enquiry. However, survey results did not reveal an increase in the numbers of staff involved in the project feeling that they constituted a professional learning community.
- **Riley** found that the WRaPP project aimed to promote collaboration within and across schools by engaging hearts and minds and to create a shared vision of what constitutes a healthy, functioning school. The study found that progress had been made in creating a collaborative model of professional development, but this needed to be taken further.

Finally, three studies found more mixed results in terms of collaboration:

- **Bielefeldt** referred to the project's aim to design and implement collaborative, student-centred activities, along with the enlisting of additional educational stakeholders to bring in additional resources, but reported that time constraints had limited the opportunities for meetings necessary for open communication and problem solving.
- **Reyes** found evidence that collaboration became an implicit and explicit mechanism that drove school reform. The partnerships created allowed participating schools to expand resources and increase community capacity for school improvement. However, some teachers reported a lack of collaboration among themselves.
- **Kahne** reported that although there was some evidence of collaboration between network schools and community institutions, formal collaborative partnerships had not been fostered between schools and community institutions.

CPD

Continuing professional development (CPD) was at the heart of 12 of the 14 networks in the studies reviewed. This made it very difficult to separate the sub- questions relating to characteristics (such as collaboration) from those about knowledge transfer mechanisms. They operated, in most cases, interdependently and dynamically because by its nature, CPD is concerned with knowledge transfer.

Hence, while collaboration enabled the network to get partners involved, it was built into CPD as the principal means by which networks engaged participants deeply – through the effective transfer of knowledge and skill. Peer-to-peer collaboration, in combination with specialist expertise (most often provided through HEIs and Local Authorities), was the dominant pattern within the CPD programmes:

- **Bielefeldt** saw teachers teaching teachers as the dominant model of professional development. This involved sharing learning experiences as a site team, applying the experiences in the school and community, passing the learning on to others and repeating the shared training at conference workshops each year.
- **Gettinger** reported that teachers' professional development was characterised by an enquiry model built on participation in collaborative meetings and the recording and analysis of critical classroom incidents.
- **Greenberg** reported that COGNET's mediated learning classroom approach was founded on the belief that educational reform is determined by the effectiveness of professional

development. It combined best practices in education with a unique approach to teaching children how to learn, supported by an implementation network that connected participants with COGNET implementers in a wide variety of settings. The use of the Building Blocks of Thinking, Tools of Independent Learning, and mediated learning experiences was held to assure teachers that each child would make significant improvement in subject matter skills as well as gains in cognitive ability and in assuming personal responsibility.

- **Howley-Rowe** highlighted the creation of a strong learning culture in which ideas were shared and implemented and frequently reported the network's impact in facilitating the exchange of ideas. More formal sharing of practice and ideas took place at network rallies.

- **Kahne** reported the use of network-wide professional development meetings to build trust and social capital, while noting that developing a desirable set of school norms and practices turned out to be problematic in the first two years of the network.

- **Montgomery** referred to integrated and extensive professional development of project- and school-based staff without going into detail about what this looked like.

- **Peters** reported on an action research-based professional development project based on a number of factors, such as the foregrounding of teacher and student learning, the development of reflective skills, the commitment to reciprocity and the creation of structures for sharing learning.

- **Pinon** reported that the network's partnership with the Institute of Learning at the University of Pittsburgh was built around the Principles of Learning, research-based practices shown to promote academic rigour and high-quality learning by students. Activities included Principals' seminars, learning walks and content-focused coaching. However, it was suggested that too many of these activities were being aimed at programme leaders and that impact would have been deeper if coaching and study groups or learning walks were available for all staff.

- **Reyes** reported that the Houston Annenberg Challenge had invested heavily in enhancing teacher learning, bringing in outside experts to work with schools on-site, using highly experienced teachers as in-house staff developers, and supporting a range of group strategies such as critical friends groups, literature study groups, enquiry groups, and action research teams.

- **Riley** reported that joint training for all staff had occurred, supported by the network's creation of a climate of trust and opportunities and time for collaboration. However, high staff turnover had made it difficult to cascade ideas in some schools.

- **Thurlow** noted staff development training being carried out via several mechanisms, including project staff working with district partners, statewide and national conferences, and the development of an inclusion mentorship programme. The inclusion mentorship programme involved teams of general educators, special educators, parents, and administrators from 14 districts throughout Minnesota. The teams participated in a three-day training institute each summer that focused on facilitating systems change in support of inclusion.

- **Zetlin** emphasised the use of peer teams to provide opportunities for sharing and mutual support through training, with further mentoring support coming from university staff. The study reported that the network's flexible, individualised approach to professional development provided teachers with the knowledge and skills needed to understand how language minority students learn, as well as giving them the opportunity to practise new ideas and increase their knowledge of teaching, the curriculum and learning. However, limited management participation in the training was also reported.

The studies gave little evidence of formal dissemination of professional development. Indeed, Peters reported that while participants shared knowledge among themselves, there was no evidence of outcomes being shared beyond those directly involved in the project. This seemed to be a common feature of the studies. All the studies reported that professional development

was characterised by peer-to-peer support, rather than using courses outside the network. External expertise tended to be valued in an advisory role in collaboration with the network.

Focus
Most of the studies reviewed concentrated on networks which fostered commitment and coherence by focusing on a limited number of objectives and interventions. It was noticeable that the some of the most effective networks reviewed had a very specific and contained focus.

Most networks used specific CPD interventions, usually introduced and supported by external expertise and theory, to ground their activity. In some cases this encouraged the creation of shared purpose around the network focus or focuses. (See section on aims above p. xx)

Ownership
Ownership of the network's goals and processes seemed to be an important element in sustaining collaborative activities. The studies used a range of processes to encourage shared ownership in both practitioners and students:

- **Thurlow** reported that the project's sense of shared ownership was reflected in its commitment to all students and assumption of responsibility for all students' learning. All the districts involved came to an awareness that it was important to keep talking about the meaning of key concepts so that over time, people got closer to having shared meanings of those concepts.
- **Montgomery** found that leadership was defined as the involvement of students in the school and community in socially responsible activities. The initiative as a whole was thought to build a learner's self-efficacy in an area with specific attention to academic performance as a result of programme participation.
- **Riley** found that the initiative's model of change was based on a bottom-up approach, aimed at responding to schools' identified needs.
- **Bielefeldt** identified teachers teaching teachers as a powerful form of spreading ownership, but also reported lack of buy-in among teachers not directly involved in network teams.
- **Pinon** reported that a common language had been developed among many educators about effective leadership and classroom instruction.

Building capacity
The studies used a range of processes to build capacity and extend the perspectives of networks' members, although once again CPD and peer-to-peer working, including tutoring and mentoring, were some of the most common processes:

- **Adler** found that the extreme differences between treatment and control groups on full-time employment indicated a powerful treatment effect. The features which contributed to this were held up as tutoring and mentoring, training in specific job skills, on the job training and coaching, training in job readiness and free placement services. This was the only study to concentrate explicitly on vocational education.
- **Howley-Rowe** found that Quest staff worked with teams from school communities in three West Virginia county school districts to invigorate efforts for continuous school improvement, using a variety of techniques to create learning communities in local schools. These included network meetings, seminars and the SMART learning programme.
- **Kahne** warned that difficulties occurred when network and school goals were not aligned and network members were not held accountable to an agreed and coherent set of principles. Principals were wary of committing themselves to criteria which they felt did not reflect their own school's contexts, which caused some tension with local officials.
- **Zetlin** highlighted the importance of a personalised approach to teacher learning to build capacity. This helped to overcome teacher resistance and support teachers in developing

the skills and confidence to increase classroom implementation of new teaching strategies and behaviours.

Some challenges
Kahne and Peters are the two studies which reported the greatest number of challenges in terms of networked impact on educational improvement in general:

- **Peters** reported that participants' ability to translate learning into educational improvement was impeded by contextual constraints. Most schools were not able to achieve school-wide change in the limited time frame of the project. The complexity of the situations in which they worked and the, at times, chaotic nature of the change process mitigated against simplistic pronouncements attributing improvement to involvement in the project.
- **Kahne** concluded that transforming educational institutions is enormously difficult. Widespread distrust among relevant actors and the prevalence of external accountability mechanisms appeared to have constrained the impact of the project's objective of developing comprehensive social capital.
- **Reyes** reported that one of the goals of the project was to build long-term infrastructure to promote school reform, but teachers' perceptions were that it had not been very effective in bringing about reforms.
- **Thurlow** found that although a very strong and pervasive commitment to an inclusive philosophy and a culture of collaboration had been created, systems change skills that were developed were generally limited to members of the core planning team.

Transfer
How do networks transfer knowledge and practice from one context to another, either within or beyond the network?
An important finding from this review was the prevalence of various types of interpersonal contact – as opposed to print or electronic communications – as the principal means of knowledge transfer and skill sharing. Many of these were integral aspects of the CPD interventions. They included the peer support noted above plus:
- expert input
- events

Expert input
Nearly all of the studies cited evidence of strategic advice, training, coaching, facilitation or mentoring being provided by a combination of external and internal expertise. Mentoring was a feature of four studies (Adler, Bielefeldt, Pinon, Thurlow). As already noted, nine studies reported on formal partnerships with HEIs, where HEIs provided advice, support and a range of theoretical and research inputs. Interestingly, only three studies made explicit reference to the use of collaborative enquiry (Gettinger, Howley-Rowe, Peters), although many of the network interventions, especially in the area of peer-to-peer professional development, could be described as forms of collaborative enquiry. The following examples indicate the range of expertise drawn on by the networks studied:

- **Adler** highlighted the use of 'co-operative liaison' with local business, career specialists and local community services in working with teachers on vocational elements of the programme. This took the forms of peer tutoring, mentoring, worksite apprenticeships, on-the-job training and coaching, training in job readiness and free placement services.
- **Bielefeldt** reported on the use of mentoring, with a teacher mentor being attached to each of the network's 22 sites. The study also reported that the perceived need for most mentors declined as sites began to implement their programmes.
- **Gettinger** reported on how PARDI (Preschool Action Research and Development Initiative) used a collaborative partnership model with researchers from the University of Wisconsin

which had a positive impact on teachers' professional development by encouraging critical reflection and thoughtful practice.

- In addition to long term HEI support, **Greenberg** cited the use of Parent Advisory Boards and noted the contribution made by the programme co-ordinator and comprehensive services co-ordinator covering the multi-agency aspect of the network, working with both parents and teaching staff and facilitating linkages to health and social services.

- **Howley-Rowe** found that Quest staff worked with teams from school communities in three West Virginia county school districts to invigorate efforts for continuous school improvement, using a variety of techniques to create learning communities in local schools. These included network meetings, seminars and the SMART learning programme.

- **Montgomery** reported that the project created an Educational Assistance Team, consisting of a director, three itinerant resource specialists and two education assistants, to offer expertise and implement programme instructional activities in the network's schools.

- **Peters** focused on the Innovative Links Project, an action research based professional development project in which schools worked with university staff, using collaborative action research to implement programmes of school reform aimed at improving teaching competencies and learning outcomes for all students.

- **Pinon** reported the contribution made to the network by the Institute for Learning at the University of Pittsburgh, which provided mentoring and a variety of resources and vision on organisational and curriculum issues for programme leaders.

- **Reyes** emphasised the use of school-university partnerships and a critical friends group formed by teachers to discuss teaching and learning issues and operate as a valuable set of external eyes. Reyes also reported the use of a range of internal and external expertise for advice.

- **Riley** reported the use of external facilitators working alongside headteachers, deputies, lead learners, teachers and pupils.

- **Sanders** underlined the contribution made by each school's Action Team, made up of school staff and others in the community, which shared information on the programme's activities through a range of methods including newsletters highlighting current research and information nationally on partnerships, bulletin boards and phone calls.

- **Thurlow** reported that core planning teams provided strategic oversight in each of the network's four districts. Their role required them to develop a vision statement, engage in action planning, clarify roles and plan strategically. The study also reported an increase in the involvement of parents in school decision-making and in the parent mentorship programme.

- **Zetlin** reported that the university acted as a catalyst for teacher change, with schools receiving one year of ongoing university support in an initiative which provided approximately ten hours of professional development to develop awareness of theory and practice in support of the implementation of a comprehensive language programme. The training was held at either the school or university at the start of each school year.

Events
Seven studies explicitly referred to the use of conferences, symposia and other formal meetings to transfer knowledge and practice. In many cases these too were built in to the design of the CPD interventions:

- **Bielefeldt** reported that three conferences were provided by the National Foundation for the Improvement of Education which funded the initiative. These amounted to 19 days of training and workshops over the course of the programme's two years.

- **Greenberg** reported that collaborative activities included an annual leadership conference.

- **Howley-Rowe** reported the extensive use by the network of conferences (later renamed rallies) which were highly valued by participants and led by students in some instances. Scholars' colloquia and summer symposia were also held, which were designed to encourage members of the Quest project to collaborate in evaluating and writing about the project.
- **Kahne** cited the development of Summer Institutes at which teacher workshops were held, as well as two-week summer schools for teachers and administrators from network schools.
- **Pinon** reported that professional development events included two district-wide staff development days for teachers, five district-wide principals' seminars, content-focused coaching for seven teachers, and an ongoing programme of learning walks. This was augmented by a series of in-campus events, such as campus-based professional development, study groups and team meetings, all designed by schools.
- **Reyes** emphasised the use of three-day summer institutes to share knowledge, along with study groups, enquiry groups and other forms of collaborative activity.
- **Zetlin** also referred to extensive training being provided for teachers outside the school terms during summer and autumn but gives little detail.

ICT
It is worth noting that none of the networks highlighted the use of ICT as an effective networking process although the use of email and websites to facilitate knowledge transfer was referred to in passing in a small number of the studies. This does not mean that it was not used – merely that it was not particularly remarked. Bielefeldt was the only study explicitly to focus on ICT – increased technology use was one of the programme's objectives. The emphasis on personal communication plus the relative lack of emphasis on ICT suggests that ICT may not be a primary source of knowledge transfer in networks that do not have technology as a focus:

- **Bielefeldt** reported that teacher use of the ICT network increased in 16 of the 22 sites and student use increased in 12 sites. However, use of both personal email and discussion areas declined during the course of the programme despite the fact that 14 of the 22 teams had a majority of their members making at least weekly use of email and 5 of the team leaders reported daily use of email.
- **Sanders** reported that only 19.5 per cent of staff had accessed or were planning to access the network's website and 11per cent of staff had emailed or were planning to email network staff.
- **Howley-Rowe** included some anecdotal evidence of email lists being used as a sounding board for thinking and sharing ideas.
- **Reyes** reported one middle school using consultants to improve its technology knowledge and use, as well as some students reporting that their maths teachers had incorporated technology into their class.

Funding
Few of the studies provided exact details of additional funding but it was clear from nine of them that additional funding was part of the networked arrangements. Sources ranged from government grants to individual schools (see page 54).

Developing inclusive cultures
Five studies reported the development of an increased sense of inclusiveness as a result of networked initiatives. Three of these (Greenberg, Montgomery, Thurlow) were among the six initiatives associated with interventions focusing on at-risk, underachieving or minority students. Peters and Reyes also provided evidence of a greater sense of empowerment and a reduced sense of isolation among network members as a result of working collaboratively with a shared purpose.

- **Greenberg** found that the parent–school partnership programme helped parents and schools to work together more closely in ways that met specific community needs to ensure children's success through education. While the study did not explicitly state that the project fulfilled its aim to achieve '*genuine community-inclusive support and ownership, both top-down and bottom-up'*, there was evidence that the foundations for such a partnership had been laid.

- **Montgomery** reported that the initiative was designed to increase the involvement and identification of Indian students in educational services for gifted students. The results of the project, however, suggested ways to identify and serve all rural or geographically isolated students who were gifted and faced other challenges, such as limited English proficiency, having disabilities, or being a minority, culturally diverse or economically deprived. Also, the study found that the boundaries that typically separated students in the gifted programme from those that were not involved diminished in importance.

- **Peters** found that teachers' ability to translate learning into educational improvement was related to the extent to which they individually and collectively felt empowered to address dilemmas and contextual constraints. While some felt that some obstacles were insurmountable, at least in the short term, others became more determined to achieve reform, and united to lobby for change at the wider school and system level. It is suggested that the latter group was assisted by cultural factors such as working collaboratively on a common focus for reform and supportive school leadership.

- **Reyes** found some evidence that networked schools had narrowed the achievement gap between economically disadvantaged and non-disadvantaged students and that schools had significantly reduced isolation within schools, between schools, and with the community by forming substantive partnerships.

- **Thurlow** found that the programme's emphasis on inclusion extended to the integration of an inclusive schooling content in personnel development and graduate training programmes, and research and dissemination focused on the role of educators in creating and supporting inclusive school practice. There was also evidence that ownership was being shared through developments such as school personnel taking responsibility for setting meeting agendas and sharing ideas about how to make inclusion work.

Appendix 6: Resources from this review

The resources from this review include a database containing:
- details of the 4, 670 titles and abstracts that were identified for this review
- details of the 102 titles and abstracts and 17 full studies identified as teacher training and which were excluded
- details of the 426 titles and abstracts passing the first stage of inclusion
- keywords for the 133 passing stage1 filtering criteria
- data extractions for the 19 studies passing stage 2 and stage 3 criteria

The database containing all of these details and the queries listed below is accessible through the Networked Learning Group.

There are also 426 **full reports** which met the stage 1 filtering criteria.

The queries run on the data set to aid the synthesis included:
- keyword counts for all studies
- keyword counts for studies passing stage 3
- tables of data extraction results for related questions (eg aims, results, conclusions)
- cross-tabulations of selected keywords for all studies

For further information about these resources contact the Networked Learning Group