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Classrooms as learning communities: a review of research

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This article reviews published research on (i) classrooms as communities; (ii) classrooms as communities of learners; and (iii) classrooms as learning communities. It is based on a reading of about 100 texts. It aims to answer the question 'What do we now know about the effects of operating classrooms as learning communities?'. Despite the fact that this mode of operating classrooms is not the dominant one, and is correspondingly under-researched, there is good evidence that it brings significant benefits.

Introduction

The focus of this review is stimulated by answers to the larger question 'what helps learning in classrooms?'. Various meta-analysis have brought together multiple studies of classroom learning. One, covering 11,000 statistically significant findings (Wang *et al.*, 1990) showed that the way in which the classroom is managed is more influential than any other variable. This points to the teachers' role in composing a classroom which attends to both social relations and learning, and the social nature of classroom management. More recently an analysis which combined studies on over a million learners (Marzano, 1998) arrived at two conclusions which confirm the focus here: 'Metacognition is the engine of learning' (p. 127), so that thinking and reflection are key processes for the classroom, and 'the self-system appears to be the control center for human behavior' (p. 126), so that how the classroom engages learners' beliefs and learners' control is crucial. Classrooms as learning communities aim to embrace both these conclusions.

Classrooms vary in the ways they operate and their variation may be understood in terms of the approach to learning which is in operation (Watkins, 2003). The dominant approach has operated since the earliest known classrooms of c3000BC and is still promulgated by many voices, including those of government. It is

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'Learning = being taught', with its associated language of transmission and delivery. In a smaller number of classrooms the view 'Learning = individual sense-making' operates. This accords with the findings of twentieth century research on human understanding. In the fields of mathematics and science education, much research adopts this constructivist view of learning (despite the fact that the folk view of these subjects holds strongly that they are about facts and knowledge rather than sense-making) (Cobb & Bauersfeld, 1995; Driver *et al.*, 1994). The evidence that teachers who adopt beliefs and practices along the constructivist lines get better results than those who adopt beliefs and practices along the lines of 'learning = being taught' now covers a range of countries and age groups, for example six-year-olds in the US (Peterson *et al.*, 1989), nine-year-olds teachers in Germany (Staub & Stern, 2002), 10-year-olds in Japan (Inagaki *et al.*, 1998) and secondary school students (Abbott & Fouts, 2003).

The research to be considered here goes beyond the idea of learning as individual sense-making, toward the view that learning is constructing knowledge with others. In a learning community the goal is to advance the collective knowledge and, in that way, support the growth of individual knowledge (Scardamalia & Bereiter, 1994). It positions learning as a process of negotiation among the individuals in a learning community, and sees individual learning as rooted in the culture within which the individual learns (Prawat & Peterson, 1999). In learning communities, social relations and knowledge-creation meet. Knowledge (both individual and shared) is seen to be the product of social processes.

There are fewer studies than one might reasonably expect of classrooms which develop in this style. Much classroom research reflects the dominant conception of 'learning = being taught', and investigates matters such as teachers' questioning, teachers' managing the classroom, teachers' dealing with student misbehaviour, teachers' grouping of pupils, etc. Thus is a teacher-centered view of classroom life maintained, together with an anonymous view of learners in which research questions such as 'Is it best to seat them in rows or groups?' are posed. Nevertheless there is a significant body of research which brings evidence to support the focus of this paper: that paying attention to social relations and learning processes brings considerable dividends—in short, better learning, better performance and better behaviour.

Because of limitations of space, full details of research studies will not always be included (sample, method, age, location), but some attention will be given to that contextual feature which most influences the classroom and its impact—the school.

The school as a context for classrooms

Classrooms rarely operate as separate islands, and one of the major influences on them is the culture of the school. Research findings on schools as communities provide a backdrop for the focus on classrooms.

Some schools operate more as communities than do others. This difference makes a difference to a range of behaviours and capacities as learners. Secondary schools that score high on an index of communal organization 'attend to the needs of

students for affiliation and … provide a rich spectrum of adult roles [that] can have positive effects on the ways both students and teachers view their work. Adults engage students personally and challenge them to engage in the life of the school' (Bryk & Driscoll, 1988, p. 107). Such schools show higher teacher efficacy, morale and enjoyment, and students in such schools are more interested in academics, absent less often, and there are less behaviour difficulties. A study of 11,794 16-year-olds in 830 secondary schools revealed that students' gains in achievement and engagement were significantly higher in schools with practices derived from thinking of the school as a community, rather than the common form of thinking of the school as a bureaucracy (Lee & Smith, 1995). Similar findings apply to primary schools: those where students agree with statements such as 'My school is like a family' and 'Students really care about each other' show 'a host of positive outcomes. These include higher educational expectations and academic performance, stronger motivation to learn, greater liking for school, less absenteeism, greater social competence, fewer conduct problems, reduced drug use and delinquency, and greater commitment to democratic values' (Lewis *et al.*, 1996, p. 17).

Pupils' sense of the school as a community has been measured with validity, and relates to individual matters such as motivation. A study of 301 students in the early secondary years concluded 'a student's subjective sense of belonging appears to have a significant impact on several measures of motivation and on engaged and persistent effort in difficult academic work' (Goodenow, 1992, p. 15). School sense of membership is strongly associated with pupils' valuing of schoolwork, their general school motivation, expectancy of success, and self-reported effort. These motivation-related measures are more associated with the sense of belonging to school than they were with their friends' valuing of school, thereby challenging the folk theory of 'peer pressure' as most influential in motivation (Goodenow & Grady, 1993).

Students with higher sense of school membership report higher grades, and a more internal locus of control, the sense that success was more in their hands than in the hands of others (Hagborg, 1998). This last element can be seen as evidence against interpreting sense of school membership as a simple idea of compliance to organisational rules—the characteristics of the school matter. Similarly, sense of belonging to school is not limiting students to their school: it is associated with looking ahead and expectations for the future (Israelashvili, 1997). Positive feelings about school relate to positive teacher–student relationships, but more so when there is a feeling of school belonging. Additionally, sense of school belonging is positively related to academic grades, and even more so when students feel that school focuses on learning and on improving competence rather than on performance and proving competence (Roeser *et al.*, 1996). Higher levels of affiliation to school reflect students' current participation in school, not their history of prior achievement (Voelkl, 1997).

Participation in school is an outgrowth of student sense of belongingness. Generally this is weakly influenced by typical aspects of the effects of school leadership and organization (Leithwood & Jantzi, 2000). It is influenced by both peers and teachers, more so than by parents in a study of teachers, parents and 1500 pupils aged 9 to 16 (Connell & Wellborn, 1991).

Students' sense of school membership influences their patterns of behaviour outside school as well as inside. Schools with higher average sense-of-community scores had significantly lower average student drug use and delinquency, suggesting that schools that are experienced as communities may enhance students' resiliency (Battistich & Hom, 1997). School supportiveness, sense of community and opportunities for students to interact and to exert influence are key factors (Schaps & Solomon, 2003). A survey of 36,254 13- to 18-year-old students showed that school connectedness (more so than family connectedness) was the most salient protective factor against behaviours such as drug use, school absenteeism, pregnancy risk and delinquency risk (Resnick *et al.*, 1993). Analysis of 12,118 follow-up interviews concluded 'we find consistent evidence that perceived caring and connectedness to others is important in understanding the health of young people today' (Resnick *et al.,* 1997, p. 830).

School differences are also set in a larger picture across countries, indicating that schools operate more as communities in some countries than in others. In a recent survey of representative samples in 42 countries, 224,058 15-year-olds in 8,364 schools were asked to respond to 'My school is a place where I feel like I belong': 79% affirmed this statement, but country differences ranged from France (44%), Spain (52%) and Belgium (53%) to Australia (85%), Finland (86%) and Hungary (89%) (OECD, 2001). Within countries, school differences were significant: 'In nearly every country, there is a wide range among schools in the prevalence of students considered to have a low sense of belonging and low participation' (Willms, 2003, (p. 54). This variation is not explained by 'family background' of students but suggests aspects of school policy and practice create student disaffection. *For schools,* sense of belonging is moderately correlated with student performance in reading, mathematics and science. So schools which give priority to working on student engagement do not do so at the expense of developing such skills as literacy: 'schools that have strong student engagement tend to have strong literacy performance' p. 54. *For any individual,* sense of belonging may not be strongly related to performance: disengaging from school does not result in poor academic performance in all cases. Disengagement from school is not simply about academic success: school practices matter.

Sense of school community can be enhanced for both students and teachers, and the route is through the classroom rather than through extra-curricular programmes or activities. 'These findings suggest that students will not sign up for those activities unless they already experience themselves as being part of a supportive community' (Osterman, 1998, p. 19). Such programmes are known to make a difference: 'Effects were strongest for students in the subset of schools that had made the greatest degree of progress in program implementation' (Battistich *et al.*, 1996, p. 12)

The benefits of community building in schools are not achieved through building any sort of community. Much depends on the values which develop, and the best is achieved through a caring, pro-social, learning-oriented approach to the relations between all parties. And this strategy is relevant for those schools which are sometimes portrayed as most difficult: 'the potential benefits of enhancing school community may be greatest in schools with large numbers of economically disadvantaged

students' (Battistich *et al*., 1997, p. 137). The benefits are often lasting, from primary schools persisting through secondary school (Schaps, 2003) on achievement test scores, academic engagement, social skills and misbehavior.

The classroom

Focusing now on the classroom, this brief review will not focus so much on the detail of teachers' classroom practices (see Watkins, 2004) as on the effects.

The review begins with research into (a) classrooms as communities; (b) classrooms as communities of learners; and (c) classrooms as learning communities. These sections are in some sense cumulative, since the development of classroom communities is concerned with both social and academic outcomes and sees them as connected. Indeed it has been argued that the agenda for education reform should reflect all three of the forthcoming sections and should cover 'social, ethical and civic dispositions; attitudes toward school and learning motivation; and metacognitive skills' (Battistich *et al*., 1999, p. 415).

Classrooms as communities

In classrooms where a sense of community is built, students are active agents and more engaged.   In any collective which operates as a community, all participants are active, so in a classroom community students are treated as active agents in collaboration to promote learning. The exercise of human agency is about intentional action, exercising choice, making a difference and monitoring effects (Dietz & Burns, 1992). The collaboration on which classrooms as communities depend requires that students are active agents in choosing and learning:

> We propose that the engine of collaboration is agency and its expression in the effort to represent and share in other people's thoughts. … One way this agency is expressed is by the decision to collaborate and the effort to reach an understanding when social rules are insufficient for successful collaboration. Another way agency is expressed is by the motivation to produce and contribute. Finally, productive agency appears in the very way we learn—we construct knowledge. (Schwartz & Lin, 2001, pp. 7–8)

Human learning is about both appropriating and producing knowledge, yet the dominant model of classrooms does not start with practices which enhance student agency. Likewise for teachers' professional agency, which is rarely the starting point for imposed changes which seek compliance, or centrally-defined reforms which have a demoralizing effect. To create higher levels of agency for children is the challenge of creating classrooms that are knowledge-building environments. To find ways in which student choice and student ideas are developed has been identified as a key issue in the design of ICT support (Scardamalia & Bereiter, 1991).

Emphasis on community action is sometimes portrayed as in tension with emphasising achievements of individuals, but the evidence does not support such a view. An eminent researcher in this field concludes:

> The findings taken as a whole show that the higher the perceived collective efficacy, the higher the groups' motivational investment in their undertakings, the stronger their staying power in the face of impediments and setbacks, and the greater their performance accomplishments. (Bandura, 2000, p. 78)

In classrooms where a sense of community is built, an increased sense of classroom belonging develops and leads to greater relatedness, participation and motivation. Classroom involvement and participation is linked to a sense of community: as students' sense of community increases, participation increases. By encouraging supportive relationships among students through cooperative learning activities, student satisfaction with the group increases and behavioural referrals drop by as much as 71% (Johnson *et al.*, 1995). Students indicated a greater ability to build relationships and worry less about 'being put down'. In informal activities, good relations were more widespread and there was less evidence of earlier factions.

Greater motivation also comes with increased relatedness in communities. Both intrinsic academic motivation and autonomy were related to students' sense of community in a longitudinal study of 4515 students of ages 9 to 12 in multiple schools and districts (Battistich *et al.*, 1995). This was explained in terms of three core inter-related motivations: perceived competence, sense of control and perceptions of autonomy (Deci *et al.*, 1991). 'The higher the perceived quality of relatedness, the greater one's feelings of autonomy and competence' (Ryan, 1995, p. 419). So relatedness and autonomy are not opposites, as they are sometimes depicted. The three motivational variables in turn predicted children's performance as measured by grades, achievement, and teacher ratings of competence. Students involved in a programme to develop community scored significantly higher than comparison students in sense of efficacy during middle school. 'Program students also had significantly higher grade-point-averages and achievement test scores than comparison students' (Battistich, 2001, p. 3).

Engagement and relatedness also influence risk behaviour. As students feel more supported they become more engaged and this in turn reduces risk behavior and likelihood of dropping out (Connell *et al.*, 1995), In this longitudinal study of 443 urban African American adolescents, engaged students reported more positive perceptions of competence, autonomy and relatedness in the school setting than students who were less engaged.

In classrooms where a sense of community is built, governance is shared and responsibility of all is developed. Classrooms which operate as communities encourage children to take an active role in classroom governance. The authority structure of the classroom is an important determinant of students' experience of community and of some of its observed effects (Solomon *et al.*, 1996). Comparison of two contrasting programmes has shown that the style of governance makes a difference: 'Although teachers in both of the programmes stressed the importance of positive student behaviour, this appears to have been defined more as diligence, compliance and

respect for authority in the [external standards] school, and more as interpersonal helpfulness, concern and understanding in the [classroom community] schools' (Benninga *et al.*, 1991 pp. 157–158). Ten year-olds' interpersonal behavior was more helpful and supportive in the latter.

Through practices such as the class meeting to discuss issues of concern, pupils work collaboratively with the teacher to develop solutions to discipline problems. Teachers avoid extrinsic incentives (rewards as well as punishments) so that children will develop their own reasons for positive actions other than 'what's in it for me'. 'In general the greater the sense of community among the students in such a class, the more favourable their outcomes on measures of pro-social values, helping, conflict resolution skill, responses to transgressions, motivation to help others learn, and intrinsic motivation' (Schaps & Solomon, 1990, p. 40). Teachers' encouragement of cooperative activities appears to be particularly important in teacher practices associated with students' sense of the classroom as a community (Solomon *et al.*, 1997).

Sense of classroom community is positively related to higher level moral reasoning based on internalized values and norms, and negatively related to lower level reasoning based on conformity to authority, social approval or disapproval, or reward and punishment (Battistich *et al.*, 1994). Students in schools with a strong sense of community are more likely to act ethically and altruistically (Schaps *et al.*, 1997), and to develop social and emotional competencies.

In classrooms where a sense of community is built, difference is not viewed as a problem and greater diversity of people and contributions is embraced.   When classrooms operate as communities, a wider range of roles becomes available, both for the classroom and for each participant: students began to view themselves in different roles and speak about themselves in different ways (Elbers & Streefland, 2000a).

Patterns of contribution become more balanced than those in teacher-centred classrooms, with individuals whose contribution rates are markedly different in large group settings displaying very similar contribution rates in small groups. '[small group] provided a more equitable opportunity for its members to participate in high-level discourse about science than did whole-class lessons' (Rafal, 1996, p. 291).

A wider range of pupils becomes valued. As one teacher put it in an ICT-supported community classroom: 'Instead of being outcasts, the nerdy kids are being treated with reverence. … [It] afforded a lot of kids that don't normally have success in school, some success'. And pupils learn a wider range of roles: 'I think there are some kids that facilitate learning, and who want to help. I think it [knowledge-building community] brings this out in some kids that aren't normally helpful or facilitating' (Christal *et al.*, 1997, p. 119).

On dimensions which are typically associated with difference in treatment and valuing in the dominant classroom, classroom communities de-emphasise difference and promote inclusion. The practices and experiences which school students report as promoting membership and belonging for them are the same practices as they see appropriate for their classmates with severe disabilities (Williams & Downing, 1998).

When a range of contributions is valued in the service of a larger whole, possession of ideas and right answers is less important.

> The students put competition and claims of authorship into perspective. Against these, they emphasized that they should work as a community and that it is the idea that matters, not who came up with it in the first place. (Elbers, 2003, p. 81)

Sense of a classroom as a community can be enhanced over time. For one programme students scored significantly higher on the measure of sense of community than did comparison students for each of three years (Solomon *et al.*, 1992).

Classrooms as communities of learners

The social arrangements which create a sense of community in a classroom can operate well but not necessarily implicate the conception of learning which inhabits that classroom. Caring and pro-social classroom communities can continue a teacher-centred view when it comes to learning. The next section reviews studies which have examined the application of community practices to the fact that the members are learners.

In classrooms which operate as a community of learners, engagement in the classroom develops into engagement in intentional learning and high level engagement in the discipline.   Agency and belonging in a community of learners are enhanced by the key practice of eliciting learners' questions. Various studies show that when this happens, the intellectual demandingness is high, both in the type of questions and the processes which follow. When students are asked to generate questions at the start of a new topic, they are likely to ask questions derived from their need to understand and focus on things that they are genuinely interested in. Such questions are of a higher order than text-based questions produced after reading (Scardamalia & Bereiter, 1992). And primary school students are able to follow their questions in depth (Hakkarainen & Sintonen, 2002).

When students direct collaborative knowledge-building discussions on science topics, they have been judged as conforming to canons of scientific inquiry, validated by independent judgments from philosophers of science, confirming that students collectively exhibit a high level of what may properly be called scientific thinking (Hakkarainen, 1995). Similarly in a maths classroom: 'students expressed their real interest and were motivated to work on problems. They engaged in mathematical discussions rather than applying algorithms and textbook rules' (Elbers, 2003, p. 80).

When such practices are used in a classroom fostering a community of learners, students became passionately engaged, used evidence in scholarly ways, developed several arguments, and generated core questions. 'Students' arguments for their claims became increasingly sophisticated over time' (Engle & Conant, 2002, p. 403) leading to the description 'Productive Disciplinary engagement'.

In classrooms which operate as a community of learners, participants come to learn from each other and to help each other learn. When interaction between members of a class is focused on the topic and process of learning, their relations become more respectful and helpful. One of the leading researchers in this field concluded: 'When an atmosphere of respect and responsibility is operating in the classroom, it is manifested in several ways. One excellent example is turn-taking. Compared with many excerpts of classroom dialogue, we see relatively little overlapping discourse. Students listen to one another' (Brown *et al.*, 1993). Further, 'we showed that children, collaborating as members of a community of inquiry, are motivated to help each other and to learn from each other' (Elbers & Streefland, 2003, p. 81).

In contrast to the impersonal relations of many classrooms, in which concerns about peer judgment and fear of criticism arise, getting to know other class members leads to a different assessment of the risk of contributing. Trust builds and members become more likely to 'ask questions, express a minority opinion, play the devil's advocate, or publicly wrestle with ideas' (Osterman, 1998, p. 17).

ICT can make an important contribution to building a community of learners. In one example of the few ICT tools which embody a learning community stance 'a more even distribution of contributions and greater attention to and productive use of the ideas of collaborators' was demonstrated (Cohen & Scardamalia, 1998, p. 93). Students engaged in more reflective activity when they had both face-to-face activity as well as the collaborative technology to construct and pursue collaborative learning goals.

In classrooms which operate as a community of learners, students are more likely to be motivated toward learning for its own sake and are more likely to make choices and feel responsible for what happens to them. The correlation between student's sense of community and both intrinsic academic motivation and autonomy is a feature of classrooms as communities (previous section). In a community of learners students use collaborative enquiry to address authentic questions they have generated, and their agency creates a range of effects: group productivity increases as students gain ownership, cognitive engagement increases as public dialogue centres on discussions of their own experiences, and students take responsibility for learning and teaching as they work in teams. When tasks are student-initiated collaborative interactions in groups increase; by contrast when students complete teacher-designed activities student dialogue centres more on the procedural aspects of the activity (Crawford *et al.*, 1999). Under these conditions, when multiple perspectives are reconciled through the medium of dialogue, collaboration creates more abstractions than does individual work (Schwartz, 1995).

Sense of community in a classroom also supports a learning orientation on the part of pupils, which is crucial for them to be active engaged learners and for high achievement. At the crucial time of transition between schools it has been shown that the common change in learners' orientation is towards a concern for proving competence rather than improving competence. A longitudinal survey of 660

students indicated that exceptions to this pattern occurred when learners perceived a learning orientation in classrooms, and these occasions are associated with higher sense of school belonging (Anderman & Anderman, 1999).

In classrooms which operate as a community of learners, students demonstrate enhanced individual outcomes on important aspects of individual learning. Programmes which aim to foster communities of learners have encouraged pupils to: (i) engage in self-reflective learning; and (ii) act as researchers who are responsible to some extent for defining their own knowledge and expertise. The aim is to enhance children's emergent strategies and metacognition, and help them advance each others' understanding in small groups, through processes such as 'reciprocal teaching' (Palincsar & Brown, 1984).

Results from such classrooms show that improving both literacy skills and subject knowledge improve, specifically:

- 'Domain-specific content is retained better by students'.
- 'Students were able to use information more flexibly in discussing thought experiments' (hypothetical situations) and counter-examples.
- Students were better at applying knowledge 'Over time the research students introduce more novel variations of taught principles along with more truly novel ideas'.
- Students show better transfer of learning to other domains, through: '(1) improvement in students' reading comprehension scores on materials outside the domain of study; and (2) gradual acquisition of increasingly complex forms of argumentation and explanation strategies'.
- Students more than doubled their comprehension on a measure where they answered questions after reading a provided passage unrelated to the curriculum of the class. They 'showed especially strong gains in their ability to summarise a passage and in their ability to solve problems analogous to the one in the provided passage'.
- Students' argumentation skills improved. 'Explanations were more often supported by warrants and backings. The nature of what constitutes evidence was discussed, including a consideration of negative evidence. A variety of plausible reasoning strategies began to emerge' (Brown & Campione, 1994, pp. 246–250).

This approach goes well beyond attempts to train pupils in learning strategies, when typically there is little evidence of them using strategies when left to their own devices. As the investigator put it 'Gradually it became apparent that the children's failure to make use of their strategic repertoire was a problem of understanding: they had little insight into their own ability to learn intentionally; they lacked reflection. Children do not use a whole variety of learning strategies because they do not know much about the art of learning' (Brown, 1997, p. 400). Thus a key element in communities of learners is that 'students should be active participants in the program, aware of their learning processes and progress. They should come to understand why they are

engaging in the activities that form the basis of the program … they should be able to serve as collaborators in the orchestration of their own learning' (Campione *et al.*, 1995, p. 65).

The extent to which the gains from these interventions are shown up in public forms of assessment depends on what form is used:

> Two of the most successful schools in our research participated in a state-mandated, high-stakes performance assessment. In contrast to the standardized tests used in the other districts, the assessment was consonant with [the classroom community programme's] educational approach, both in its emphasis on higher-order thinking in response to open-ended questions and in its inclusion of collaborative group investigations and problem-solving in science, mathematics, and social studies. … Of the six districts studied, only in this district did educators see their community-building effort as a means to promote achievement on mandated assessments. (Schaps & Lewis, 1999, p. 217)

Classrooms as learning communities

A classroom run as a learning community operates on the understanding that the growth of knowledge involves individual and social processes. It aims to enhance individual learning that is both a contribution to their own learning and the group's learning, and does this through supporting individual contributions to a communal effort. Here the stance is that the agent of inquiry is not an individual, but a knowledge-building community (Paavola *et al.*, 2002).

In classrooms which operate as a learning community, disciplined discourse becomes part of the community. Accounts of classrooms as knowledge-building communities include those with specially designed ICT support. From the earliest examples:

> There have been impressive results in textual and graphical literacy, theory improvement, students' implicit theories of learning, standardized achievement tests, and comprehension of difficult texts. Results appear stronger the longer students use this collaborative environment. (Scardamalia & Bereiter, 1996, p. 37)

Disciplined discourse emerges: records of a community discussion over a period three months, comprising 179 entries (Bereiter *et al.*, 1997) show that although it may begin as personally-oriented, it evolves into a scientific inquiry. Students pursue various knowledge sources, and undertake empirical studies so as to test their questions.

In classrooms which operate as a learning community, responsibility for and control of knowledge becomes shared. In this sort of classroom, members not only take responsibility for themselves and others, but also take responsibility for knowing what needs to be known and for insuring that others know what needs to be known (Scardamalia, 2002).

The cognitive and the social are both developed in such an environment: 14 year-olds whose class ran as a constructivist learning environment using communal knowledge-building software over a one-year period showed 'a higher level of

self-regard, improved ability to regulate their behavior and an increased ability to make credible judgments about someone else's assertions than did the control group' (Ryser *et al.*, 1995, p. 375).

In classrooms which operate as a learning community, conceptions of learning are richer and co-constructive.   Classrooms which operate as knowledge-building communities are characterized by the interplay of private and public reflection, and in such contexts students change their approach to learning from a shallow passive one to a deeper active one. One hundred and ten junior school students in five comparable classes were assessed in terms of their beliefs about learning, and their reading comprehension, six months apart. They became more likely to report that learning is a matter of understanding and not simply getting all of the facts, that it is important to fit new information with what is already known and that learning is a matter of understanding increasingly complex information and not simply a matter of answering all of the questions. These students showed a significant improvement in problem solving and recall of complex information, and were significantly more likely to use information provided in a text to solve problems (Lamon *et al.*, 1993).

   The shared view of knowledge which develops in a learning community is voiced by 11-year-olds reflecting on their learning:

> Even if you learn something perfectly, or are a pioneer in your area, all your work is useless if nobody else can understand you. You might as well have done no work at all. The point of learning is to share it with others. Lone learning is not enough. (Lamon *et al.*, 2001, p. 12)

> Good science making is all about working with ideas, testing them out in different conditions, retesting, talking with people who are working on similar ideas, and bringing ideas to the whole group. (Caswell & Bielaczyc, 2002, p. 288)

In classrooms which operate as a learning community, shared metacognition develops about the process of learning.   The combination of talking and writing is important in the service of learning: by discussing their understandings students construct more advanced knowledge, and incorporate the outcomes of discussions in their written understandings. Eleven-year-olds have been very positive about talking- and writing-to-learn and also on the combination, which shows an appreciable level of meta-cognitive awareness (Mason, 1998). Collective metacognition has been noted emerging in group discussions amongst 14 year-olds. This includes planning and regulating (including standards for task performance), monitoring (including comments on the status of their understanding), and evaluating (including evaluating others' ideas—positively more often than negatively) (Hogan, 2001). In these ways one hallmark of a learning community is built—it is a community which learns about its own learning.

   Again, interventions which focus on running classrooms as learning communities have proved viable, with important results, not the least of which is changing the culture of the classroom. A cumulative effect over three years has been shown in some studies, with the quality of student explanations monotonically increasing over that time, and moving from descriptive in Year 1 to explanatory in Year 3 (Hakkarainen, 2003).

The processes of a learning community can be built without expensive technological support (Hume, 2000). Indeed, relying on pre-existing technology from outside is not likely to change the dominant culture of classrooms. Technology needs to co-evolve with social practices and structures of participation in communities (Lipponen, 2002; Miyake & Koschmann, 2002) for effective learning environments to be built (Bielaczyc, 2001).

Conclusion

This review shows adequate evidence to support the idea that the development of learning communities should be a key feature of twenty-first century schools. The connectedness of outcomes—social, moral, behavioural, intellectual and performance—is a particularly important feature here, and one which may address the challenge which has been set by key players in this field:

> To draw politicians and business people away from their fixation on achievement test gains one must offer them the vision of a superior kind of *outcome*. The failure to do that is, I believe, the most profound failure of educational thought in our epoch. (Bereiter, 2002b, p. 490)

At the same time the fact that the research reviewed here is investigating understandings which are against the current of dominant discourses could create difficulty for both researchers and practitioners alike. Researchers may have to put additional effort into their proposals in this domain. Teachers may find themselves developing practice which is contrary to the conventions of 5000 years. In a classroom where the aim is to promote public dialogue and deep understanding rather than pre-fixed procedures, close analysis of the discourse confirms that the teacher will find herself amidst various voices which may be in tension or even conflict (Forman & Ansell, 2001). But it would be hazardous to over-state or over-simplify these forces. Voices on educational reform show considerable variation, and are not the one simple or single stance which is sometimes stated.

It is noticeable that the research reports span North America, continental Europe and the Far East but none comes from the UK. Although the UK has excellent pioneers in key aspects of classrooms as learning communities—such as dialogue (Mercer, 2002), thinking (Dawes *et al.*, 2000) and ICT (Wegerif & Dawes, 2004)—there is not a comprehensive framework for operating classrooms, applicable to all classrooms, nor are there studies of the impact of such a framework. In addition, I have been unable to find a UK example where school classrooms are using the available technology for building learning communities. In this field, London is not leading the way.

Notes on contributor

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