Teaching and Learning Research Programme

Teachers Learning to Learn

Mary James

Institute of Education London, England

Robert McCormick

Open University, England

Abstract

Learning to learn by students, aimed at giving them autonomy, requires teachers to develop new classroom practices. Hence teachers' learning to learn is as important as their students'. In 2001-2004, our project examined how learning how to learn (LHTL) practices were developed by teachers in 40 English schools, based on a model of change that linked school management policies, teachers' professional learning, their classroom practices, and their own and students' beliefs about learning (James *et al.*, 2007).

Methods included teacher and student questionnaires, and interviews of head teachers (HT), school project co-ordinators and a sample of teachers. The latter were also observed and some video-recorded.

Teachers found it difficult to promote student learning autonomy (SLA) because of external constraints. They were able to promote autonomy if they fundamentally changed the classroom tasks and climate. At school level there were strong statistical relationships between school policy and teachers' professional learning; 'engagement in inquiry' was particularly related to the promotion of SLA. We also investigated the learning between schools and how they used networking, using ideas on 'weak links' from network theory. We mapped the ego-centric networks of co-ordinators and head teachers in some schools, revealing that there were many powerful informal links and networks that could be developed.

Introduction

History will tell how the 21st Century is to be characterised, but this much we know already: it will be a time of unprecedented growth in knowledge and speedy change, for good or ill. In order to flourish in this knowledge economy, individuals and communities will constantly need to learn new things, apply their knowledge in new contexts, create new knowledge where existing ways of doing and thinking are found wanting, and exercise wise judgement about what is important and what is not. Learning content will always be important, but learning how to learn will be equally vital.

This presents a challenge for teachers and for schools who will need to focus on two things simultaneously: teaching the substance of subjects, and helping students to learn the ideas and practices associated with the process of learning itself. In the research reported in this paper, we came to see this process as having two reflective and strategic dimensions: making learning explicit to students, and promoting their learning autonomy. For many teachers, this requires them to learn new knowledge (about learning), develop new skills, and reassess their roles. Teachers need to learn, as well as their students, and schools need to support them in this, which requires organisational learning. There is a sense, then, that learning how to learn (LHTL) is necessary for both students and teachers. This paper examines these processes for both groups of learners, but especially for teachers.

The 'Learning how to learn in classrooms, schools and networks' (LHTL) Project[1] set out to investigate two key questions based in these insights:

- How can learning how to learn practices be developed and embedded in classrooms without intense outside support?

- What conditions in schools and networks support the creation and spread of such knowledge and practices?

The Learning How to Learn project

The LHTL project was funded from 2001 to 2005 within the large, UK-wide Teaching and Learning Programme (see www.tlrp.org) managed by the Economic and Social Research Council. The central aim of the TLRP is to conduct research to enhance outcomes for learners in authentic settings of practice. In other words, there is an imperative not only to investigate 'what is' but also 'what might be'. For this reason the LHTL project was designed with two components – development and research – to investigate how

---

[1] The Project (ESRC ref: L139 25 1020) was directed by Mary James (University of Cambridge until December 2004, then at the Institute of Education, University of London) and co-directed, from 2002, by Robert McCormick (Open University). Other members of the research team were Patrick Carmichael, Mary-Jane Drummond, John MacBeath, David Pedder, Richard Procter and Sue Swaffield (University of Cambridge), Paul Black and Bethan Marshall (King's College London), Leslie Honour (University of Reading) and Alison Fox (Open University). Past members of the team were Geoff Southworth, Colin Conner, David Frost, Dylan Wiliam and Joanna Swann. Further details are available at http://www.learntolearn.ac.uk .

innovations in LHTL practice are created and implemented, and what impact they have.

The project team drew its members from five universities. It worked with 40 secondary, primary and infants schools from seven local authorities in southern England. According to performance tables and inspection reports, most of these schools were broadly 'average' at the start of the project - with room for improvement.

Conceptual basis of the project

We used the phrase 'learning how to learn' (LHTL) in the title of our project although we did not have a satisfactory definition of the concept at the beginning of our work. We assumed that it had something to do with self-monitoring and self-regulating aspects of meta-cognition (Brown, 1981) but our interest in finding out what can be *done* by teachers and students in classrooms, to promote learning how to learn, led us away from regarding it as a psychological property of learners (such as a disposition or general ability) and towards seeing it as a set of practices that can be developed by students to help them to learn autonomously, in new settings, when teachers are not present to support or encourage them. These would be crucial for lifelong learning.

Of course, such LHTL capabilities would involve the development of dispositions and skills but these were unlikely to be sufficiently generic to allow them to be fostered in specific study skills or 'learning to learn' courses, or assessed by measures that did not require a substantive context in which LHTL could be demonstrated. It was partly as a result of a failed attempt to develop a test of learning to learn based on what students actually do in unfamiliar contexts (Black *et al*. 2006), and partly as a result of reading more deeply in the literature (philosophical as well as psychological), that we came to the conclusion that LHTL cannot be separated from learning itself i.e. learning *something*. Rather it is an activity involving a family of learning practices (tools) that enable learning to happen. This explains our preference for 'learning *how* to learn' over 'learning to learn' - the *how* word is important.

We agreed with Dearden (1976: 70) that:

> Learning how to learn is at one stage further removed from any direct specific content of learning. It might therefore reasonably be called 'second-order learning'. There could be many such comparably second-order activities, such as deliberating how to deliberate, investigating how to investigate, thinking out how to think things out, and so on.

Like Dearden, we rejected the idea of a 'super-powerful unitary skill' because of 'the enormous divergent variety of first-order learning'. More persuasive to us was the idea that LHTL is a 'family of structures of second-order learning', from which practices may be selected according to the nature of the first order learning being pursued. This means that first order 'learning' and second order 'learning how to learn' are inextricably linked.

However, Dearden regarded 'learning autonomy' as having priority – being top of the hierarchy - in the LHTL family. We agreed. However, can be argued

that, if LHTL is a family of practices, 'learning autonomy' is not just another structure or practice in this family. Rather it is the objective or desired outcome of all LHTL activity or practices. This moves it onto another plane: an important point for us because promotion of learning autonomy, and hence agency, became the key focus of our project.

A further insight was that it is not necessary to regard autonomy as a quality of individual minds alone. For example, socio-cultural theorists (e.g. Rogoff, 1990) draw attention to the socially-mediated nature of meta-cognition. Thus, the social/collaborative dimension of both learning and learning how to learn is crucial and leads us to question the concept of 'independent learning' as an educational aim, which is so prevalent in educational discourse in England[2].

The discipline of a development and research project forced us to think about the particular family of second-order LHTL activities we might recommend to teachers, or encourage them to develop. Practices associated with formative assessment or 'assessment for learning' (AfL) (ARG, 1999) held promise because previous research and development of formative assessment, with which some of the team had been associated (Black and Wiliam, 1998; Black *et al.*, 2003), had demonstrated the potential for improved learning and achievement. Such AfL practices clustered under four main headings: (i) rich classroom dialogue and questioning to elicit student's understanding; (ii) formative feedback to help student's know how to improve; (iv) sharing learning objectives, criteria and exemplars of what counts as quality learning in domains; (iv) peer- and self-assessment. Underpinning these were two principles which emerged when we carried out a factor analysis, on responses to a teacher questionnaire in which we attempted to operationalise these AfL practices in the form of survey items. We called the two relevant factors: 'making learning explicit' in classroom discourse and reflection; and 'promoting learning autonomy' through enabling learners to identify their own learning objectives, and through peer- and self-assessment. These two factors captured important features of learning how to learn as we had come to understand it.

If learning autonomy is the goal, and learning how to learn is the activity oriented towards that goal, then assessment for learning can be viewed as providing tools for the activity. The relationship can be represented hierarchically (see Figure 1).

---

[2] Concerns about the theoretical and practical validity of the concept of 'independent learning' have penetrated UK policy making processes. It is significant that government departments have selected the term 'personalised learning' in preference (http://www.standards.dfes.gov.uk/personalisedlearning/) although there is still much debate about what this actually means (see http://www.tlrp.org/documents/personalised_learning.pdf)

Learning Autonomy (outcome)

↑
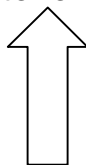
Learning How to Learn (activity)

↑
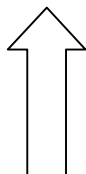
Assessment for Learning (tools)

Figure1: Relationships between three key concepts

Design of the project

Although we planned to build on existing research, we wanted to go beyond replication. Most research into the effectiveness of formative assessment (or AfL) had been conducted on a small scale with intensive support from researchers. If such innovations are to go 'system-wide' we knew that they would need to be implemented in authentic settings with much less support. Thus we chose to provide little more than the kind of help schools might find within their local authorities (LAs) or from their own resources. Then we observed what happened. We were especially interested in how the project 'landed in schools' and why innovation 'took off' in one context but not another. Our particular interest was in the conditions within schools and networks that are conducive to the 'scaling up' and 'rolling out' of AFL and LHTL practice.

Development work in schools was initiated by the academics (who were the schools' critical friends) with the help of LA advisers who acted as local co-ordinators. External support was light-touch to simulate the kind of resource that schools might have available. A whole-school inset day introduced teachers to the evidence base which was important in convincing them that AfL was worth trying. Then we shared with them some of the practical strategies that other schools had developed. An audit and action planning activity enabled them to discuss how they would like to take the project forward in their schools. Some chose to work through optional work shops that we provided; others selected or adapted them. (All these resources are now available in a book of resources for teachers: James *et al*., 2006b) Each

school decided how best to implement innovations. The other main intervention from the project team was to feed back to the school co-ordinator, and sometimes other staff, the results of the baseline survey we conducted into staff values and stated practices. This showed up differences among groups of staff and stimulated discussion and action. We provided materials to support more general CPD and school improvement strategies. At network level, school co-ordinators' meetings provided development opportunities.

Our research used careful and systematic data collection and analysis to enable us to analyse patterns across our sample as a whole, and over time, and to examine school differences on common measures. We developed research instruments at each level (classrooms, schools and networks) with a view to integrating them to provide a holistic picture. We collected quantitative data, mainly through questionnaire surveys to help us discover general patterns, associations, group differences and change over time. We collected qualitative data, mainly through recorded observations and interviews, to give us more depth of insight and especially to help us interpret statistical associations. We also requested performance data from national databases in order to provide some response to the question: Has the project observed improvements in pupils' measured attainments? We treated these data cautiously, but we incorporated them into our case studies.

We carried out our development and research work in authentic settings where many factors interact. (Schools were subject to multiple innovations and changes at the time.) We did not expect to be able to carry out carefully controlled experiments, because we could not hold other variables stable. For this reasons we knew that we would not be able to claim, with confidence, that any change we observed was the result of our specific interventions. Nevertheless, we theorised that certain variables might be expected to have an influence on others and we proposed to investigate these as carefully as we could. This we called a logic model of linked factors in a causal argument (see Figure 2). We used our quantitative and qualitative data to interrogate these links. The quantitative data gave us evidence of associations and the qualitative data gave us insights into possible explanations. These could not be the kind of explanations offered by controlled trials because the whole point of this project was to see what would happen when ideas generated from carefully controlled small-scale experiments 'go wild' – when they cease to be 'controlled'.

For practical reasons we organised our work on three levels and gave sub-teams responsibility for developing instrumentation and analysis at one of three levels – at classroom level (mainly King's College), at school level (mainly Cambridge and IOE) and at network level (mainly the OU and Reading). In practice these levels overlapped. This is powerfully illustrated by the fact that teachers themselves learn in their classrooms, in their schools, and with colleagues in other schools linked through personal and professional networks. Our work sought to examine these across-level relationships in teachers' learning, which is the particular focus of this paper.
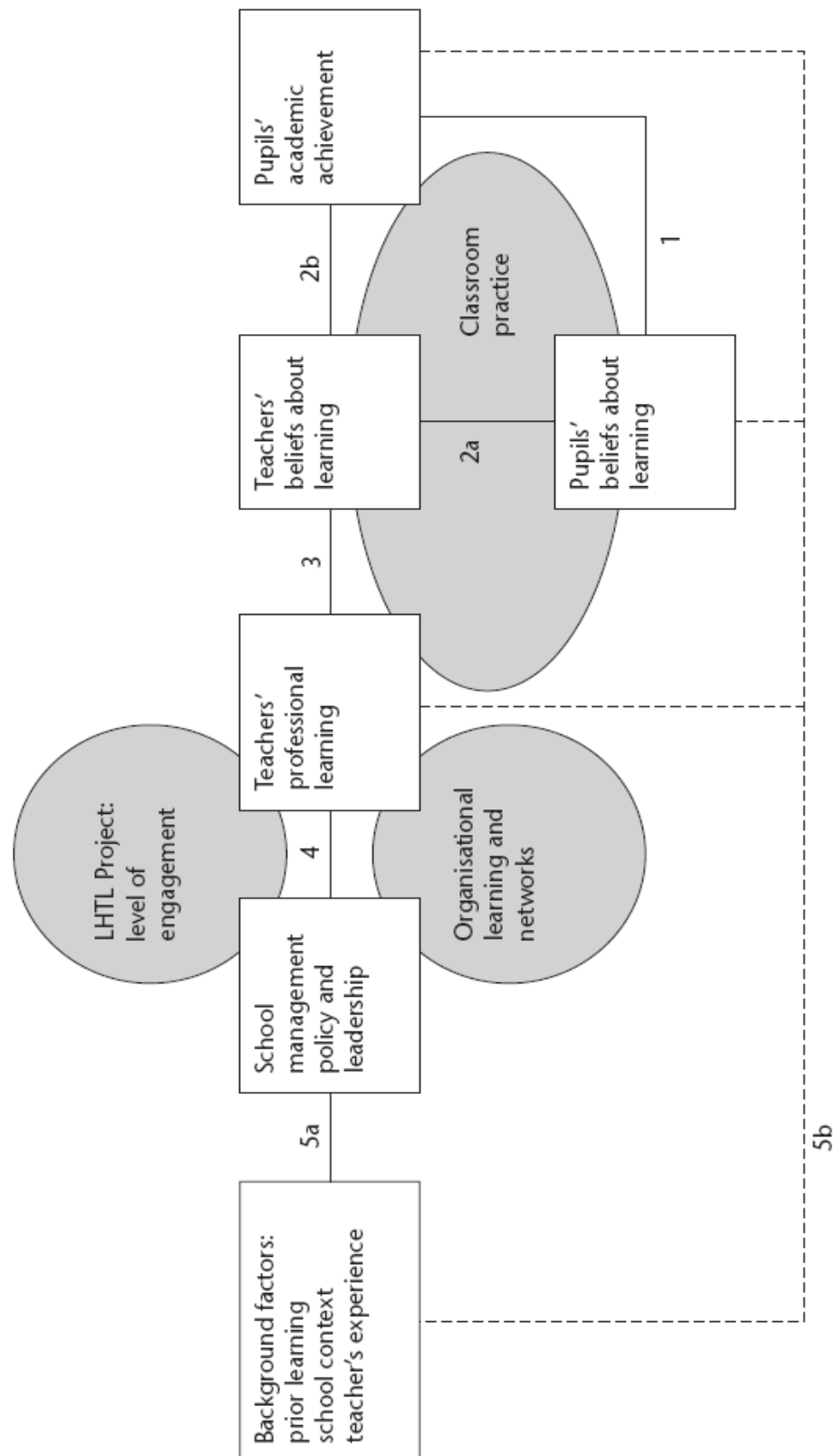
Figure 2

Findings related to teacher learning

Teachers learning in their classrooms

27 lessons were videoed as part of observations of a sub-sample of 41 focal teachers from 20 project schools. Almost all the lessons were filmed at the midpoint of the project and so they provide snapshots of classroom practice. Alongside these video recordings we were able to place evidence from interviews with the same teachers about their beliefs about learning, and their pupils' comments on the lessons. These snapshots also sat within a wider picture of teachers' practice and values distilled from survey data collected from 1200+ teachers in 32 schools (more detail is provided below). Three main dimensions of classroom practice (factors) emerged from the wider questionnaire evidence which provided a useful initial framework for the study the video evidence. These were: the extent that there was evidence of teachers 'making learning explicit', 'promoting learning autonomy' or pursuing a 'performance orientation' i.e. in contrast to a learning or mastery orientation (Dweck, 2000).

What became apparent from the video material was that assessment for learning practices were being handled very differently in the various lessons observed. It seemed that AfL strategies had been adopted, in some lessons, in ways that reflected what might be called the 'spirit' of AfL, showing a deep understanding of the principles underpinning the practices. In other lessons the implementation of AfL seemed more mechanical, more the 'letter', focusing on surface techniques. One factor in particular seemed to differentiate one type of lesson from another – promoting learning autonomy. Significantly, this was associated with the way in which that principle was instantiated in the tasks that the students' undertook. An example may help to illuminate the distinction we made.

Two of our video recordings were of different teachers of English, teaching Year 8 classes (13 year olds). Ostensibly, they were both attempting to do similar things in similar contexts. One of the key findings of earlier research on AfL (Black *et al.*, 2003), was that sharing the criteria with pupils and peer and self-assessment is beneficial. These are, in a sense, both procedures. In both English lessons the teachers shared the criteria with the pupils by giving them a model of what was needed. The pupils then used those criteria to assess the work of their peers.

In lesson A, pupils were looking at a letter they had written based on a Victorian short story; in lesson B they were asked to consider a dramatic rendition of nineteenth century poem. Both had the potential to enable pupils to engage with the question of what makes for quality in a piece of work – an issue which is difficult in English and hard for pupils to grasp. The teacher, in lesson A, modelled the criteria by giving the pupils a piece of writing which was full of errors. They were asked to correct it on their own. The teacher then went through the corrections with the whole class before asking them to read through and correct the work of their peers. In lesson B the teacher and the classroom assistant performed the poem to the class and invited the pupils to critique their performance. From this activity the class as a whole, guided by

the teacher, established the criteria. These criteria then governed both the pupils' thinking about what was needed when they acted out the poem themselves and the peer assessment of those performances.

Two crucial but subtle elements differentiate these lessons. To begin with the scope of the task in lesson A was considerably more restricted in helping pupils understand what quality might look like, focusing instead on those things which were simply right and wrong. Pupils in lesson B, on the other hand, engaged both in technical considerations, such as clarity and accuracy, as well as the higher order, interpretive concepts of meaning and effect. In addition, the modelling of what was required in lesson B ensured that pupils went beyond an imitation of that model. Each of the tasks in lesson B, including encouraging the pupils to create their own criteria, helped them to think for themselves about what might be needed to capture the meaning of the poem in performance. In other words the sequence of activities guided them towards autonomous learning. The procedures alone, of lesson A, were insufficient to enable this last beneficial outcome of lesson B. The question concerning teachers' own learning is: what is it that led the teacher of lesson B towards a deeper understanding and interpretation (the spirit of AFL) than the teacher of lesson A?

Analysis of our questionnaire and interview data suggests that teacher's beliefs about learning affect how they implement AfL in the classroom. Much of the roll out of AfL in England[3] has focused on giving teachers procedures to try out in the classroom without considering what they already believe about learning in the first place. Evidence from the questionnaire data suggests that some teachers feel more able to promote student autonomy in their classrooms than others. Certain patterns also emerged from analysis of interview data indicating that those teachers who articulate a clear commitment to student autonomy are more likely to realise it in the classroom. Underpinning lesson B, for example, was the teacher's strong conviction that her job was to make her classes less passively dependent on her and more dependent on themselves and each other. Unlike the teacher in lesson A, her beliefs about learning all centred on a move towards the greater autonomy of her students.

Teachers holding views similar to teacher B were also more likely to blame themselves for students not learning rather than the students themselves (or some barrier external to the classroom). This led them to question how they might approach those activities, which failed, differently, or capitalise on those tasks that went well. For example:

> The idea is that sometimes you prepare the lesson, which isn't appropriate for the pupils. It's over their heads, or it's too easy, and that sometimes prevents learning from taking place, or meaningful learning…You might be able to control the situations so that they complete the task but they haven't actually learnt anything because it's too complicated and they didn't get the hang of it, or it was too easy and it was something they could dash off. (Fran)

---

[3] It has been promoted by Government in its 'National Strategies' (e.g. http://www.standards.dfes.gov.uk/primary/about/).

> If I've taught a lesson, then I'll go over it, reflect, think, what could I do better next time? Sometimes it's just a thought and sometimes I actually kind of go back over the scheme of work, look at the lesson plan and write notes to myself for next time. So it depends on what it is really and how severely bad it went. (Angela)

In this way the AfL procedures are employed and reflected upon to achieve a particular point of understanding or realise the principle of student autonomy. The procedures are not seen as ends in themselves or simply as things to do to enhance performance in tests and examinations.

In understanding these findings, however, we could not ignore the context in which teachers in England work. At the time of our study, teachers and students alike worked in a system dominated by the demands of the curriculum and examinations. The pressure was to cover the course or teach to the test rather than take the time to explore pupils' ideas and understanding. Therefore, one way of understanding a gap between what teachers say they believe and what they actually do in the classroom is to understand the pressures of the current climate. Using the software package, *Atlas ti*, we coded 37 transcriptions of interviews with classroom teachers. Of 16 major coding categories, one was 'performance orientation' (140 passages) and another was 'barriers to student learning' (366 passages). When these two categories coincided we found three sub-categories: 'pressures of curriculum coverage', 'pressures of national testing' and 'pressures of a tick-box culture'.

The tensions and dilemmas that teachers face and their struggles to bring their practice in line with their educational values, whilst coping with pressures from outside, were a strong feature of their learning in the classroom. Some appeared content with 'going through the motions' of trying out new practices but a small proportion (about 20%) 'took them to heart' and, with a strong sense of their own agency, tested and developed these ideas in their own classrooms in creative ways. The challenge for us was to find out what kinds of support within and beyond schools would allow the twenty per cent come nearer to being one hundred per cent.

Teachers learning in their schools

In order to investigate the conditions in schools that might promote changes in classroom practice we constructed a questionnaire to be administered to staff in our project schools on two occasions, two years apart. This had 84 items in three sections, each relating to a dimension of interest to us: classroom assessment practice and values; teacher learning practice and values; school management and systems practices and values.

The basic assumptions that shaped this aspect of our research were:

- The promotion of AfL and LHTL in classrooms represents a considerable innovation in teachers' practices.

- This requires teachers to learn these new practices.

- Such learning needs to be encouraged by a supportive school culture.

We had 1212 responses to our first administration of the questionnaire to teachers and teaching assistants, and 698 to the second administration. We carried out factor analyses on each of the sections on the first (baseline) administration of the questionnaire to identify underlying factors. The following were the factors we identified:

Dimensions of classroom assessment:

Making learning explicit: eliciting, clarifying and responding to evidence of learning; working with students to develop a positive learning orientation (alpha: .73).

Promoting learning autonomy: a widening of scope for students to take on greater independence over their learning objectives and the assessment of their own and each other's work (alpha: .76).

Performance orientation: a concern to help students comply with performance goals defined by the curriculum, through closed questioning, and measured by marks and grades. (alpha: .54) N.B. In the literature performance orientation is distinguished from learning orientation; the latter is important for sustained lifelong learning.

Dimensions of Teacher Learning

Inquiry: using and responding to different sources of evidence; carrying out joint research and evaluation with colleagues (alpha: .77).

Building social capital: learning, working, supporting and talking with each other (alpha: .74).

Critical and responsive learning: through reflection, self-evaluation, experimentation, and by responding to feedback (alpha: .76).

Valuing learning (alpha: .63).

Dimensions of school management practices

Deciding and acting together: involving staff in decision making and using their professional know-how in the formulation and critical evaluation of school policy (alpha: .91).

Developing a sense of where we are going: clear communication by senior management of a clear vision and the fostering of staff commitment to the whole school based on good working knowledge among staff of school development priorities which they view as relevant and useful for learning and teaching (alpha: .84).

Supporting professional development: by providing formal and informal training opportunities so that teachers, for example, can develop skills to assess their students work in ways that move them on in their learning, and to observe learning as it happens in the classroom (alpha: .76).

Auditing expertise and supporting networking: information is collected on practices that staff themselves think they do effectively, and on informal teacher networking in which they play an active role. Teachers are supported in sharing practice with other schools through networking (alpha: .80).

Using these factors we were able to examine, among other things (see James *et al.*, 2007, for a full account), the changes in teachers' practices over time, aggregated across our whole sample (see Figure 3).

Figure 3: Changes in teachers' classroom practices, 2002-2004.

2002

2004
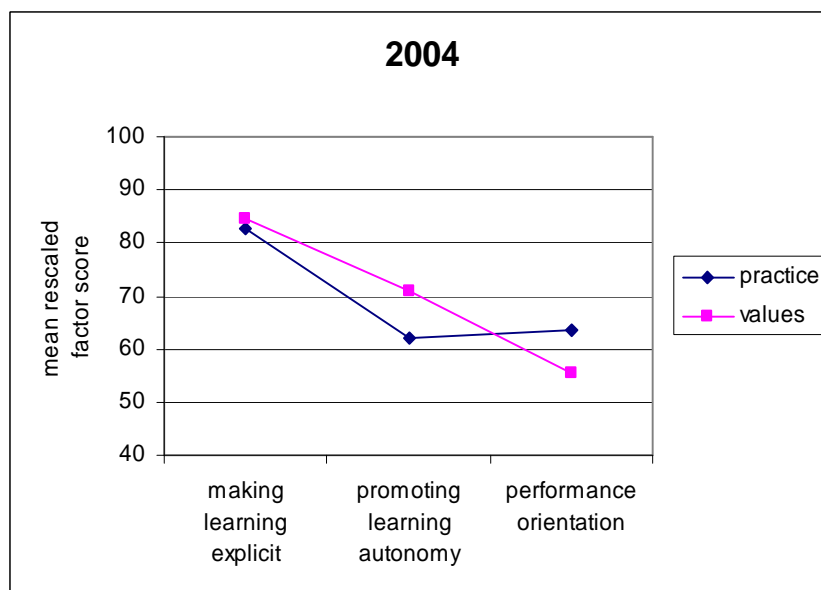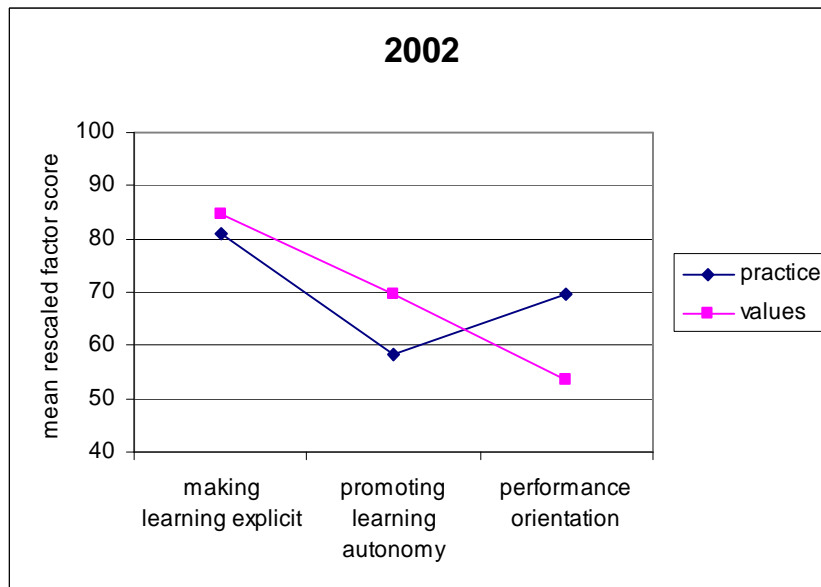
The main gaps between teachers' values and their practices at the beginning of the project were related to promoting learning autonomy (practices noticeably behind values) and performance orientation (practices noticeably ahead of values). By the end of the project, teachers were reporting to us that they were rebalancing their assessment approaches in order to bring their practices into closer alignment with their values. They did this by reducing practices with a performance orientation (by 9%) and by increasing practices with a focus on promoting learning autonomy (by 7%). Levels of making learning explicit were already high at the beginning of the project. These high levels showed a slight 2% improvement over the two years of the research.

The key finding from this part of the research is that in order to promote learning how to learn in classrooms, teachers reported reductions in performance orientation and increases in promoting learning autonomy with sustained high levels of making learning explicit.

Schools' performance data indicates no negative impact of these changes on school performance, as measured by national test results, from 2002 to 2004, but there were some interesting success stories. It is important to recognise that these graphs are for the sample as a whole therefore individual school differences are smoothed out. In some of our most successful schools there was much higher valuing and practice of promoting learning autonomy. For example in one school with 84% 5A*-Cs at GCSE in 2004, and high value-added scores[4], the majority of teachers consistently valued making learning explicit and promoting learning autonomy almost equally highly (and above performance orientation), and their values-practice gaps were minimal.

After factor analysis, in relation to each of our dimensions, we carried out multiple regression analyses to look at associations between factors on the different dimensions. We wanted to find out to what extent the variation in classroom practice might be accounted for by teachers own learning practices and/or school management practices. Our key findings are represented in Figure 4. On the right of this diagram are the classroom assessment factors; in the middle are the relevant teacher learning factors[5]; and on the left are the school management factors.

In this 'broad brush' analysis, what appear to be important, at the level of the school, are (a) a clear sense of direction – there is communication within the school of a clear vision, there is also commitment among staff to that vision; (b) systems of support for professional development – teachers released to plan together, they are encouraged to experiment and to take risks with their practice along with a range of other learning opportunities; and (c) the management of knowledge – expertise is audited, schools have systems for locating the strengths of staff as a basis for managing staff expertise and building on it through support for internal and external networking. However the impact of these factors on classroom practice, particularly those practices associated with learning how to learn and the promotion of learning autonomy are mediated by teachers' own learning practice, particularly collaborative

---

[4] These are key indicators used in school performance tables constructed by government in England.

[5] We omit 'valuing learning' because this factor was unstable.

classroom-focused inquiry. Thus, the key school condition for the promotion of learning how to learn by students appears to be development and support of teacher learning through their inquiry into classroom experience. This might include learning from research, but also working with other teachers to plan, implement and evaluate new ideas.
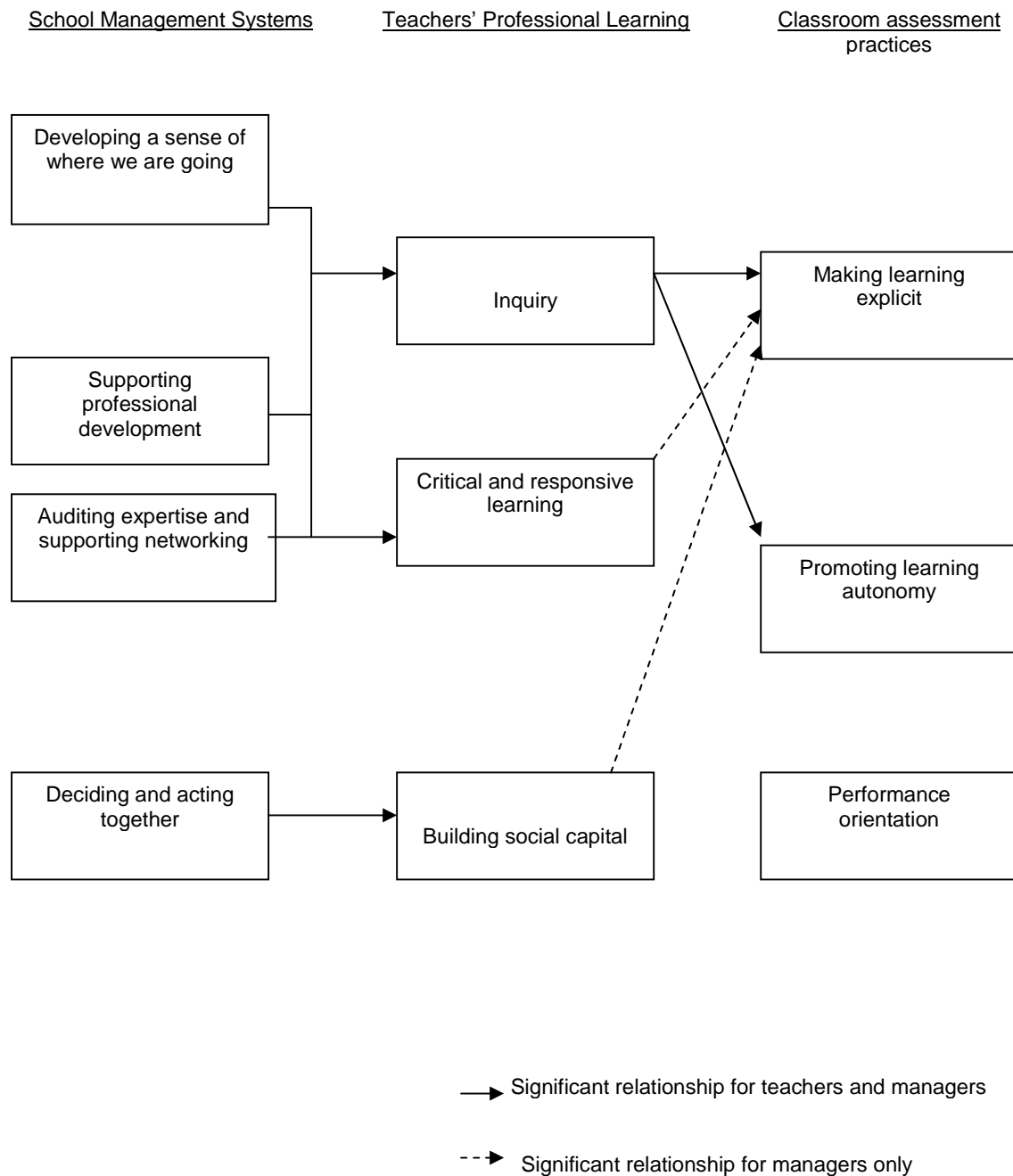
School Management Systems   Teachers' Professional Learning   Classroom assessment practices

Developing a sense of where we are going		Making learning explicit
Supporting professional development	Inquiry	Promoting learning autonomy
Auditing expertise and supporting networking	Critical and responsive learning	Performance orientation
Deciding and acting together	Building social capital	

→ Significant relationship for teachers and managers

⇢ Significant relationship for managers only

Figure 4: School conditions that foster successful classroom promotion of learning how to learn

14

Data from coordinator and head teacher interviews, and other sources (e.g. workshop activities), revealed that embedding changes in classroom practice, teachers' professional learning, and school systems and practices, is a process that takes time. It is on-going in that it is never completed since contexts change. As one head teacher eloquently put it in interview:

> Well it won't just happen. … some of these questions imply that it's a sort of finished business. […] Well it isn't, and that's actually at the heart of it. It's a development of permanent reflection and refinement and there's no end if you like. You can't reach the stage where you can say 'Ok, done that, got there, sorted, I've done my learning and now I'm teaching ok', the profession should never be like that anyway and no profession should actually. For one thing the external circumstances are changing, but also, what we understand about learning is changing all the time. It's what we understand professionally: we as a collective profession of teachers; or what we as individuals understand; or what we with that particular group of students understand. […] what you're learning is judgment and you're learning more about how to judge within a set of principles...

Embedding occurs through differing combinations of approaches and practices: working groups; standing items on meetings; school and department improvement plans; teacher 'champions' working together; informal dialogue; inviting and acting on feedback from students, networking with other schools.

These differing combinations of approaches and practices reflect the fact that schools have people with different strengths, dispositions and priorities; schools are at differing stages of development and organisational maturity; and that they face differing changing contexts, all of which influence the embedding of learning how to learn. Cluster analysis of our staff questionnaire data demonstrated the extent to which different groups of staff within schools have different configurations of values and practices (see Chapter 8 in James *et al.*, 2007); in secondary schools subject differences were particularly marked. Both quantitative and qualitative data also showed the extent of differences between schools and primary and secondary sectors. These within-school and between-school differences indicate a need for differentiated approaches to continuing professional development for teachers and to school improvement plans. One size does not fit all.

Our evidence indicated that each approach or practice has both structural and cultural aspects, which interplay in complex ways. Cultures develop through structures, and structures are shaped by cultures. School leaders, subtly or more directly, change structures and shape culture. They both lead and model, and, very importantly, they support distributed leadership so that others who are not necessarily in positions of formal leadership can exercise influence - structurally and culturally.

Embedding learning how to learn occurs within a context of existing practices, structures and cultures, many of which may be antithetical to learning how to learn. These existing embedded practices, structures and cultures often need to be challenged, in order to embed learning how to learn. The challenge for leadership, as revealed by our data, was to create space and the climate for

reflection and sharing, which includes encouraging dialogue, dissent and risk-taking. We came to view 'double loop learning' (Argyris and Schon, 1978) as particularly important at school-level. This involves stepping back from the familiar plan-do-review cycle to examine each stage before stepping back in to do something new. This process, at organisational level, mirrors the process of strategic and reflective inquiry for teacher learning, which in turn mirrors the process of developing learning autonomy, through AfL and LHTL, by students.

At all levels collaborative knowledge creation and sharing is crucial, which in our project was the particular focus of our study of teachers learning through networks.

Teachers learning through networks

The primary research question for our investigation of networking was: how can the knowledge and skills of learning how to learn be effectively transferred within educational networks? This implies an understanding of the nature of educational networks, and our research proposal indicated that we would map the nature of these networks.

There was also strong interest, in subsidiary research questions, in the role of technology in such networks and the levels of teacher competence and confidence in using network technologies. We discovered that our initial confidence in the role of technology in educational networks, at least those pertaining to schools, was seriously misplaced (Carmichael and Procter, 2006).

We had a number of sources of data which together provided a picture of schools well-equipped with new technology. Most of our sample schools had a student-to-computer ratio below the national average and some had invested heavily in hardware, software and network infrastructure.

However, these resources were little used for 'school-to-school' electronic networking. Most teachers used their classroom and staffroom computers' internet connections to gain access to commercial content providers, central resources such as the Qualifications and Curriculum Authority website and their local LA 'Grid for Learning'. On the whole, where schools had begun to employ tools such as email and web-based resources, these were often being used to replicate and supplement existing processes, rather than enabling new patterns of interaction, sharing and professional development.

The use of ICT may be embedded in professional practice, but the focus is mainly on what it can offer in terms of material resources for lessons. For example, teachers in our sample used the Internet as a source of lesson resources (74%) and schemes of work (49%), but fewer (26%) reported using it to find information about teaching techniques. However, there was considerable optimism and anticipation on the part of teachers, managers and LA officials about what network technologies, such as video conferencing, *would* be able to offer once technical constraints had been resolved.

Returning to the lead research question, the mapping task envisaged was evidently needed because many ideas about the nature of the networks are poorly formulated. Discussions of networks in the literature refer to

'collaborative process …knowledge-sharing and sustainability' (Jackson, 2002) or to the patterns of meeting and collaboration associated with 'communities' rather than 'networks' (Kubiak and Bertram, 2004). The processes by which networks play a role in knowledge creation and sharing tends to be assumed rather than interrogated.

We found Castells' (2000) conceptualisation of the 'layers' of the 'network society' provided a helpful starting point for a better understanding. The first layer describes the electronic network itself: what we might call the *electronic map*. This simply looks at the electronic connections and how various servers, server systems and exchanges, might inter-relate and switch electronic traffic around. The second layer is concerned with mapping networked resources such as web pages: what we call the *information map*. A third layer is concerned with the use of the network by actors and groups: what we would call the *actor map* (McCormick & Carmichael, 2005, p. 3).

When people - including our respondents - talk about networks and networking, they tend to blur the distinctions between these layers, or apply ideas that are developed to describe networking of one 'layer' to other layers. For example, when an LA is described as a 'hub', it is sometimes unclear whether this refers to its location within the electronic infrastructure, as a provider of information, or as a group of people with particular expertise.

We found it particularly useful to distinguish between 'whole network' thinking (the view from ten thousand feet) and 'ego-centred' models (the way it looks from where I am now). On the basis of this latter view of networks, we carried out a mapping task that allowed us to understand the nature of the networks that teachers (in our case LHTL project school co-ordinators) and head teachers had access to or were part of (Fox, *et al.*, 2007). When we drew upon the network literature we were able to identify in these maps examples of some of the major ideas found there (e.g. Hakkarainen *et al.*, 2004), and this enabled us to see how networking might be used as part of teacher and school learning.

The first insight was the need to recognise and value what are known as *weak links*, that is, links where there is not a strong relationship involved but where the knowledge involved is valued (Granovetter, 1973). One such example comes from our data:

> We'd get a school or a head teacher or a maths subject leader to come up and talk about what they've been doing in their school and so that has led to situations where somebody may have then approached the person afterwards and said, 'Well, just tell me a bit more' or 'Could I have a copy of . . .?' or 'Can I come and pay a visit?' and so on.
> (Redbridge local authority co-ordinator/adviser)

Thus teachers attending a conference might pick up some good ideas and be enthused by a speaker such that they go back to school and try a new approach. The speaker has no strong relationship with the teachers, but nevertheless this is an important link. These weak links contrast with *strong links* that are the focus of so many communities (rather than networks); strong links are important but difficult to sustain in the face of the need for a school to learn using its everyday resources. This was an important part of our project

approach discussed earlier, which enables schools to learn in ways that can be scaled up for all schools.

This recognition of different strengths of links indicates the importance of recognising different kinds of links and networks. One important finding was the difference in the kinds of links that the co-ordinators had, compared with the head teachers. The latter are usually seen to be the 'networkers' of a school because they have the opportunities, not only to regularly work outside the school, but are seen as gatekeepers to knowledge from outside sources. Head teachers' networks include *embedded links* - embedded because they are personal and involve friendship:

> I have actually established a whole link and group of friends through playing football basically. Obviously the more formal meetings too, but the informal discussion that goes on has been far more productive . . . because you basically tend to be likeminded individuals sharing my views.
> (Sam, head teacher, Alder Primary School)

More usually, however, head teachers build links with one another in *affiliation networks*, which they are then able to use when they need help:

> I would then ring people and ask, 'What do you do with so and so?' or you know, 'Have you ever had to deal with whatever?' . . . Yes, it is partly because I have been around for a while so that I probably know most of the longer standing heads reasonably well.
> (Barbara, head teacher, Juniper Primary School)

LHTL school co-ordinators on the other hand had to build new networks to go with their role and, because they were in the new area associated with the LHTL practices described above, this brought new sources of knowledge and ideas into the school. By linking the school to new networks, the co-ordinator can form a bridge from the school to other networks and other external sources of expertise. This is a familiar function fulfilled by any teacher who goes out of school to a meeting, inservice activity or conference and reports back. Figure 5 shows an example of a co-ordinator's map of her networks.

These informal networks and links are an important resource for schools. Learning how to understand them is in a sense the 'learning how to learn of networking'. Schools could benefit from understanding the different types of networks and links, from trying to map them for their school, and by encouraging and giving teachers opportunities to network (i.e. use the networks). These are important and new aspects of teacher professional development

Figure 5: map drawn by a school co-ordinator

Summary and conclusions

In this final section we summarise some of our findings in terms of ten key messages for teachers' professional learning.

1. The ultimate goal of assessment for learning and learning how to learn is to promote learning autonomy. Learners (whether students or teachers themselves) need to take responsibility for their learning and develop strategies that enable them to learn both on their own and with others.

2. AfL practices (tools) are a useful starting point. However, these practices should serve underlying principles, such as making learning aims, processes and outcomes explicit to learners and promoting learning autonomy through encouraging 'mindfulness' and strategic approaches.

3. Although teachers appreciate practical advice, classroom practices can become ritualised and mechanistic if teachers are not stimulated to think about the principles of learning that underpin them. We made a distinction between those teachers who implemented the 'letter' of AfL by injecting AfL practices into what they usually do without changing anything more fundamentally, and those who captured the 'spirit' of AfL by integrating practices into the flow of lessons to regulate the learning process itself. This latter required some understanding of underlying principles and we concluded that beliefs and practices are interrelated and need to be developed together. It is not sufficient just to tell teachers what to do.

4. Those teachers (only about 20% of our sample at the beginning of our study) who had most success with implementing AfL and LHTL in their classrooms were those who demonstrated a capacity for strategic and reflective thinking and took responsibility for what happened in their classrooms. They were not inclined to blame external circumstances (such as initiative overload) or pupil characteristics (such as innate ability or attitudes) but concentrated on the ways in which they could improve the learning experience for pupils.

5. Although most teachers held clear and positive educational values, the majority of teachers struggled to bring practice in line with their stated values. These values-practice gaps closed somewhat over the course of the project but many teachers felt constrained by a policy context that encouraged rushed curriculum coverage, teaching to the test and a tick-box culture.

6. Values, beliefs and practices were not uniform over all groups of teachers. In secondary schools, there were differences in the beliefs and practices of teachers with different subject specialisms. The highest percentage of teachers with classroom practices consistent with AfL were teachers of English. In contrast, mathematics teachers seemed to struggle with these ideas. There were also differences between schools. These differences indicate the level of the challenge for leadership and support, and particularly for development of differentiated strategies for professional development.

7. Classroom-based collaborative inquiry practices for teacher learning emerged as the key influence on teachers' capacity to promote learning autonomy with their pupils. These include learning from research and also working together to plan, try out and evaluate new ideas.

8. Such knowledge creation among teachers can extend beyond the classroom through networking across the school and with teachers in other schools. Networking through face-to-face meetings of various kinds builds the social capital (mutual support and trust) that supports the exchange of intellectual capital (ideas and practices). But the networks should involve a wide variety of links to enable all schools and teachers to take part.

9. Opportunities for teachers to learn in these ways, through classroom inquiry and networking, depend significantly on organisational structures, cultures and leadership. Particularly important is a school's knowledge of the expertise in its midst, or available to it, and its capacity to tap into this expertise, grow it and spread it through professional development activities and networking. The quality of leadership at every level is crucial to making this a reality.

10. The key challenge for leadership is therefore to create the space and climate for school staff to reflect on and share aspects of their practice. This includes encouraging and stimulating dialogue and risk taking. In this way, innovations can be tested, embedded and sustained. Without it, they remain surface changes which decay and disappear when the next initiative comes along.

References

Argyris, C. and Schön, D. (1978) *Organizational Learning: A Theory of Action Perspective* (Reading, MA: Addison Wesley).

ARG (Assessment Reform Group) (1999) *Assessment for Learning: Beyond the black box* (Cambridge: University of Cambridge School of Education).

Black, P., Harrison, C., Lee, C., Marshall, B. and Wiliam, D. (2003) *Assessment for Learning: Putting it into Practice* (Maidenhead: Open University Press).

Black, P., McCormick, R., James, M. and Pedder, D. (2006) Learning how to learn and assessment for learning: a theoretical inquiry. *Research Papers in Education*, *21*(2): 119–132.

Black, P. and Wiliam, D. (1998a) Assessment and classroom learning. *Assessment in Education*, *5*(1): 5–75.

Brown, A.L. (1981) Metacognition: the development of selective attention strategies for learning from texts. In M. Kamil (ed.) *Directions in Reading: Research and Instruction* (Washington, DC: The National Reading Conference).

Carmichael, P. and Procter, R. (2006) Are we there yet? Teachers, schools and electronic networks. *The Curriculum Journal*, *17*(2): 167–186.

Castells, M. (2000) *The Rise of the Network Society. Vol. I. The Information Age: Economy, Society and Culture*, 2nd edn (Oxford: Blackwell).

Dearden, R.F. (1976) *Problems in Primary Education* (London: Routledge and Kegan Paul).

Dweck, C.S. (2000) *Self-theories: Their Role in Motivation, Personality and Development* (Philadelphia, PA: Psychology Press).

Fox, A., McCormick, R., Procter, R. & Carmichael, P. (2007) The design and use of a mapping tool as a baseline means of identifying an organisation's active networks. *International Journal of Research & Method in Education* *30*(2), 127-147.

Granovetter, M. (1973) The strength of weak ties, *American Journal of Sociology*, *78*(6), 1360-1380.

Hakkarainen, K., Palonen, T., Paavola, S. and Lehtinen, E. (2004) *Communities of Networked Expertise: Professional and Educational Perspectives* (Amsterdam: Elsevier).

Jackson, D. (2002) *The creation of knowledge networks: collaborative enquiry for school and system improvement.* Paper presented to the CERI/OECD/DfES/QCA/ESRC forum Knowledge management in Education and Learning, 18-19 March, Oxford.

James, M., Black, P., McCormick, R. and Pedder, D. (2006a) Learning how to learn, in classrooms, schools and networks: aims, design and analysis. *Research Papers in Education*, *21*(2):101–118.

James, M., Black, P., Carmichael, P., Conner, C., Dudley, P., Fox, A., Frost, D., Honour, L., MacBeath, J., McCormick, R., Marshall, B., Pedder, D., Procter, R., Swaffield, S. and Wiliam, D. (2006b) *Learning How to Learn: Tools for Schools* (London: Routledge).

James, M. et al., (2007) *Improving Learning How to Learn in classrooms, schools and networks* (London: Routledge).

Kubiak, C. & Bertram, J. (2004) *Network Leader's Perspectives on the growth of Networked Learning Communities.* Paper presented at the British Educational Research Association conference, Manchester, September 14-18.

McCormick, R. & Carmichael, P. (2005) *Theorising and researching teacher learning across schools.* Paper presented to the ESRC TLRP Seminar Series: Learning to Learn: Supporting learning to learn with face-to-face and computer-mediated communication, University of Newcastle, 15 March

Rogoff, B. (1990) *Apprenticeship in Thinking: Cognitive Development in Social Context* (New York: Oxford University Press).