

**NODES AND NETS: INVESTIGATING RESOURCES FOR  
PROFESSIONAL LEARNING IN SCHOOLS AND NETWORKS**

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## **Preface**

In a visit to England in June 2003, I spent three weeks learning about the rapidly developing Networked Learning Communities (NLC) project of the National College for School Leadership.<sup>1</sup> The NLC model is rooted in the assumption that cooperation among schools, driven by a shared interest in learning, can yield improvements at multiple levels. Yet networks might reasonably be seen as competing with other settings (schools, classrooms, other personal and professional spaces) for individuals' time, labor, interest and emotional commitments. How, exactly, is the promise of improvement realized through participation in networks?

Research provides some evidence that networks may help individuals and schools accomplish what they cannot accomplish on their own. They expand the pool of ideas, materials and assistance on which individual schools can draw; they engage participants in mutual problem-solving; and they inspire and recognize accomplishment.

Yet there are dilemmas with invoking the existing research as a warrant for network-building. As others have noted, research on "networks" actually spans networks of quite different sorts: networks of schools, networks associated with specific programs of professional development, and networks of individuals who share interests of some sort.<sup>2</sup> To what extent research on one kind of

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<sup>1</sup> During my visit, I visited a local network site, attended a multi-day Network Learning Group event, talked with individuals who could be considered architects of the NLC strategy, and conferred with researchers whose interests focused both on the network development and on the nature of "effective professional learning community" within schools. In the period since my visit, I have continued to follow NLC developments by reading NCSL papers and attending conference presentations.

<sup>2</sup> For a comprehensive review, see Kerr et al. (2003); for additional reviews and commentaries, see Lieberman & McLaughlin (1992) and Lieberman & Grolnick (1996); among the specific studies, see Allen, Glickman & Hensley, 1998; Firestone & Pennell, 1997; Goodlad, 1994; Huberman, 1995; Lieberman & Wood, 2001; Lord, 1994; Miller, 2001; Muncey & McQuillan, 1996; Wohlstetter & Smith, 2000.

network supplies guidance for others remains unclear. Further, the available research reveals substantial variations in the ability of networks to influence teacher practice or to build schools' organizational capacity for improvement. At its best, the research helps to identify the conditions conducive to professional learning and to strong network effects on school-level improvements. However, there's relatively little research that delves deeply into the nature of network activity and into the question of precisely how such activity achieves its effect on thinking and practice beyond the network itself (how it leaves "footprints on practice.")

I came away from my visit wondering about the relationship between schools and their networks, and have continued to wonder about it since. Despite the growth of networking in education, and repeated appeals for more "professional community" as an avenue to school improvement, we know little about the interaction between a network-based professional community and the localized professional communities rooted in the daily lives of schools. We are only beginning to learn what exactly transpires in such interactions that constitutes resources for professional learning and school improvement.

The NLC initiative presents an extremely fruitful opportunity for such learning. It offers an array of sites for concentrating more fully on the relationships between schools and networks—or perhaps more precisely on the relationship between professional community and professional learning both within schools and across school and network spaces, activities and relationships.

My thinking about the knowledge-building possibilities in the NLCs is informed most directly by my own and others' efforts of the last few years to unpack the notion of "professional learning community" at the level of practice and to understand the contribution of such professional relationships to the progress of school improvement. In the 15-year period from 1987-2002, I conducted three sets of field studies that continue to supply me with new insights into problems of professional learning, school improvement, and the significance of external ties.<sup>3</sup>

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<sup>3</sup> *Research on the Contexts of Teaching in Secondary Schools* (CRC, 1988-92) was conducted under the auspices of the Center for Research on the Context of Secondary School Teaching (CRC) at Stanford University from 1988-1992. My research in CRC focused on conditions of teachers'

At the time of my visit to the U.K., my colleagues and I had recently completed the third of these studies, a case study of workplace professional community and professional development involving secondary mathematics and English teachers in two comprehensive high schools. Staff in each of the schools had formed some relationship with external networks, but the nature, strength and significance of the network ties varied substantially. The schools and groups within the schools differed with regard to the permeability of their boundaries and with regard to the nature, intensity and duration of external ties. As the analysis progressed, I came to see (a) the ways in which the nature and locus of professional community within each school positioned it to contribute to and benefit from networks in particular ways (and not others); and, as well, (b) the specific ways in which the network affiliations helped define and delimit participants' views of "reform" and shape their professional learning opportunities. That analysis, still ongoing, has heightened my interest in the NLCs.

### **Schools and Networks: A "Problem Space" for Investigation**

In this paper, I focus on ways we might think about and investigate how school and network environments supply resources for professional learning and school improvement.<sup>4</sup> I argue two main points:

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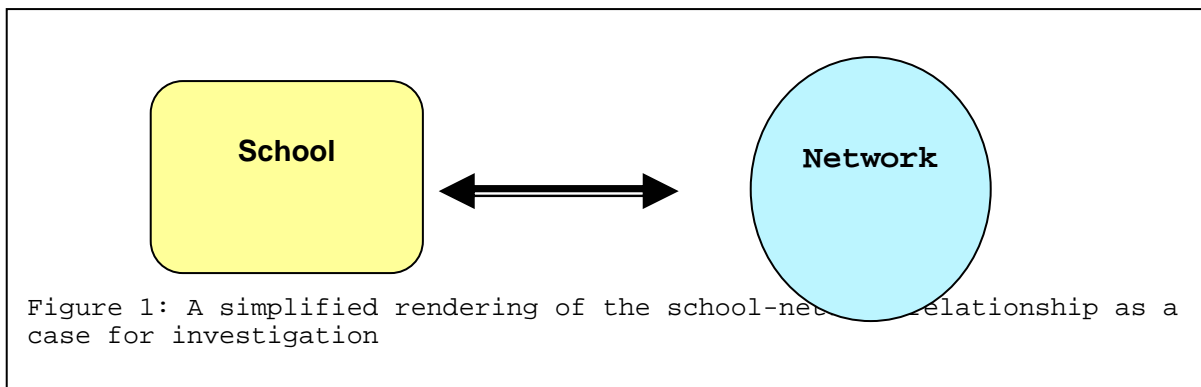
professional community and professional development in comprehensive high schools. The *School Restructuring Study (SRS, 1992-1998)* investigated the meaning of "restructuring" in 36 elementary, middle and high schools receiving five-year restructuring grants under California's School Restructuring Demonstration Program. Participating schools were part of a state-wide network of schools facilitated by the Center for School Restructuring. The *Teachers' Professional Development in the Contexts of Secondary School Reform (PDCR, 1998-2002)* study examined the relationships among professional development, professional community and school reform, with an emphasis on mathematics and literacy.

<sup>4</sup> Although I focus here on issues of professional learning and school improvement, the NLC initiative is of course also interesting from a more macro reform policy perspective. The U.S. is still relying on competitive market models, heightened controls over teachers and teaching, and the threat of sanctions (including public humiliation) as the dominant strategies for solving the persistent "achievement gap." Such a policy stance treats educators and students as motivated to improve through the exercise of authority and pressure—and also as adequately positioned to improve (what was missing, presumably, was adequate focus and motivation, not human and material resources). The fact that the U.K. has preserved a focus on achievement standards while moderating its policy strategy in the

The particular *nature* of school-network relationships and the *variations* in those relationships are likely to matter with regard outcomes we care about; this is not to argue for one definition of the “good” or “effective” network, but to suggest that we analyze the variations and how they position educators and schools for improvement in particular ways.

To understand how participants actually construct opportunities for professional learning and resources for school improvement through their participation in networks, we could (a) do more to join the largely separate bodies of research on within-school community and research on networks, and (b) make more use than we currently do of the emerging literature on workplace practice and workplace learning in fields outside education.

The “problem space” for this paper can be portrayed something like this:



This simplified rendering encompasses three central working assumptions:

- (1) that the school is positioned, or could become positioned, to exploit the resources of a network for purposes of school improvement. This assumption speaks to the nature of existing professional relationships in the school, the quality of leadership, the stability and capacity of staff, the LEA context, the social and political relations with community, etc—that is, to conditions that make for fertile ground in the school. Those conditions may

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direction of cooperative models and enhanced supports for teachers and teaching makes it an important policy contrast case (see Bartlett, 2004).

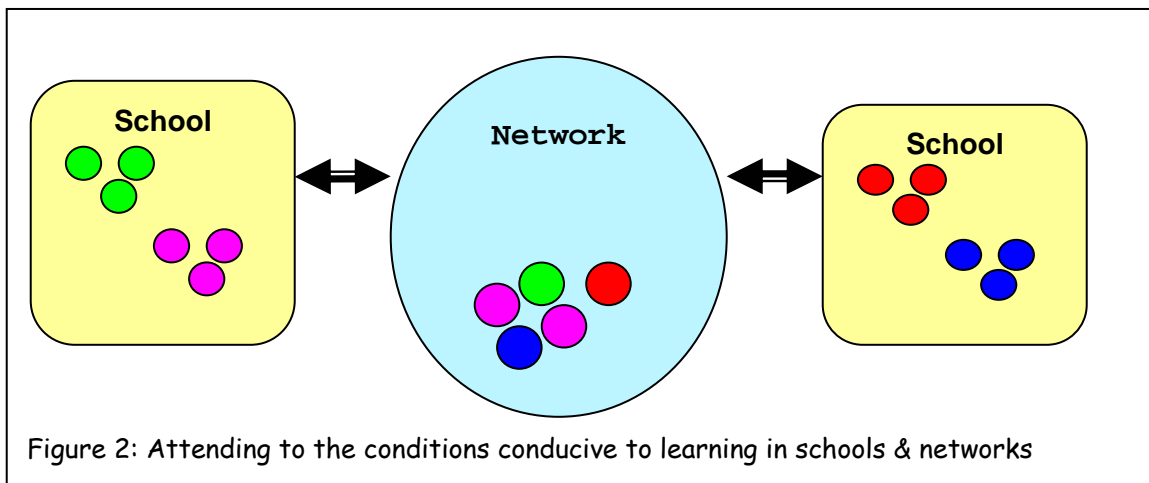
range from minimal threshold to robust, with consequences for productive participation in a network.

- (2) that the network has resources, or could come to have resources, of importance to the school—resources in the form of ideas, materials, advice or encouragement that justify the transactional and opportunity costs of participating.
- (3) that there are interactions, activities, and processes by which the “stuff” of network interaction comes into the school—and vice versa. This is sometimes cast as a problem of “transfer,” but as others have argued (e.g., Eraut, 2000; Knight, 2002), that term proves too limited as a way of understanding the nature of learning and the cognitive and social entailments of changing practice that are of interest here. The two-way arrow also conveys the work of boundary spanning, together with an assumption that the relationships are in some manner reciprocal (participants both give and take), reflexive (both the school and the network change over time), and synergetic (both the school and the network get stronger over time through their contributions to one another; they are more than the sum of their parts).

Presumably, the school-network relationship succeeds to the extent those assumptions are met, although no network could conceivably supply resources to satisfy all purposes, interests and needs. Within this problem space, one can pose several categories of questions that are familiar but also necessarily complicated in ways that are masked by the simplified rendering above.

• *Conditions conducive to learning in schools and networks:* What goes on in each location—school or network—that supplies resources for professional learning and school improvement? This is a foundational or threshold question about organization and/or group culture, resources, practices and leadership. (These locations are what I refer to as “nodes” in the title of this paper). What are the practices, dispositions, relationships, and structures inside schools that make it possible for a *whole school* to benefit from the network participation of *some individuals*? (as in Figure 2). What are the practices, dispositions, relationships, and structures of networks that enable people

in these out-of-school settings to dig deeply into evidence of teaching and learning that comes from inside schools and classrooms?



schools have acknowledged spaces, physically and institutionally. Do networks also occupy space, as implied by the graphic? Are network activities bounded in space and time the way a school day might be thought to be? To what extent are the learning opportunities associated with networks constructed as formal events such as courses or workshops or conferences (even though these may afford various kinds of non-formal learning), and to what extent are they instead, or additionally, constituted in hard-to-track informal exchanges over telephones, email, or the flow of material artifacts such as curriculum materials from one place to another?

- *Spanning the worlds of school and network.* What's in the arrow, i.e., what is the nature of activity and who are the participants? This is a question about the purpose and scope of particular network relationships and particularly about the "mechanisms" or processes by which the boundary work gets done, and by which schools and networks influence each other over time. Figure 3 portrays the arrow as a set of activities, resources and relationships that constitute "boundary-spanning." Most research on networks portrays the boundary-spanners as adults, and especially adults who are professional educators, yet recent NLC reports highlight the role of pupils among the key participants in some networks. Advocates for networks anticipate that the participation of some can influence the many, yet there is evidence that schools vary with regard to how the network participants are viewed in the home school. In our own study of a whole-

school restructuring initiative that included school-to-school networking, teachers in many schools, especially secondary schools, viewed the reform leaders as a "separate" group in the school (Little & Dorph, 1998). How does the nature of the arrow affect the outcomes we care about, ranging from teacher retention to pupil achievement?

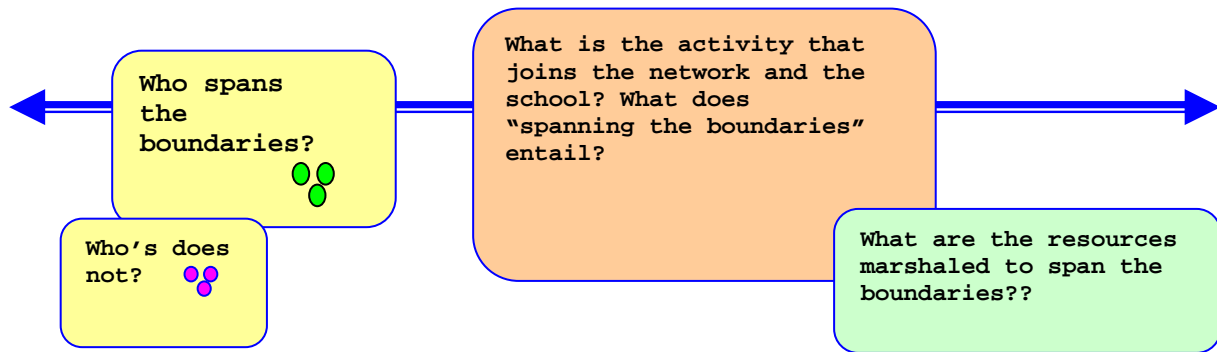


Figure 3: The arrow as a set of boundary-spanning activities, resources and relationships



• *Evidence of learning.* What do we take to be evidence of learning at each of the levels of interest (pupil, teacher, school, network, system)? This is fundamentally the "footprints in practice" question regarding the nature and extent of influence, about the causal inferences we might make, and the conceptual and methodological challenges entailed in that work.

How do we make attributions about that learning, especially attributions regarding the contribution of the school-network relationship? For example, if we think network participation yields new ways of thinking about, talking about and enacting classroom instruction, how would we account for that? As Jean Lave observed some years ago: "Learning is an integral aspect of activity. That learning occurs is not problematic...*What* is learned is always complexly problematic" (1996, p. 8).

Unpacking the "what" of learning is complicated in at least three ways. First, individuals arrive at networks via different paths, not always of their own devising; regardless of the espoused purposes of formal networks, the felt motivations and purposes of the participants – and thus what they attend to – will vary more widely.<sup>5</sup> Second, participants bring their existing cognitive, social and material resources to network activity; what is and might be learned in networking draws upon prior learning and the pool of resources thus collectively available.

Third, unpacking learning is further complicated by the multi-faceted nature of the "what." "What is learned" may operate at different levels of explicitness and awareness (Eraut, 2000), and may implicate one or more of several levels of relevant professional knowledge and practice (Knight, 2002).

For example, teachers who come together for a network activity focused on literacy are learning more than one aspect of practice at a time. By virtue of their own experience and disposition, they are positioned in some way to learn whatever technical "stuff" is explicitly and formally the object of attention (e.g., approaches to teaching writing in primary grades). But such "stuff" is never entirely technical or "merely" practical, nor is the

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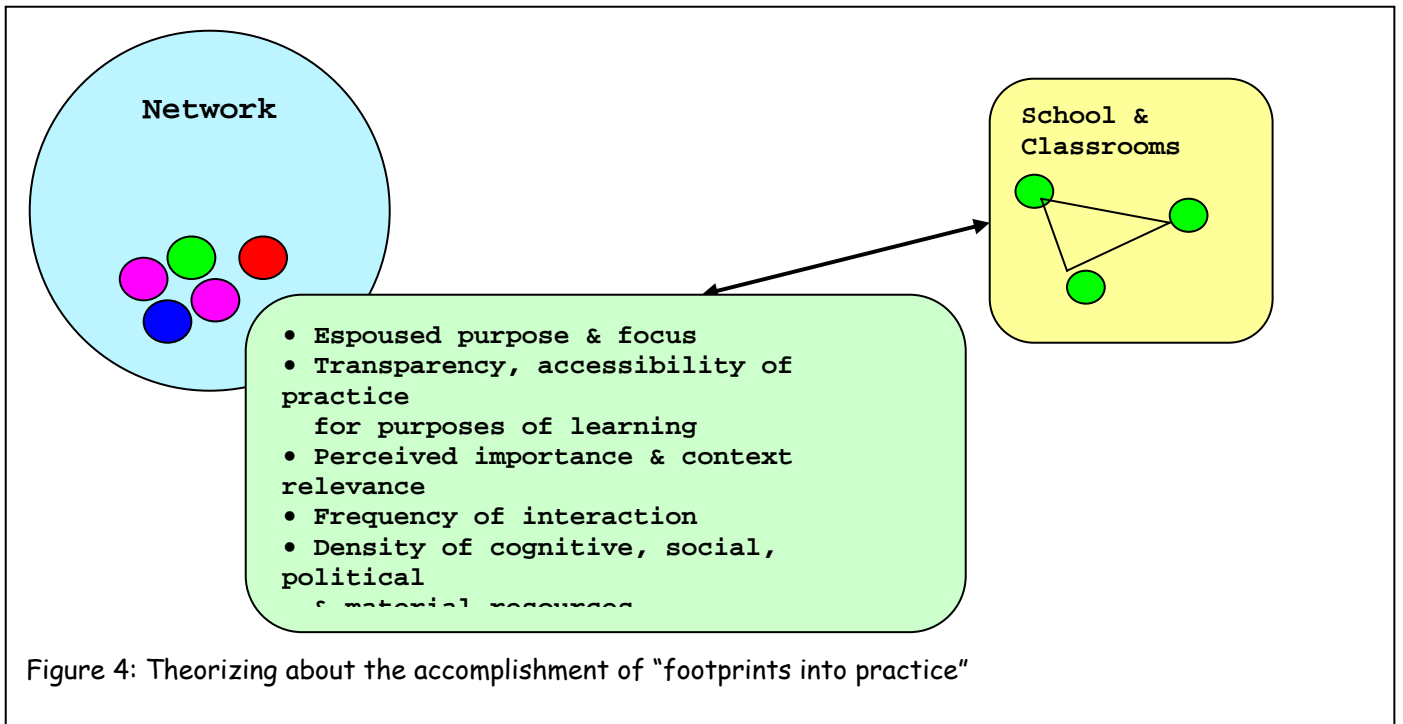
<sup>5</sup> In her recent visits to participating NLC schools, Lora Bartlett (n.d.) asked teachers whether and to what extent they considered themselves part of the network activity (either directly or indirectly), and how they came to be involved (or not). The answers point to the intersection of individual interests and institutional agendas.

relevant learning context made up solely of the formal activities in which people participate. What the participants in the literacy workshop learn is bound up necessarily with what they already know and do, together with their conceptions of the meaning and importance of literacy, their beliefs about children's abilities and motivations, their reading of the available human and material resources, and their assessment of professional and personal priorities and obligations; and so on. In this regard, the task of finding "what is learned" and how it matters to individuals, schools and the networks themselves goes beyond the task of following the implementation of a particular innovation, although it may entail that as well. So the "footprints into practice" problem proves both important and challenging.

These three broad questions about (a) learning conditions in schools and networks (b) the nature of network relationships and (c) evidence of learning and change converge in an effort to construct a plausible theoretical tale about school-network relationships. Such a tale could be expressed as a set of propositions to be investigated in a range of contexts and thus also could be the basis of practical guidance to those involved in networks and networking. Figure 4 provides one illustration of such an attempt. It draws on workplace learning studies and on prior network studies to identify a set of variable conditions that might help account for professional learning and changes in practice that could be attributed to network participation.<sup>6</sup>

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<sup>6</sup> There's a conversation to be had about notions of "strong" and "weak" ties. Granovetter's arguments (1973, 1983) regarding the "strength of weak ties" force us to consider how combinations of weak and strong ties might help us to understand the place of networks and networking in improvement-oriented practice (weak ties are more likely to afford information flow, access to innovation, and access to other groups; strong ties characterized by interpersonal trust influence interpretation and uses of new information, ideas, and material). In this view, "weak" ties are not necessarily something to be remedied; rather, weak and strong ties provide different kinds of resources for individuals, groups and organizations.



intended to put forward a complete and comprehensive theoretical model. Nor does it adequately summarize an inventory of findings from the available empirical research. Rather, it reflects my thinking from cases (introduced below) together with *reading* of separate literatures that could productively be joined.

### **Network Variations and How They Matter**

Data from a recent study of professional development and professional community in two secondary schools illustrate the ways in which school-network relationships vary and the significance of those variations for professional learning and school improvement.<sup>7</sup> The two

<sup>7</sup> What follows are necessarily truncated descriptions, used only to illustrate the utility of an analytic scheme built on the organizing questions above. For a more complete discussion of these two cases, see Little (2003b) and Little, Horn & Bartlett (2000).

schools differed with regard to the kinds of external ties they forged and what those external relationships afforded as resources for school improvement. Without making any claims about the generality of these illustrative cases, the idea here is to expose a set of interesting questions and ways of thinking and talking about them, and to invite a conversation rooted in the NLC experience that could deepen our understanding of these relationships and practices.

Both of the case study schools were populated by educators interested in school improvement (in other words, this isn't a "good school, bad school" story). In both cases, staff in the schools had forged relationships with external sources of ideas and support, including relationships with networks.

School 1 had developed long-standing ties with a national reform organization and its network of affiliated schools, and at the time of our study had also received funding to participate in a separate regional school reform network. Although some teachers in the school had also participated in professional development networks (particularly in the area of literacy), the school-based networks dominated school improvement discourse in the school. Schools applied for membership in these networks, committing to a program of whole-school reform. This configuration parallels other school-to-school networks, although such networks vary with regard to origin, espoused purpose(s), partnerships with universities or reform organizations, and characteristic activity.<sup>8</sup>

Unlike the external ties maintained by School 1, which were centered primarily on organizations engaged in whole-school reform, those at School 2 were concentrated in network-based programs of professional development, in teacher networks in specific subject areas, and in affiliations with reform-oriented programs of teacher preparation and/or research in local universities. The math department provided the most fully developed example of this configuration. Nearly all math teachers were affiliated with a statewide professional organization of reform-

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<sup>8</sup> Research on school-to-school networks in the U.S. dates back to the late 1960s and early 1970s' studies of the League of Cooperating Schools) and includes, but is not limited to, research on the Coalition of Essential Schools, the Southern Maine Partnership, the League of Professional Schools, the Puget Sound Consortium, and the Southern Regional Education Board.

oriented math teachers and attended its conferences as a group. For about a decade, they had also cultivated relationships with a group of like-minded teachers throughout the region with whom they talked and met frequently. Finally, they sustained a relationship with a group of university researchers, serving as a research site for research on mathematics teaching and learning while also drawing on the researchers as a source of information and insight. The configuration at this school parallels others in which individual teachers or teams of teachers affiliate with networks anchored in particular shared interests.

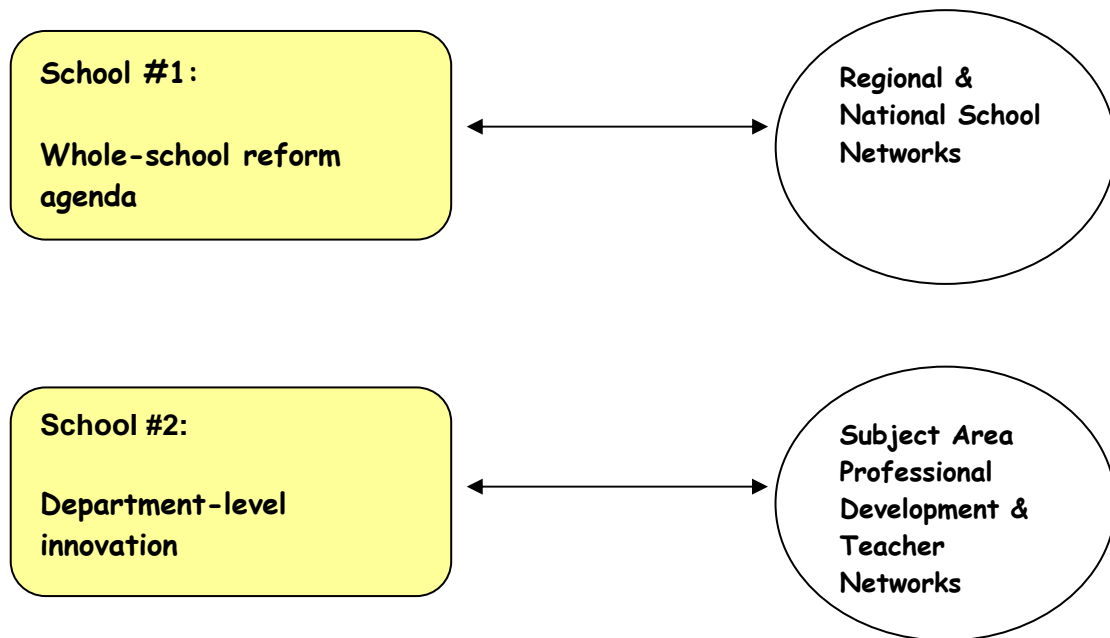


Figure 5: An illustration of variation in network ties

Each of these configurations had its particular strengths and limitations.

School 1's affiliation with networks of reform-oriented schools helped propel it along an ambitious path to school improvement. Teachers and administrators credited the external partnerships with providing an organizing set of values and principles together with specific resources for improvement, including: coaching in the development of school-wide change strategies and inquiry processes;

professional development opportunities focused on reform leadership; assistance in the collection and interpretation of school-level data on student performance; and regional network meetings for school-based teams. As our research team observed the summer staff retreat, the weekly two-hour staff meetings and the monthly teacher study groups, we were impressed with the strength of school-level professional community and the staff's collective commitment to inquire into conditions of student success and failure. Strong school leadership by both teachers and administrators, together with the shared sense of belonging to a network of like-minded schools, helped to create conditions conducive to professional learning and persistent efforts to improve.

However, we also came to see certain limitations on the school's improvement efforts, limitations that we traced in part to the nature of the school's external ties. First, both the national and regional network emphasized processes of whole-school reform; they allocated no resources to professional development related to teaching and learning in specific subject domains. As a member of our research team has written, "The logic of the reform seemed to be: If teachers examine school-wide problems, then reconsideration of classroom practices (which presumably involves subject matter) will follow" (Horn, 2002, p. 55). At School 1, many teachers spoke with satisfaction of "the amount of freedom ...to experiment," but as one teacher acknowledged directly, "Most of the restructuring things that we do... Most of those things don't touch on inside the classroom."

Despite the emphasis on "inquiry" in School 1 and its associated networks, teachers had few resources to draw on to re-consider their teaching practice or to investigate the sources of students' failure at the level of the classroom. This pattern replicates one we had observed in our earlier study of state-sponsored whole-school reform, where reform leaders acted on the premise that rallying whole-school support for broadly defined improvement goals would translate into capacity for classroom-level change (Little, 1999, 2003). [In an analysis of reform progress in Belgian elementary schools, Maes, Vandenberghe & Ghesquière (1999) conclude that bridging whole-school reform activity to classroom change requires explicit mechanisms and interventions.]

Further, the special funding that School 1 had received to support its network participation brought with it a set

of obligations for reporting and other activity, creating tension between time spent on network obligations and time devoted to within-school activity. The school's external reform partnerships consumed large amounts of time and staff attention, limiting the time and attention available for issues of teaching and learning in specific subject domains.<sup>9</sup> Staff devoted time to preparing progress reports, undergoing formal progress reviews, and participating in meetings or other professional development activities. A math teacher lamented: "For the most part, it appears that our department collects and reports on data for our [funders]. We really don't have time to deal with the issues that we want."

In School 2, reliance on teacher-based networks also displayed both strengths and limitations. Subject departments' external ties to colleges and universities, special programs, and professional networks outside the school expanded the meaningful boundaries of professional community and constituted strong resources for curricular innovation and instructional improvement. Teachers in both mathematics and English designated blocks of time each week for collaborative work within their respective departments. English teachers organized in grade level teams, with one team (the 9<sup>th</sup> grade "Academic Literacy" group) working intensively to develop a course that would help students acquire meta-cognitive strategies for reading complex texts and gain confidence and pleasure as readers. In weekly meetings of the Algebra Group (involving 7 of the 10 full-time members of the math department), teachers took up specific dilemmas of student learning and related issues of teaching practice. In those conversations, they did mathematics problems together, discussed students' difficulties and accomplishments, demonstrated ways of approaching difficult concepts, invited disclosure of teaching problems or uncertainties, and created an environment conducive to collective problem-solving. An announcement posted to recruit a new teacher read in part:

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<sup>9</sup> Although some individual staff members had previously participated in subject-specific networks focused on literacy, those involvements fell off as the demands associated with the "whole-school" oriented networks escalated. One could observe traces of literacy network participation in the classrooms of a few individual teachers, and to good effect, but there it ended. One might imagine a configuration by which school-to-school networks enable participating schools to multiply the substantive contributions of teacher-to-teacher networks.

All teachers of each course meet weekly to collaborate on lesson plans, discuss student progress, and share ideas. We believe this tremendous level of collaboration is one of the things that makes our department unique, and we think the chance to participate in these conversations is an invaluable opportunity for any teacher (beginning or otherwise).

Commenting on the value of these weekly meetings, one teacher says:

I know that when I come to the [Algebra Group] meetings, if I bring something that I don't understand or it's something that I'm upset about or something I need clarification on or something that I just want to process, then I'm going to get input from those people and it's going to make a difference for me. Because they are involved in the process, they care about the process, and they're educated about the topic that we're discussing, which is math.

However, several constraints limited the impact of these arrangements. The school supplied few resources to support the teachers' involvement in external networking or professional development, or to capitalize on what they were learning through their internal collaboration and network participation. No funds were specifically reserved for participation in external professional activities, while within-school professional development time was dominated by administrative priorities. Teachers pursued their professional learning and innovation on their own time (after school, on weekends and in the summer) and largely on their own dollar. Absent both symbolic and material supports at the school level, teachers' efforts remained heavily dependent on individual initiative and effort. Innovating departments cultivated strong teacher community primarily through heavy investments in teacher leadership and large amounts of uncompensated teacher time – an inherently unstable arrangement (on this point, see Elmore, 1996). Viewed from the perspective of *school* improvement, reliance on localized department-based innovations and idiosyncratic external arrangements seems a weak strategy, compounded in this instance by school leadership that remained both impervious to subject-specific professional learning needs and inattentive to differences in department professional cultures.<sup>10</sup>

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<sup>10</sup> Consistent with other portraits of comprehensive high schools, departments at School 2 differed with regard to department culture and not all exhibited the collective norm of innovation and improvement

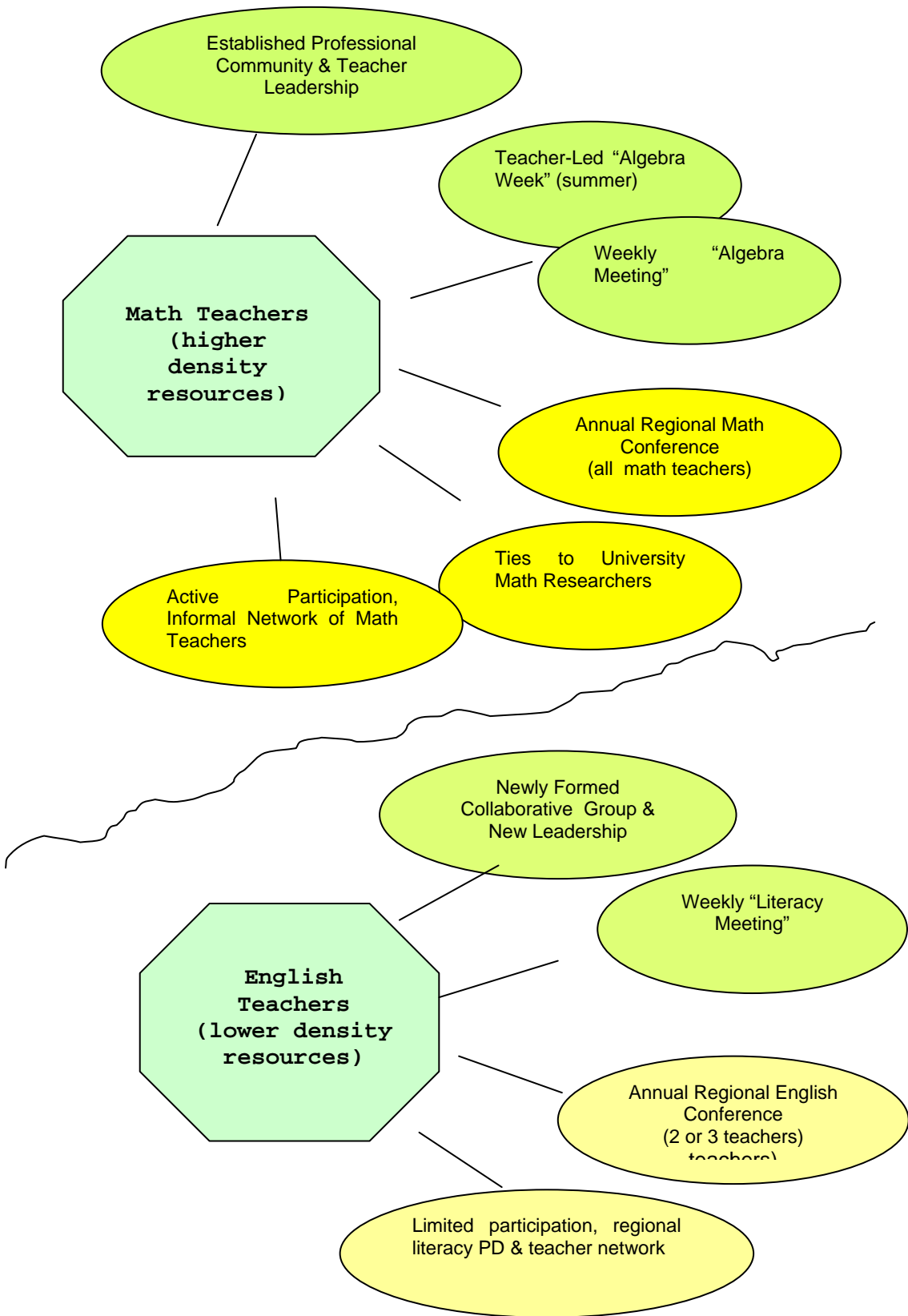


Further, the department-based groups varied in the strength of their internal community and ties to their respective external networks. Figure 6 displays some of the differences in supports available to the two groups through their internal arrangements and their external ties. The math teachers had established what might be described as a "high density" of resources for professional learning and instructional improvement. Those resources – which owed a debt to the strength and continuity of department leadership – included jointly developed materials for teaching mathematics, generative ways of talking together about teaching and learning, established mentoring relationships, and structured activities and routines for focusing the weekly meetings of issues of learning. This "high density" of resources inside and outside the group, honed over a decade or more, has paid off; students in this school routinely enroll in higher level mathematics courses at a higher rate than students in other schools with comparable demographics (Horn, 2002).

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characteristic of math and English. The history department, for example, was home to some highly innovative individuals but collectively fit the profile of what Siskin (1994) termed a "fragmented" department.

Figure 6: Varying density of internal and external resources for professional learning and innovation in two groups within the same school



The English teachers, on the other hand, were a newly formed group with broadly shared commitments to improvement but more tenuously shared conceptions of subject and subject teaching and a far lower density of resources for learning and innovation. They invested a high level of time and energy in the development of their new course, but struggled throughout to justify its focus and content to students, parents, colleagues and even themselves. Indeed, over the course of a single semester, the course grew to look more and more like standard "English 9." Compared to the math group, the English teachers had fewer reserves of experienced leadership and established professional community on which to draw; they had less experience with the kind of teaching they were trying to introduce and fewer materials with which to scaffold it; and, particularly germane to this report, they pursued an intermittent and ambivalence-laden relationship with the literacy network that had generated the idea for the Academic Literacy course in the first place.

As our analysis unfolded, we developed a growing appreciation for the significance of external ties in helping us understand what was transpiring within our case study schools. The schools and the groups within them varied with regard to their involvement with external networks or other resources, resulting in a mix of what might be considered more insular or more cosmopolitan work environments; where they existed, the external ties varied in their focus, intensity and perceived importance, and thus with regard to teachers' opportunity to learn and their resources for improvement. Further, a school's or group's capacity to exploit the resources of *external* (network) participation seemed clearly contingent on *internal* leadership and professional community. In effect:

Each school, by virtue of its history and conditions, was positioned to accomplish something that the other was not, but neither was positioned *both* to support teacher learning in subject domains and to sustain teachers' long-term engagement and persistence with the work of whole-school improvement." (Little, 2003b).

As a research team observing these two schools, we began to wish we could marry the rich, close-to-the-classroom professional community of the math teachers in School 2 to the capacity for whole-school goals and improvement processes at School 1. We also began to appreciate the need

to learn more about the specific contributions made by external ties to schools' internal capacity for improvement and to teachers' knowledge, practice and commitment.

### **Investigating Learning in the Relationship Between Schools and Networks**

David Jackson (2004) has drawn on the work of Church and colleagues to characterize the relations among member schools in a network in terms of "threads and knots." The threads represent relationships conducive to learning (high level of communication, trust) and the knots represent the activities through which learning develops and relationships are built. In this model, the activities (knots) provide structural form and continuity to the net. Jackson's argument is that the knots (activities) are the places where good work must be done if the networks are going to realize their collective ambitions. By extension, these are the places where research must be concentrated if we are to learn something about the possibilities and limitations of networks and networking as an avenue for learning and improvement.

In our own work, my colleagues and I are only beginning to grapple seriously with the problem of tracing professional learning in and across the various contexts of teachers' work groups, schools, professional development environments and networks. This is in many ways complicated and elusive work, but we are convinced there are ways to get started with it and that it will yield both conceptual developments and practical insights. Our recent analysis and intended research trajectory reflect the following strategic choices:

*1. Where to look for learning: Identify situations and practices that lend themselves to the investigation of professional learning*

Put simply, our strategy here is to place situated practice more fully in the center of our research questions and designs. David Jackson's argument focuses attention on the actual work of networks and networking – their activities and accomplishments. Although there are some promising exceptions, much of the writing about professional community and about networks remains at the level of

abstract principles and interview-based testimony. Both are important but insufficient to promote or capture the nature of learning opportunity and the dynamics of "real time learning" to which the NLCs aspire (see Bentley & Horne, 2003). Our own analysis suggests that we will make headway in understanding the affordances and accomplishments of school-network relations to the extent that we focus more directly and concretely on illuminating the resources they supply for learning and improvement—what they are, how they're marshaled in particular configurations, and how they achieve their effect at the level of teaching and learning? That is, what constitutes networking and professional community *at the level of practice?*

At a recent working conference on investigations of improvement practice, several colleagues and I attempted to work out what might be entailed in pursuing this kind of research and to identify some fruitful starting points (Lampert, 2004). Among the specific examples we discussed, drawing on our own data, was an instance of "revising materials of instruction," a presumably common instructional practice that might be the focus of network interaction and thus the target of an inquiry into professional learning and its "footprints." A member of the working group recounted an instance in which instructional materials—their design, use, refinement and continued use—became the organizing point of departure for professional learning among colleagues concerned with the use of pronouns in a foreign language class. Our report (Lampert, 2004) summed up our discussion this way:

*We tried to articulate what practices of teacher learning were involved in this process, and we discussed:*

- *The teacher's learning to articulate what he did in his class so it would be usable by another teacher;*
- *The teacher's learning to see something about student responses to this material by talking with a colleague, which (maybe) he had not been able to see from the perspective of his own practice;*
- *The other teacher learning how to teach pronouns in a different way by trying this material;*
- *Both teachers' need to elaborate their assumptions about students, learning, and subject matter in order to talk together about this instructional material/activity.*

*In this example, we considered the revised material/activity as both evidence of the practice of teacher learning and a product of teacher learning. We also saw it as an opportunity to collect evidence about organizational practices that support teachers' learning in and from practice. In considering this example, we began to push ourselves to be more articulate about the difference between changing something and improving something.*

*.. In particular, we focused on the design of and experimentation with materials as an opportunity for teachers to expose and improve their thinking about the subject matter they are teaching and about how it could be learned, both as individuals working alone, and in collaborative work with colleagues. We considered the usefulness of thinking of instructional materials as "boundary objects" that could represent practice and improvements in practice, both for practitioners and for researchers. We also elaborated the possible variations in the social organization of this work, and considered the transactions between teachers' private (in and out of class) and collaborative (out of class) activities.*

*We returned to the question of when an instructional material/activity could be considered "better" rather than simply "different," and we interrogated the idea that "a material is better when it gives more students access." This led to defining several kinds of access that might be relevant, including institutional access, pedagogical access, and access to the subject matter.  
(pp. 1-3).*

To unpack learning in and through ordinary practices of teaching, professional development or leadership requires data records that meaningfully capture evidence of those practices. Earlier in this paper, I inventoried three sets of my own studies focused on understanding the relationships among professional development, professional community and school reform. Although each of these studies entailed a certain amount of direct observation, only the last of them took video- and audio-taped records of *situated practice* to be a central and crucial data source. It is in the examination of those records that we are now able to expose in persuasive detail the kinds of interactions and other resources that help account for the success of the math teachers in our case study school (School 2) and help us understand the more limited progress in other groups and settings. The field has advanced sufficiently that such records are now increasingly used in programs of

professional education (Lampert & Ball, 1998; Lampert, 2003), corporate programs of improvement (Jordan & Dalal, 2003), workplace studies in numerous fields (Luff, Hindmarsh & Heath, 2000) —and of course, in educational research (Goldman, Pea & Derry, in press).

2. *Exploit past research in new ways: Integrate research on "school community" and "networks" through a focus on resources for learning and improvement*

We now have a long history of research and practical experience that focuses on whether and how the professional relationships among teachers contribute to school improvement and to teachers' own effectiveness and commitment. However, much of that research is divided up into rather self-contained niches. Two of the niches with particular relevance here are the research on *school-based professional community* and the research on *networks*. With few exceptions, research on professional learning community within schools takes the school as a meaningful unit of analysis; even when studies focus on within-school groupings such as departments, grade levels or teams, the school typically operates as an effective boundary on the "case." Similarly, research on networks concerns itself with the network as an entity, with participants from a particular school standing as a kind of proxy for the school itself.

Yet these case boundaries, so convenient for research, do not correspond to the places and pathways traversed by the individuals and groups we study. Nor do they allow us to capture precisely the kind of boundary-spanning work that individuals and groups do when they move from one institutional space to another. For both practical and reasons, it makes sense to shift focus from organizational forms and sites to the resources for and trajectories of learning. The case boundaries would look more like the "problem space" presented at the beginning of this paper, or like the image of "threads, knots & nets" that Jackson borrows from Church's work.

[There's also the matter that the research on professional community has become more conceptually elaborated and more rooted in studies of practice than studies of educational networks; further, most studies of educational networks take little account of network theory or network-based research in other fields. An explicit aim to integrate these lines

of research may serve to advance our thinking about the nature of network relationships in productive ways.]

3. *Develop or adapt new conceptual tools: Exploit the conceptual and methodological advances for studies of workplace (situated) practice and workplace learning.*

As yet, the field of education has developed few of the fine-grained investigations of professional workplace practices, workplace learning and organizational change that have emerged in other fields of study (for example, Engestrom & Middleton, 1998). Researchers outside education have exploited both traditional ethnographic methods and advanced video and audio technologies to uncover the practices by which people at work learn, construct, coordinate, and transform their practice in domains that vary as widely as scientific research (Lynch & Woolgar, 1988), medical diagnosis (Mishler, 1984), transportation communication and coordination (Hindmarsh & Heath, 1998), navigation (Hutchins, 1996) and veterinary surgery (Pinch, Collins & Carbone, 1998). These "cognitive ethnographies" have helped demonstrate the potential utility of concepts and methods aimed at understanding participation and learning in the context of communities of practice. Sociologists, also responding to the "cognitive turn" in the social sciences, have employed the notion of "organizational sense-making" to understand the relationship between large scale institutional processes or organizational structures and micro processes of interpretation and interaction (Vaughan, 2002; Weick, 1995).

In two recent papers (Little, 2002, 2003a), I have tried to identify some of the conceptual tools and heuristics by which workplace practices and learning are rendered accessible in these studies. I described these as among the potentially useful precedents on which we might draw in the investigation of professional community and school improvement. Briefly, these were:

Access to practice and the "horizon of observation."  
In his studies of novice marine navigators, Hutchins (1996, p. 52) employs the term "horizon of observation" to define the extent to which elements of a work environment are available as a learning context. Hutchins' image responds to the general question, also taken up by others,



of how a given practice comes to be known, shared, and changed through participation (see also Lave & Wenger, 1998; Wenger, 1998). The image of "horizon of observation" strikes me as particularly apt for studies of professional learning and improvement in education, where the horizon is so often restricted by the insularity of the classroom, norms of autonomy among teachers, and the absence of shared ways of talking about practice in settings beyond the school. In particular, we might concern ourselves with the scope and significance of classroom and school practices that makes their way into network settings.

The face and transparency of practice, or "publicly available features." More specifically, then, one might wonder about what *specific aspects* of work come to be visible through teachers' participation with one another, and with what fullness and specificity—what I have elsewhere termed the "face" and "transparency" of practice (Little, 2002). I take the notion of "publicly available features" of practice from a study of veterinary surgery reported by Pinch, Collins & Carbone (1997). Through their analysis of one feature of practice—the difficulty of specific tasks—the researchers introduce the more general concept of publicly available features of practice. I argue that this notion of publicly available features might profitably be applied and extended in studies of teachers' communities of practice.

The networks present an interesting challenge in this regard both for participants and for research. In what ways do network activities expose the publicly available features of practice in ways that support learning and change? In our study of a school reform network during the mid-1990s, we found that much of the network activity took the form of "show and tell" presentations that provided public accounts or displays of "reform progress" but did relatively little to engage participants in deep examinations of teaching, learning, schooling and leadership practice (Little & Dorph, 1998). Our current research on professional community among secondary teachers begins to show how groups and activities vary in the resources they supply for digging deeply into assumptions, conceptions and practices (Horn, in press; Little, 2003; Little, Gearhart, Curry & Kafka, 2003).

Categories and classifications. "To classify is human," as Bowker & Star (1999) remind us. Writing about

"classification and its consequences," they employ examples as disparate as the history of the International Classification of Diseases (ICD), race classification in apartheid South Africa, and shifts in the nature and codification of nurses' work to show how the creation and maintenance of classificatory schemes constitute fundamental kinds of social practice. Because they are inevitably historical, political, moral, and cultural constructions, and because they tend to form a taken-for-granted, invisible infrastructure of working practice, classifications supply both resources for and impediments to learning and change.<sup>11</sup> In one analysis of data from our current study, Horn (in press) shows how routine ways of classifying students are taken up differently by the mathematics teachers in two high schools as they justify curricular decisions and explain students' difficulties or failures in mathematics; the result is to create quite different opportunities to examine and problematize practices of mathematics teaching and learning. Horn's analysis reveals the specific practices by which teachers' interactions in one group help render the tacit explicit and thereby interrupt the assumptions embedded in common terminology ("fast kids, slow kids"). For both the participants in school-based professional communities and networks and for the researchers seeking to understand the possibilities and constraints of those activities, making the tacit visible proves to be complicated but essential business.

### Conclusion

This paper lays out some possibilities for approaching the investigation of professional learning in the context of school-network relationships. It makes the case that such investigations would benefit from a focus on the *activity* that constitutes networks and networking. Further, it argues that useful precedents and resources for investigation reside in several separate lines of research that have yet to be productively joined: research on professional communities; research on networks; and research on workplace practice and learning. These are ideas in progress, and the

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<sup>11</sup> See also Wenger (1998) on the related concept of "reification." It is in the reifications, including classification schemes, that the historical and institutional characteristics of teaching as an occupation are made particularly evident in the more micro-interactions of day-to-day work.

Networked Learning Communities offer a compelling opportunity to further the conversation.

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