Teachers' Learning Through Networks

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Abstract
Networks provide ways of thinking about how teachers create and share knowledge about practice, which is at the core of experienced professionals’ learning. They have increasing importance as an element in public policy for improvement of education in schools, particularly in the UK. Using a variety of theories, this paper presents concepts that provide insight into such networks, through data from maps of teachers’ networks. Network concepts were used to analyse these maps, showing how brokerage, and the informality and strength of links, are important in understanding the implications of networks for the school. The paper opens up insights into how teacher learning can be enhanced in new ways, with a real focus on the school as a workplace for teachers.

Educational networks as a way of thinking about knowledge creation and sharing
One aspect of the Learning how to Learn Project (a $2 million project within the ESRC Teaching and Learning Research Programme in the UK) is to investigate how teachers and schools learn how to learn Assessment for Learning (AfL) practices. These practices involve using formative assessment to improve learning (Black and Wiliam, 1998). This learning requires the development and sharing of new practices that involve profound change for teachers as individuals and for schools as collectives. Networks are often seen as a way of creating and sharing knowledge, but are more frequently researched within organisations than between them (e.g. Hakkarainen et al., 2004). At the outset of the project in 2000, we were primarily concerned with discovering whether networks (and electronic networks in particular) provided a possible ‘mode of engagement’ for schools interested in developing AfL approaches – and to discover to what extent AfL principles and practice would be shared among schools. Our particular research question was:

To investigate how educational networks, including electronic networks, can support the creation, management and transfer of the knowledge and skills of learning how to learn.

Networks, and many of the concepts associated with them (such as ‘hubs’, ‘nodes’, and ‘brokers’), are often poorly conceptualised or differently conceptualised and described by various sources; for example a hub can be seen as a point where many connections are made (as in electronic networks), or it is one where an influential person can be found. More importantly, many accounts of teacher networks, are in fact more appropriately seen as communities in that they involve the close and intensive working of teachers (e.g. Lieberman, 2000). Wenger’s (1998) definition of such communities views them as sites of teacher learning, with a focus on the social aspects of such learning, and tends to under-emphasise the perspective of the individual teacher. While such communities may be one element in a network, it is evident that there are other fruitful connections

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2 The relationship between networks and communities of practice is developed further in McCormick (2003)
among teachers and schools. We sought to understand these networks using the insights from a wide range of literature.

**The language of network theories**

There are three basic features of networks, namely, nodes (who and what is communicating in the network), links (how this communication is being conducted) and the ‘traffic’ in the links (what is it that is being communicated). Although this looks like an essentially electronic model of a network, there are a variety of levels at which this can be viewed, depending upon the theoretical perspective and focus of analysis. School networks involve activity not only at what Castells (2000) describes as the 'layer' of electronic infrastructure (layer 1) of the 'network society', but also involves the distributed information resources (layer 2) which are accessed by 'actors' where relationships are important (layer 3) in support of a variety of learning and managerial activities (Castells, 2000: 442-446). Distinguishing these aspects is, as we shall show in the paper, a critical element in beginning to see how networks and the process of networking are understood by participants.

To counter the rhetoric of networks, increasingly becoming evident (e.g. Hargreaves, 2003), there are a number of frameworks which offer fruitful approaches to analyses of at least some aspects of networking. For example: Social Network Analysis (SNA; see Wasserman & Faust, 1994), is a well developed approach used by many in a variety of fields, including in the knowledge creation and sharing within innovative companies (Hakkarainen, et al, 2004). This latter approach, drawing on the need to add to the Sfard (1998) two metaphors for learning (Acquisition and Participation Metaphors), views the work of experts through a knowledge creation rather than a learning metaphor (Paavola, Lipponen & Hakkarainen, 2004). Learning focuses on a 'curriculum' to learn (and therefore that there are those who already know it) whereas knowledge creation is more indicative of the situation of teachers in a new area of practice such as AfL.

The useful work of Hakkarainen et al. (2004) provides only a partial basis for analysis. Their use of SNA concepts (e.g. density, centrality), is based on highly structured instruments within complete closed networks. Other concepts they employ are affiliation networks in which individuals share a commitment to concepts, principles or communities; these, like 'embedded' personal social networks, are imported into workplace settings, and may be more important to individuals than formal, inward-looking networks in organisations. They also distinguish between the loosely-defined, self-regulating and long-lived communities that emerge through these as a result, compared with managed, task-oriented knotworks. They develop the work of Granovetter (1973) in that they distinguish between strong ties (proximal, frequent, reciprocal and multiply-redundant) and weak ties (distal, infrequent, not reciprocal); see Palonen et al, 2004.

However, all of these approaches, and the analysis associated with them, are based on the view that the whole network can be ‘known’ and that links are bimodal (they either exist or they do not) or are quantifiable. The use of powerful concepts such as ‘centrality’, the intuitive appeal of which, Watts argues, has led to analysts ‘focusing heavily on devising centrality measures
either for individuals in a network or for the network as a whole' (Watts, 2003: 52). The situation for schools is that we have no clear idea of the nature of the networks that they draw upon for their knowledge development and learning; there is no ‘complete’ network in the way that there is a complete organisation (i.e. all those in the organisation are identifiable). Individuals in schools will have links with a wide variety of people, groups and communities etc., both in and outside of their school. For such ego analyses (Wasserman and Faust, 1994; pp. 42) we therefore designed a novel mapping technique (described in Fox et al, 2005) for those in schools and local authorities (LAs) to represent, from their perspective, their organisation’s network. This gave ‘snapshots’ of what are referred to as ego-centred perspectives of educational networks.

It might be worth at this point reflecting on an alternative view of personal networks, as taken by Gladwell (2002). His approach is to focus on connectors, mavens and salesman, individuals who are, respectively, well connected, active collectors of knowledge and persuaders. His analysis attempts to explain how ideas spread and why there are ‘tipping points’ in this spread such that they reach ‘epidemic’ proportions. This is a legitimate way of explaining the role of individuals, but we are faced with explaining connections that include entities other than individuals, and for this we consider network theories helpful. This does not discount the kind of analysis Gladwell carries out, and indeed there are overlaps when he comes to discuss the nature of connectors acting in what other theories (including network theories) call brokers, however, it will become evident that network ideas can lead to other dimensions of brokerage.

**Analysing networks to show the mobilisation of social capital**

Hargreaves (2003) has called on the education system in the United Kingdom to recognise that mobilising capital (intellectual, social and organisational) in schools is a way of thinking about increasing school effectiveness. Notions of capital are based on Marxist views of accumulated surplus being invested in order to exact expected returns. The neocapital theories on which Hargreaves based his exposition refer to modifications of the above. Such capital he refers to as a school’s invisible assets. The networks, our respondents’ represented and discussed, from either their school’s or LA’s point of view can be considered in this light. Discussion of knowledge creation, and transfer, implies increasing the intellectual capital, the skills, expertise and knowledge, of all nodes involved (students, teachers, school leaders, advisers etc.). Through talking to school leaders we find out about the organisational capital, the knowledge and skills being used to improve a school. We also collected evidence from LA advisers and network co-leaders associated with networks set up under the auspices of the National College of School Leadership’s network learning programme³.

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³ The programme of Networked Learning Communities (NLC) funds groups of schools to set up a network and is reported on by Cordingley (2003) and NCSL (2004). Preliminary evaluations include Buchberger et al, (2003) and CUREE (2003)
Our analysis of networks, however, adds most to the exploration of social capital, which focuses on how resources, embedded within social networks (Lin, 2001), are utilised and lead to expected benefits for both individuals and the collective network in terms of wealth, power and reputation. The access to resources individuals have and the processes of mobilisation of these resources that increase social capital in a network are considered important by Lin. This we address by considering the links made with people and organisations (nodes) (Castells’ layer 3), what they are gaining through these links (layer 2), and how connections are made (layer 1).

Personal, ego-centred, views of an organisation’s connections can be demonstrated from within a single school. The differing networks offered by both a headteacher and a co-ordinator from the same school can be analysed in terms of them being two ego-centred networks. While our respondents were asked to represent their school’s communications, the resultant network maps and interviews related also to the personal intensional networks of the respondents, as recognised by Nardi et al (2000). Their personal creation, management and activation for individual benefits, either instrumental (i.e. wealth, power and reputation) or expressive (physical health, mental health or life satisfaction) (Lin, 2001), need to be recognised and understood before they can be harnessed effectively by school leaders for the collective good.

Burt (2001) argues that increasing network closure through the inter-connectivity of all those in the network one with the other, should be combined with the siting of key actors (with high social capital related to external links) such that they are able to broker across what he terms ‘structural holes’. These holes are an absence of links between one node and another which, if bridged by new connections and relationships, can allow new routes for information to flow.

Our data allows us to analyse the networks described to us for individual, schools and among schools. Although we should respect that the data is ephemeral and incomplete in nature, we can respond to Erickson’s (2001) call for more grounded research into the processes of social capital in other industries. This also supports Hargreaves’ (2003) call within education that social capital is a worthwhile attribute to recognise and encourage.

The data on which this paper is based

43 respondents, including headteachers, school co-ordinators and LA advisers, were asked to represent the professional communications they were aware of relating to their organisation. They were encouraged to explain what was foremost in their minds as they drew the maps, and why they used different particular modes of representation. This commentary was recorded and transcribed and, together with the map itself and other sources of data collected as part of the project (see James et al 2006), provided an initial dataset. (See Figures 1 and 2 for examples of maps). Subsequent focused interviews (approximately a year later) were concerned with changes in the patterns of communication and the impacts of networking on practice.

Figure 1: A headteacher’s map of the communication network of her elementary school
Maps and transcripts were treated as qualitative data and, while we attempted to aggregate some data in order to produce whole-school or cross-school maps, what this demonstrated was the variety of perspectives of networks, rather than any common views of specific networks or networks in general. For practical purposes we take the data to encapsulate the respondent’s perceptions and conceptions of the networks of their organization (school or local authority), their role within it, and the resources available to them as they engage in professional activity. Head teachers and school project coordinators from the same school offered us two different perspectives.

From these data we produced two levels of analysis. The first was descriptive with a low level of inference looking at such things as: the organisations, roles, key actors, etc., which made up the nodes; the nature of the links, and some elements of structure of the network. The second level drew upon the theoretical ideas discussed above, which identified important features of networks considered pertinent to understanding knowledge creation and sharing. We created a large number of codes, drawn largely from the literature, that were then reduced into a number of groups of network ideas:

1. indications of the ‘traffic’ in the network, i.e. the knowledge, ideas and materials that are shared or ‘moved’ around the network links;
2. the important nodes (important from the point of view of theory) such as ‘broker’, ‘expert’, ‘communities’ and ‘knotworks’ (where people come together for short-term tasks);
3. the nature of links in terms of their formality and their strength (the strong and weak ties referred to earlier);
4. the extent and nature of electronic communication in the links;
5. important inter-relationships between nodes and links (the significance attached to a role in the network, perceptions of identity, directionality of links and hierarchical relationships among nodes).4

In this paper, we present data from the mapping exercise for two respondents (the Head Teacher and the Assessment Co-ordinator) based in the same elementary school, in terms of the second-level analysis based on the whole sample, focusing on network links. In addition we include an analysis of two further interviews with these respondents focusing on more general school issues.

The school and it’s networks
This elementary school (Juniper Primary School) is a two-form entry of 3-11 year-olds in a outer London Borough with around 450 children on roll. Approximately one-third of children are eligible for free school meals, about a quarter have special educational needs and, a high proportion, over three-

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4 Working papers were generated for each group and a working paper describing the development and application of the coding frame.
quarters have English as an additional language. The headteacher was about to retire having spent 11 years in her current post. The assessment coordinator, who acted as the school co-ordinator for the Learning how to Learn (LHTL) project, was also a network co-leader for the local Networked Learning Community containing a sub-network concerned with AfL. She had a specific and formal role within this externally managed network (NLC), whose focus was aligned with the work of our own project. The co-ordinator shared the co-leadership of this network with a school leader in a nearby secondary school. In consultation with a critical friend, allocated by the LA, the network organised various events centred around termly meetings of school AfL project leaders. Both headteacher and co-ordinator raised several issues they considered particular to their school and which affect their networks: high student mobility, a high staff turnover in some years and being situated in a rich multi-cultural community.

Their maps are those given in Figures 1 and 2, providing us with representations of Castells’ (2000) layered view of networks. The physical connections being made (i.e. links made) pertain to layer 1, how the information flows (through a range of methods of communication) is at layer 2, and the actors (including organisations and groups etc.) involved represent layer 3. In the first map the headteacher represented nine types of node as connected with the school:

- other head teacher colleagues,
- other schools,
- outside agencies,
- ‘Friends of the school’ (a form of parent-teacher association),
- parents,
- children,
- governors and
- LA officers, advisers and council members.

The co-ordinator includes most of these types of node in her map but, with respect to some types of node, gives more detail in terms of a greater density of nodes (e.g. with respect to internal school networks, and LA and outside agency connections). Extra nodes were also represented, principally concerning the AfL network and LHTL project, within which she had co-ordinating roles. Evidence of the nature of the information travelling around the network was not always evident on the network maps themselves, but was revealed through secondary analysis of the transcript data collected from associated interviews with these two respondents.

**A value dimension to the relative strength of links**

We have already pointed to the distinction drawn by Granovetter (1973) and Palonen et al (2004) between strong and weak links. Strong links might include close working relationships between colleagues working with the same age group at school or in the same department. Those that are ‘weak’
are distal, infrequent and uni-directional. These links might include those between practitioners and LA advisers or educational psychologists. Much of the work on teachers’ workplace learning assumes that links must be ‘strong’ and hence involve intensive working (thus to the dominance of the idea of communities, rather than networks).

Our respondents were keen to distinguish between the strength of links and the value of links, and suggested that there were strong links that were of little value and, more significantly, weak links of high value. ‘Value’ was described in terms of ‘quality’, ‘satisfaction’ and the relevance and impact they had on practice. We developed this into a model of strength and value (as represented in Figure 3) in which links can be plotted on the basis of two related continua.

Figure 3: A model of strong and weak links taking into account the perception of value of the link.

In this paper we will focus on the high value links. Low value links were described to us by the school leaders at this elementary school as, for example, links with governmental education departments with respect to a raft of recent initiatives. These were mentioned several times by both respondents but seen as one-way and can be argued to fall into the strong, low-value category of links.

The headteacher alludes to the perception of such initiatives as low-value by suggesting that they might be considered worth objecting to but that, while they do often have statutory implications on practice, she tries to maximise the value of them to her school in every case. The most common weak, low-value links were those with LA officers and advisers. The head teacher did not mention any direct connection with any particular nodes within the LA (see Figure 1), mentioning generically advisers, officers and council members. The co-ordinator (although showing the LA connections in more detail on her map – Figure 2) only spoke of the critical friend attached by the LA to the AFL network as having any meaningful link with the school and even then not with respect to the, related, LHTL project:

The co-ordinator concludes that it appears that the LA feel they are supporting the school’s participation in the AFL and LHTL initiatives indirectly i.e. through

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5 An exploration of a sample of LHTL project schools, including this one, and their attitude and responses to government policies is dealt with by Swaffield & MacBeath (2006).
the critical friend role, which is supporting the Assessment for learning network as a whole. What they can’t understand is why there is no involvement from (or link with) the LA assessment adviser for what is a supposedly LA-supported assessment initiative.

In contrast to these low-value links, school leaders spoke of both strong and weak links being of high value to the school. We consider these firstly, with respect to internal links to the organisation, in which strong links are unsurprising, and secondly, as they relate to links with nodes beyond the school. We present both weak and strong examples of these highly valued external links.

**Strong, high value links: To what extent is the internal network a community?**

It is the networks internal to the schools or organisation that is most likely to be known and can be considered possible for a school to develop as an interconnected web of strong links. Both headteacher and co-ordinator of Juniper Primary School spoke of how senior staff felt that the school should be working collectively.

> I think as a collective body, we’re all responsible for each others’ professional development in a way, aren’t we. I mean, we kind of all feed into…and especially for my role, I’ve been very responsible for their professional development.
> (Juniper_Prim_Sch_Co-ord int_end of year one)

This vision equates with notions of those in the school being connected more like a community rather than as a network. The headteacher certainly reported that teachers’ support each other’s planning, especially supply staff (who fill in for absent teachers) and new teachers:

> When you talk with people you will find that they are willing to help one another in order that things work better … I have people who come in from the [supply] agencies and so they tell me…I think it’s probably true, staff don’t mind coming here because they know that they will get supported in terms of the planning, (Initial level 2 headteacher interview_Juniper)

The school also operates a buddy system, including two ‘buddies’ being allocated for the new deputy head. The head explains how this is used to induct new staff quickly and allows a personalised route to monitoring induction:

> I think [the buddy’s are] a supporting role [and are] a way in which we have actually promoted that so that [policies] bed in faster than if people are just left to sort of think about it, but then there are still things that every so often you throw up and you think ‘Oh we thought they had understood that and they haven’t’, so you then have to go back and say ‘Actually we do it like this, you know’ and you have to not be frightened to say that, (Initial level 2 headteacher interview_Juniper)

We have examples of how informal and direct approaches taken by this school’s headteacher to connect the staff meaningfully and in collaborative relationships. For staff observed to have issues within their classrooms or who raise issues about classroom practice, the headteacher suggests observation...
of their peers and encourages the teacher working with these peers afterwards. By increasing the interconnectivity of teachers, not only will social capital be increased by the greater understanding of colleagues and their practice, it also suggests that the school is working towards network closure in this community (Burt, 2001). Network closure is described as the interconnectivity of all nodes within a known network with one another. This reduces the risks associated with relying on key actors for knowledge transfer and encourages knowledge flow. In this school the head extends the community of classroom practitioners by including teaching assistants.

One of the main impacts of the early stages of involvement with the LHTL project, after an audit of staff values and practice (Pedder, James & MacBeath, 2005) was the mis-match between the beliefs and perception of practices of teaching assistants and teachers. This inspired training tailored to the needs of teaching assistants, a body whose numbers had grown vastly over the last decade.

... there's recognition that we needed to address the level of understanding of the LSAs [teaching assistants] of what we were doing, so we've gone back and they've had INSET training now on the issues like success criteria and feedback (Juniper_Prim_Sch_Co-ord int_end of year one)

These training opportunities will have enabled teaching assistants to meet with one another in a way not usual for those used to working within only one or two classroom environments. They were also able to interact with those members of teaching staff delivering the training as well as with each other, hence increasing the knowledge flow and social capital.

Student voice was highly valued at this school. This inclusion of students in the vision of community goes beyond Wenger’s notion of a community of practice, equating more closely with ideas of a learning community (Sergiovanni, 1999). Students are given opportunities, through a school council, to have a say about practical school issues to which the staff have responded:

We also have a school council and the school council raises issues at times...there are simple things that they actually have raised and have put into place, things like a dinner rota ...they can talk about whatever they would like, what they, they have a teacher who helps them with that, but it isn’t a member of the senior management team, quite deliberately, we felt that they needed to feel to free, he makes certain there are some notes and minutes that get passed on up when they have met, they tend to want to talk about football and school dinners, or toilets and school dinners and so sometimes it is moving on from those issues to sort of wider ones, but they do have input that is really useful. (Initial level 2 headteacher interview_Juniper)

Students also have a role in agreeing shared classroom rules:

So, at the beginning of this academic year, all classes drew up class rules with the children which were then formally put down in a sort of letter that went home to parents so that parents and children and classes had the same perspective. (Initial_Juniper_L3-HT_Barbara_(AF)II.txt - 6:112)

Students are also actively engaged in their own behaviour management:

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6 On secondary analysis of transcripts across the sample of 17 schools, the headteacher and co-ordinator scored higher than average on number of quotes relating to student voice.
Also, it has become known as the Bill Rodgers sheet, but if a child has done something that isn’t okay there are a series of questions that they have to deal with and they make written communication if they are able to.

Greater student autonomy and ability to participate in dialogue about classroom practices was seen as one of the main outcomes expected through participation of the school in the LHTL project:

I think the one thing we haven’t done enough of yet is really evaluating what students think about it…we’ve talked to some of the children, I know hopefully we’ll get some feedback from you about the students (aged 9-10) as well at some stage, but things that sort of children have said and the comments they’ve made have been very positive (Juniper_Prim_Sch_Co-ord int_end of year one)

We’ve had some interviews with students, especially when our maths advisor came here and he came with our maths co-ordinator to talk to the children about the impact of some of these [LHTL] strategies on maths, which was good, and that was fed back to us. But I do think that talking to the children …is something we have, we’ve underused at the moment and that’s something definitely in September we’ll be doing more of….We do need to get more of a vision of how they perceive a lot of these strategies. We’ve done it with the success criteria, talked to them about …what’s it helped (them) to do, but I do think that we need to spend more time doing that. (Juniper_Prim_Sch_Co-ord int_end of year one)

However, in this school key groups of members of the community i.e. staff and students have high turnover. The school leaders spoke several times of how they managed this and we have made reference to the buddy system and culture of shared planning. New staff, regardless of their prior experiences, were expected to quickly become fully participating members of their new community,

Leadership of this internal community

In addition to monitoring of all the school’s policies and the observation of classroom teaching by the headteacher and phase leaders, teachers providing weekly plans and regular samples of assessed work. The headteacher could thus look for anomalies and address them personally. Her style was to go and question the teachers involved and through dialogue to ensure understanding:

should something not be coming up right, then I will go back and talk, to the year group leader, or I will go and sort of question something… I’ve gone to somebody and said well actually it rather looks from your plans as if you are doing no PSHE [Personal, social and health education] with your class, I know you are, make certain you put something onto your plans for future, you have not actually indicated to me where your oracy is going on for this week or where your focus is on oracy, and they are using a symbol, just so that, and that keeps it everybody’s mind. (Initial level 2 headteacher interview_Juniper)

This head also used metaknowledge of members of staff, strategically, to best locate them within the internal network. This social knowledge of staff was very explicitly discussed by the headteacher in terms of aiming at retaining staff. For example, she offered the role of co-ordinating between school and our research project to a middle manager who already had expressed academic inclinations:

I knew that this would particularly hook into her so that as the co-ordinator, so this may be a bit Machiavellian, but it was another way of holding her and her interest
because she would need something to get her teeth into that was about academic learning and theory. (Initial level 2 headteacher interview_Juniper)

The direct management approach taken by the leadership, was matched by informal opportunities to raise concerns in private interviews and formal public settings and included teachers and teaching assistants:

Well I always did have, prior to performance management ... a staff interview, usually in the summer term, usually after the end of May when you have no longer any resignations coming in, I have to say, and I would ask questions (Initial level 2 headteacher_Juniper)

if there are concerns that are coming up from staff ... we have a school management team meeting about once every fortnight and so their concerns come through there. (Initial level 2 headteacher interview_Juniper)

The headteacher demonstrated that she was prepared to change arrangements when they were causing concern to staff. One example given was of inconsistent relationships between teachers and support staff:

so I drew up this list of, you know this sheet, and I talked with one or two people, my deputy, with classroom assistants with a couple of more experienced teachers and said how do we think this will go and then I took it to the staff, and just people read it and thought no that was fine, it promotes the idea of communication and courtesy (Initial level 2 headteacher_Juniper)

Staff voice, student voice and parental voice (discussed later) are all actively encouraged at this school, supporting empowerment and facilitating greater autonomy to members of the network, which strengthens links through increasing social capital (Lin, 2001). This empowerment is also considered to be a characteristic approach of what have been termed ‘transformational’ leaders.

The leader then facilitates this process by creating within the organisation a climate of trust which helps the vision to get accepted by the people within the organisation. This is also achieved by empowering the people to have ownership of the vision and to make it work for themselves. The leader then drives the vision on by reiterating the vision and its values through as many media as are possible within the organisation (Hammond, P, 2001, p. 5)

Such leadership focuses on stimulating change through bottom-up participation (Hallinger, 2003) and is a term that began to be used in the 1990s in educational literature. The leadership style at the school appears to be that, by direct and personal facilitation, members are empowered and interconnectivity encouraged (therefore raising the social capital of the whole), such that the school develops as a learning community; a vision held originally by the headteacher.

This approach is exemplified in the way the LHTL project was implemented in the school. The headteacher chose two middle managers with vision and expertise, who worked with different age children, to co-co-ordinate the embedding of the LHTL initiative into the practice of others. It was considered important by the co-ordinator that she and her co-co-ordinator were practitioners to exact the respect of the other staff.

One of the reasons that we were chosen to do it was, you then avoid this whole thing of “Oh, it’s alright for you, but you don’t teach”, you know, that sort of...you know, you get that a lot, don’t you? “It’s ok you suggesting this, but you don’t know what it’s like in a classroom. (Juniper_Prim_Sch_Co-ord int_end of year one)
The school approach to taking on a new initiative, such as AfL, was direct and inclusive facilitating everyone in the community to be able to contribute something as soon as possible to the discussions on how best to proceed.

At every stage we’ve had a trialing period, so people would decide within their Year groups and Phase groups that they’d go away and do something. Then there would be, say a month later or 2 months later, a period when they’ll come back and feed back about what’s happened in triallng.(Juniper_Prim_Sch_Co-ord int_end of year one)

As with all aspects of the school, feedback from the staff was encouraged and valued:

We have evaluated some of the things that teachers have said, and teachers have been very very positive about the effects of things. (Juniper_Prim_Sch_Co-ord int_end of year one)

We’ve done a lot of feedback, feeding back from the staff point of view, so in staff meetings we’ve had sort of just some sort of key questions that the staff have answered about how they felt for example the success criteria have impacted on the children’s learning… with key questions, and then I’ve kind of correlated a lot of that together and fed back to the staff about it, what we [collectively] felt. (Juniper_Prim_Sch_Co-ord int_end of year one)

Personal learning opportunities were followed up and, as necessary, individuals were offered greater support by the co-ordinators or other school leaders. Staff were also encouraged to further develop using external inspiration in relation to their own interests:

we haven’t denied people knowledge, if you know what I mean, it’s like “Oh, we went to this conference and this was suggested and it’s really good, and some of us are going to go away and try it.” So we have had little pockets of teachers trying things out to see what, especially in areas that haven’t yet become part of the whole school approach. (Juniper_Prim_Sch_Co-ord int_end of year one)

Such individualised support and intellectual stimulation are also consistent with the Leithwood et al (1998) model of transformational leadership, which leads onto the notion of using weaker, usually external links, to bring in highly valued knowledge and ideas. These links have been acknowledged by Granovetter (1973), and Hakkarainen et al, 2004), to be extremely important to organisations, for example, in terms of remaining innovative. Before these ideas are applied to this school’s educational networks, we develop the argument that this school is deeply committed to developing a well-connected learning community firmly embedded in, and connected to, its related wider community.

**Weaker, high-value links: involving the wider community**

Links with parents, governors and local residents are outside the increased closed network described above and, although they are less strong than the internal ones, they are valued. The head spoke of her school as a place deeply embedded in the local community. Her network map also

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7 The UK education system is divided into phases (age groups each with their own curriculum and expected outcomes). In an elementary school the Foundation phase covers pre-school and the reception (first) year (ages 3-4), Key Stage 1 phase (ages 5-7) and Key stage 2 phase (ages 8-11).
demonstrated more links to nodes in the local community of the school than her fellow headteachers in the LEA (6% of total links made by the school as compared with 3%)\(^8\).

Both the headteacher and co-ordinator referred to a prevalent and informal approach to maintaining contacts; the so-called ‘open door policy’ quoted as an approach to keeping in contact with parents. The co-ordinator explains how this is manifest:

> that could be done by telephone, we phone them up and just discuss things, meetings, letters home, OK and then [in terms of] meetings is that kind of casual playground meeting. (Initial_Redbridge_nlc_coord_L3_Kate_(AF)II.txt - 11:35)

Families were welcomed into the school buildings and access to support facilitated. Those families, for whom English is not the first language, are further supported in school with translation support by support staff and/or parents, depending on the location of expertise. Reciprocal links with parents and, in particular between governors and parents, were ones highlighted by the headteacher when drawing her network map (Figure 4):

> Besides that the school has networks with governors, many of whom again may be a part of … they actually link in to some of those who are from the parents. The arrow [showing communications] is both ways because … in fact they are both two-headed arrows because they come both ways. And the responses tend to go that way (pointing to governors) and what we are working on with your [LHTL] project is that we get more understanding of it coming back the other way [from governors to the school] but I am not sure I feel it works as well that way. (Initial_Juniper_L3_HT_Barbara_(AF)II.txt - 6:36)

**Figure 4:** A crop of Figure 1 showing the links represented by the headteacher between school and governors

She went on to explain the value of this link to the school:

> But the two-headed arrows come both ways and that definitely works both ways. The governors and the parents are particularly useful in helping the school keep its ear to the ground as to when there is concern or upset and sometimes misconceptions can get put right very readily if that network is working effectively so that’s quite helpful in many ways. (Initial_Juniper_L3_HT_Barbara_(AF)II.txt - 6:36)

I think we have learnt a lot from the parents of our governing body, because they tend to be, the parents on our governing body, and there are more of them than are just elected …Some are co-opted as well, because there are issues about getting our parents involved…one of the things is when we were talking about homework policy and home school agreement, which went very much through governors as well as teachers, it was actually them saying, ‘But if you do it like this the community need to know exactly what they are to do, so therefore be explicit with homework, you know don’t be woolly about saying, you know listen to your child read as it were’. Actually say, ‘You know, read for a certain length of time and talk about main characters, or whatever, you know be quite clear cut about it….That will be supportive for the families to be very sure about what the child is learning, if they are learning the 3 times table actually put that down, not just learn tables as their homework for the time’. (Initial level 2 headteacher_Juniper)

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\(^8\) This was typical of the sample of 17 headteachers. The data relating to this descriptive analysis is contained within the network mapping paper Fox et al (2005a).
One of the examples quoted of how the school responded to concerns from parents related to the celebration of Ramadan by Muslim children while at school. One of the parent governors is Muslim and brought a request from the community that the school reconsidered its approach to how children were supported when fasting, in particular that it was acceptable to fast at year 5 but not at year 3 and that they were kept inside on the days of fasting:

So I was worried about this but as a governing body we debated and it came out we said “Well are we actually discriminating on the grounds of equal opportunity because no other children are kept inside”. So what came out of it was that we would let the children do whatever they would normally do, there would be a Ramadan register, if they were fasting we had to know, we had to know parents knew that, that’s what they were doing, because other children latch onto a bandwagon without parental knowledge, and its fine if they said it was for the whole time, or if it was for each day we had to have a letter, and we did it this year, and I have to say it saved us a lot of trouble (Initial level 2 headteacher_Juniper)

Although this does not relate to classroom-situated knowledge creation and sharing, it does show evidence of increased social capital between the school and the local Muslim community and an increased strength of these links. It demonstrates well that this school has the values, mechanisms and leadership to share, to recognise and share this capital.

**The value of external weak links to the school**

The above evidence has shown how the school operates as an inward looking and ‘closed’ network with opportunities for all nodes (students, parents, teaching assistants, teachers and governors) to have a voice and participate in making progress towards to shared goals. We note that the school also recognises the need for brokerage as a bridge to external resources, another aspect of social capital called for by Burt (2001), Lin (2001) and Erickson (2001):

Employers value potential employees with social capital because employers can convert individual social capital into organisational social capital by hiring the individual and mobilising his or her contacts for organisational goals. (Erickson, 2001, p127)

The workplace as a ‘site’ for learning thus takes on a different complexion, one that is not bound physically to the school site. A highly connected member of the teaching staff can be expected to have access to expertise and resources that, if recognised by school leaders, can be mobilised for the good of the school. The headteacher at this school recognises this as distributed knowledge and distributed access to resources:

I wouldn’t put myself up as being an expert in those areas, but sometimes you can use other peoples learning to very good effect in order to manage a situation well. (Initial level 2 headteacher_Juniper)

We have seen earlier how she placed this co-ordinator very deliberately in her role as AfL co-ordinator in the school⁹.

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⁹ How the co-ordinators role as network co-leader affects the links to the AfL network by the school is explored further in Carmichael et al (2006).
The co-ordinator acts as a ‘bridge’ between the school to two different groups of nodes and their resources. Firstly, she bridges to those involved in the AfL network, both in other schools and in the LA, when acting as co-leader of the AfL network:

I have sort of picked up some things from other schools which have been really interesting and have sort of fed into some of the things we’ve done, and vice-versa, we’ve been able to share a lot (Juniper_Prim_Sch_Co-ord int_end of year one)

Secondly, the co-ordinator bridges to those involved in the LHTL project. Both headteacher and co-ordinator maintained weak links with the LHTL project through contacts with researchers, such as ourselves, and another project team member who acted as critical friend, charged with facilitating development work in school. The co-ordinator used evidence provided by her weak, yet highly valued, links with those on the project team to inspire her colleagues:

We’ve always had the kind of little snippets, you know, nuggets of wisdom, more or less, you know. So we’ve kind of used that as almost a backdrop to everything and that’s worked quite well because people have sort of really got into that idea that … there’s a lot of work been done before and so these are good, solid practices.(Juniper_Prim_Sch_Co-ord int_end of year one)

One thing, I mean, that kicked it off, [our critical friend] came and did the initial thing, right back in April, and I think that really impacted quite well, because it was like somebody different, from the outside world. And he had such a vigour for everything and such enthusiasm that I think it really … translated quite well to everybody. So that was really good. I think we kicked off with a bit of a bang, which was nice. (Juniper_Prim_Sch_Co-ord int_end of year one)

This support and the resources again placed the school in a privileged position.

In many ways we’ve, …partly because of the impetus of the involvement from Cambridge, we seem to be able to get going on this a lot sooner than a lot of the other schools in the network, because we had that start. (Juniper_Prim_Sch_Co-ord int_end of year one)

The co-ordinator explained how this was developing into a two-way set of links with others within the NLC allowing the school to be one of the first to be able to share ideas of novel practice with others in the AfL network.

So we’ve presented stuff about the success criteria …and shown some of the practice that we’ve done and asked, you know, things that have worked, things that haven’t worked, and then we did the same with feedback, and then we invited one school [that does] lots of work on questioning and they came along and talked about questioning, and presented some of the ideas they’ve used for that. I think it was a way of sort of giving people ideas. (Juniper_Prim_Sch_Co-ord int_end of year one)

These links were again a form of brokerage as those from this school shared their experiences with other schools. She also explains how, accessing the work of others provides inspiration to keep trying new approaches, for

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10 Each school was allocated 2 days of critical friend support and access to materials, including those through a website.

11 One of the universities involved in the LHTL project.
example, going back to the logs of AfL classroom activity she had trialled and had encourage staff to keep:

... I want to have another go at that next term ... because I have seen them working in other schools, because I know at [one of our feeder High Schools] they have got [them], because I put displays together for the whole network and I’ve seen some interesting ones. So I think if they can do it, we can do it. (Juniper_Prim_Sch_Co-ord int_end of year one)

These quotes provide evidence of how this co-ordinator exercised brokerage, the bridge-building role she was developing. Both formal and informal opportunities for networking provided benefits both for the school and the AfL network.

Once connections have been made between teachers, the relationships may develop such that they visit one another. This was evident with respect to transition work where weaker links have been strengthened by such visits:

We also work quite closely and well with [name of local secondary school] and they are not the only school [to which our] ... children go [on leaving this school], but I have to say they are the school with whom the links are best, and a lot of that is on their part and ours. (Initial level 2 headteacher interview, Juniper)

The co-ordinator in particular refers to a symmetrical link operating between teachers in both the elementary and secondary school. The headteacher used her own stronger links with the headteachers of local schools linked through transition to discuss and decide to engage collaboratively with the LHTL project:

in fact [headteacher 1] and [headteacher 2] and I discussed the fact prior to the bid [to the LHTL project] going in, and we...Yes, that actually this could well suit all of us ... and [headteacher 2] and I [were] saying ... for certain of our senior members of staff this is a way of their actually supporting their own career and their development requirements. (Initial level 2 headteacher interview, Juniper)

In addition to meeting in each other’s schools, teachers booked rooms to meet at a perhaps ‘neutral’ venue when making inter-school connections:

There has certainly been some networking with other schools sort of at their schools and then gathering in a group at perhaps the Teachers’ Centre. (Initial_Juniper_L3_Headteacher 6:30)

Headteachers do not have equivalent colleagues in their own school and this headteacher alluded to the value to her of a personal network of headteachers in other schools. There is no evidence that headteachers similarly value the external networks of their teaching staff and yet, as we have shown through the example of the school co-ordinator, they need to rely on the brokerage of individual members of staff to access external resources. Such links to ‘peers’, acting as external relatively weak, yet highly valued links, are likely to be more possible for headteachers, especially those who do not have teaching commitments.

This headteacher’s map had a higher proportion of links using the telephone than other headteachers (12% of links were made by telephone compared with 6%). The use of the telephone, as opposed to e-mail or paper

12 This refers to the larger sample of 17 headteachers.
communications, parallels this head’s preference for face-to-face, individual interactions in school and reflects her direct approach to managing links:

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. (Initial_Juniper_L3_HT 6:47)

A significant factor in who becomes persistently involved in a specific network appears to be related to the shared history of those involved, during which time they have had time to build up relationships with certain actors (Nardi et al, 2000). This head refers to having a range of people known from previous activities from which to draw when needing advice or information:

Some of them are people who you have worked with in the past because you have come through schools or people you have met up with when you have been on a course or a meeting or you have been on a panel together in order to achieve something.” (Initial_Juniper_L3_HT 6:47)

These embedded links are sometimes related to roles (i.e. those she has by virtue of her headship) and including membership of panels and groups associated with the LA. Her reasons for selecting certain nodes in a network over others appeared to be related to the trust in these personally known contacts and the metaknowledge of their capabilities.

Researcher: So, on what basis would you contact people? How would you choose from all these Heads?

Head: I guess it would depend on whom I trust and it would depend on where I thought their level of expertise was. (Initial_Juniper_L3_HT_Barbara)

The trusted, highly respected, and hence strong links can be considered an informal knowledge community. Burt, (1987) talks of their being important informal aspects of working in formal strong teams. They also relate to high levels of social capital of the headteacher.

Links will be activated by this headteacher as appropriate to her needs and taking into account the relative trust, respect and perception of their expertise in any one area. To whom this head will turn will depend on whether what she wants is easily transferable, codified information (for which weaker links are appropriate) or whether it involves advice involving opinions, tacit knowledge or emotional support (for which strong links will be activated).

There was some evidence that social networks were used to recruit new staff in other industries (Marsden, 2001; Erickson, 2001). In setting up the years covering 4–7 year olds at her school13, the headteacher spoke of utilising tried and trusted links (stronger, high-value, links) as well as making new ones on the basis of recommendations (weak, high-value links):

I had been a junior head teacher so one of the things that I did was I rang up people that I knew had good reputations in infant schools and went visiting and picked brains. Then when I had to appoint a nursery teacher I actually had an infant colleague come along and do those interviews with me. That was really a very

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13 Elementary schools are often split into ‘infants’ (ages 4-7) and juniors (ages 8-11) and sometimes these form separate schools. The school in question now has both groups of students together.
productive thing where I was learning, now people come to my foundation stage because it is well organised and well run… Where you actually feel you are going to gain and where you can work alongside somebody else. It has to be somebody that you can get along with. (Initial_Juniper_L3_HT_interview)

One of the things that I did too was give myself training so I went on courses to Cambridge [University], to the Institute, to some of things that had [name of academic] and people like that. So that I actually got myself tuned into the early years and what it was that I had to address. So, I think it is sometimes on a needs must basis. There are some people that you hear and you tolerate but often they have very good ideas and you can take their views. (Initial_Juniper_L3_HT_interview)

These findings suggest that if school leaders are to value their staff’s membership of similar such networks or informal knowledge communities, firstly opportunities to network informally should be offered and secondly, the relative value placed on such links should be respected as being personal. Headteachers need to develop metaknowledge of the social capital developed by each member of staff and manage their roles as brokers for the school to the external resources residing with these external nodes. This could allow school leaders to systematically manage the bridging of structural holes (Burt, 1982). We have shown how through the LHTL school co-ordinator, bridging to an AfL network and the LHTL project (see Figure 2), the school has managed to bridge such a hole, through her intensional networks. This was followed by sharing ‘cascading’ knowledge within the internal school network, giving access of other staff in school to these weak yet highly valued links beyond school.

We’ve had a couple of people going [to conferences] and then they’ve come back and they’ve done an INSET after that, we’ve fed back to the whole staff as well. So you’re bringing in different ideas and different perspectives. (Juniper_Prim_Sch_Co-ord int_end of year one)

We’re trying to get different staff to get to conferences as well now. (Juniper_Prim_Sch_Co-ord int_end of year one)

Widening the access to the nodes and resources embedded in these external networks reduces the risks of brokerage, if the broker leaves (Burt, 2001), and increases the social capital of the whole school (Lin, 2001). Important in this case as both the headteacher and the school co-ordinator left the school prior to the completion of the LHTL project. They took with them their personal networks and in part their brokerage roles. It appears sustainability was not achieved as the school did not complete its engagement with the project and no longer plays as active a role in the AfL network. These exemplify the risks of relying only on key actors for sustainability.

In conclusion
This paper has demonstrated how at one school ideas of social capital in its broadest sense can be used to explain the benefits of networking processes operating at one school. Key processes included allocating buddies to new staff, facilitating opportunities for colleagues to work one with another (including teaching assistants with teachers, teachers with one another and school leaders with other teachers) and encouraging the voice of all members of the internal school network. The headteacher describes the dual processes at play of both increasing the density of the school’s internal network
(increasing the number of strong links) and facilitating the bridging of potential structural holes (locating key players with social capital to utilise weak links to access external resources) in particular with respect to developing AfL in the school.

Key areas in which this school manages to develop social capital through professional strategies feature:

- The importance of strong links in the school's internal networks and the empowerment and involvement of teachers, students and parents in these.
- The high proportion of face-to-face and telephone links (i.e. personal and direct ones), reflecting the personal styles of the school leaders.
- The importance of personal informal networks, and the role of school leaders in setting up structures and opportunities for informal networking to take place.
- The importance of those links that are 'weak' and the recognition that they can be brokered through key actors in the school’s network.

As noted above, research in networks in other sectors has also shown the importance of informal networks and the necessity to respect both strong and weak links. The mapping activity might prove a valuable activity for the 'networked school': not an attempt to establish an objective and complete aggregate map of a small 'region' of 'the network', but rather as an inter-subjective review of the personal and institutional networks of participants both within and beyond the school itself. This would allow schools to collectively explore the ways in which they could develop the learning of their staff. School leaders could consider strategic brokerage, broadening the connections of staff to overlap with and/or complement those of their colleagues and creating opportunities to create and share knowledge of practice. Discussion could meaningfully focus on each of the three layers of Castells’ model i.e. on the physical connections being made as links, information that is available through the links and the personal connections being made.
References


Granovetter, M. (1973) 'The Strength of Weak Ties.' American Journal of Sociology 78(6), pp. 1360-1380.


Figure 1: A headteacher’s map of the communication network of her elementary school
Figure 2: A co-ordinator's map of the communication network of the same elementary school
Figure 3: A model of strong and weak links taking into account the perception of value of the link.
Figure 4: A crop of Figure 1 showing the links represented by the headteacher between school and governors