Canadian Journal of Learning and Technology / La revue canadienne de l'apprentissage et de la technologie, V35(1) Winter / hiver, 2009

Learning for Teaching: Building Professional Knowledge on a National Scale

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Abstract

This paper takes a large-scale social perspective in describing a national project in Australia that was premised on local school communities working together and contributing ideas for the benefit of their students, and potentially, the whole country. The project was intended to improve schools' capacity for educating boys, and in the long-term, the learning outcomes of under-performing boys, using evidence-based and action research methods. It was supported by the web spaces and tools of the National Quality Schooling Framework and Think.com. This paper emphasises the structures and processes teachers engaged in while building knowledge through their daily work, where the resulting ideas became the property of the whole community. Analyses focus on the extent to which an underlying social structure for knowledge building developed in various parts of the nation during the project, making it possible to characterize a process for innovations in education with commitment to continual idea improvement.

Résumé

Le présent article adopte une perspective sociale à grande échelle pour décrire un projet national en Australie fondé sur la collaboration des communautés scolaires locales et leur contribution d'idées au bénéfice de leurs élèves et, éventuellement, de l'ensemble du pays. Le projet avait pour but de rendre les écoles plus aptes à éduquer les garçons et, à long terme, d'améliorer les résultats d'apprentissage des garçons qui sous-performent à l'aide de méthodes de recherche-action fondées sur des données probantes. Il a bénéficié du soutien des espaces et des outils Web du National Quality Schooling Framework et de Think.com. Le présent article met l'accent sur les structures et les processus que les enseignants ont utilisés dans leur travail quotidien pour la coélaboration de connaissances; les idées qui en ont résulté sont par la suite devenues la propriété de l'ensemble de la communauté. Les analyses portent principalement sur la mesure dans laquelle une structure sociale sous-jacente de coélaboration des connaissances s'est développée en différents endroits de la nation au cours du projet, ce qui rend possible la caractérisation d'un processus d'innovation en éducation avec un engagement envers l'amélioration continue.

Introduction

The problematizing of boys' education in Australia in the late 1990s stemmed from statistics and reports that identified worrying aspects of boys' learning and behaviour. Compared with girls, significantly more boys were identified as 'at-risk' in literacy and fewer boys reached the national literacy benchmarks (Commonwealth Government, 2002). Boys reported less positive experiences and enjoyment of schooling (Trent & Slade, 2001; Rowe & Rowe, 1999), and were said to be less engaged, more easily distracted, and less motivated (Collins, Batten, Ainley & Getty, 1996). Risk-taking associated with depression and suicide was 4–5 times greater for boys (Collins et al, 1996).

While these are important issues, we should not make generalizations about boys' performance, viewing them as a homogeneous group (Alloway, Freebody, Gilbert & Muspratt, 2002; Lingard, Martino, Mills, & Bahr, 2003). Many boys do share common experiences of 'being a boy' in Australian society and are undoubtedly influenced by dominant discourses and images of masculinity. However Collins, Kenway, & McLeod (2000) found that socio-economic status was actually the most significant factor in school performance, and others argue that social and cultural backgrounds must be taken into consideration (Alloway et al, 2002; Lingard et al, 2003; Rowan, Knobel, Bigum, & Lankshear, 2002). This led to the question: 'which girls, which boys are at risk?'

Patterns emerging in Australia show that those particularly at risk are Aboriginal boys, boys from working class areas, and boys from homes where the first language is not English (West, 1999). To address these problems, the Inquiry into the Education of Boys asserted the importance of a strong foundation of literacy and numeracy in the early years of schooling, supporting male relationships in school, and the availability of male role models (Commonwealth of Australia, 2002). Based on their research with 1800 male secondary students, Trent and Slade (2001) recommended systemic changes, research into the nature of learning environments, and a better understanding of good teaching for boys. Alloway et al (2002) called for more empirical inquiry into the ways in which these discourses affect the life and learning of particular boys in particular contexts, including ongoing observation and analysis by teachers and researchers.

In light of this, the Australian Government initiated the Boys Education Lighthouse Schools (BELS) Projects in 2003 and provided substantial resources, with $AUD 27 million allocated to improve boys' educational and social outcomes between 2003 and 2008. Organizations were selected by tender to manage the projects. In BELS Stage One, researchers working with schools identified ten guiding principles for boys' education (Department of Education Science and Training, 2003). This was followed in 2004-5 by BELS Stage Two, which involved 350 schools in 50 clusters. Teachers in clusters applied for funds, and if successful, became involved in gathering data, devising local projects and measuring their impact.

The project encouraged both evidence-based approaches to document 'what works' at a broad scale (Slavin, 2002) and action research (Kemmis, 1999) aimed at collectively improving the situation in local contexts. The focus was to develop innovative practices in educating boys through improving teachers' knowledge and their capacity for change. At the level of each school, boys (and girls) and their teachers engaged in new ways of working together to test ideas for improvement. Each cluster chose a focus (such as improving literacy, providing male role models, using computer technologies or hands-on learning). Most of these clusters were based on geographical regions, although member schools were often quite dispersed, and two were made up of schools from several states.

Underpinning the project was an ambitious use of technology designed specifically to support teacher learning and school innovation; enhance the evidence-base that schools could draw on to improve and demonstrate the quality of student learning outcomes; ensure continuing focus on quality learning outcomes for all students; and research and develop the capacity of schools to access and engage teachers in both real and virtual learning communities as part of their normal professional practice (Capponi, 2004). This followed the recommendations of a national study of innovation in Australian schools (Cuttance & Innovation and Best Practice Consortium, 2001). The resulting National Quality Schooling Framework (NQSF) portal was informed by projects in the United Kingdom at Ultralab and the National College for School Leadership and by David Hargreaves' (2003b) arguments for a system in which schools that are sources of best practice become nodes, linked in networks supported by information and communication technologies. When the BELS Stage Two tender was awarded to Cuttance's team at The University of Melbourne (including the author), it provided an excellent opportunity to work with teachers on building knowledge to address national concerns. The NQSF portal provided the primary means for regular communication and documentation of BELS projects in an attempt to ensure democratic participation of schools in metropolitan and rural and remote areas across Australia.

Knowledge building in communities of practice

Knowledge building is a collaborative, intentional effort to improve knowledge (Scardamalia & Bereiter, 2006) by generating ideas, theories and hypotheses, continually improving them in community contexts such as those described above, and putting them into practice. Scardamalia (2002) suggests that there are twelve principles of knowledge building. They are: real ideas, authentic problems; improvable ideas; idea diversity; rise above; epistemic agency; collective responsibility for community knowledge; democratizing knowledge; symmetric knowledge advance; pervasive knowledge building; constructive use of authoritative sources; knowledge building discourse; and embedded and transformative assessment. The BELS Projects were not intentionally built on Scardamalia's twelve principles, but, as this paper shows, several of the principles were important to the design of the project at the broad scale. For example, in terms of authentic problems, although the project was instigated by the government, the problem of boys' education was real to the participants. All ideas were treated as improvable, particularly due to the dearth of knowledge in the field of boys' education. The principles of collective responsibility

and democratizing knowledge were emphasised in the project structure (described below), while teachers were encouraged to consider, interact with, critique, and improve existing authoritative sources.

This paper was framed in the belief that teachers will be more effective in building new knowledge at a national scale if they develop and work in communities of practice. As Scardamalia and Bereiter elaborate, all communities are communities of practice. For some the practice is traditional craft, for others it is innovation. Knowledge building and knowledge-building environments support practices and discourse that define knowledge-creating communities.

Previous research in schools identified four broad roles carried out by teachers working with students in classrooms using computer technology (Hartnell-Young, 2006), and concluded that where the practice is viewed as the construction of collective knowledge (Scardamalia & Bereiter, 1999), all participants (students, teachers, mentors, experts and assistants) share the challenge of advancing knowledge. It identified that many teachers considered themselves learners, and that their own learning, to innovate and improve professional practice, was an important aspect of their daily work. Some teachers were clearly developing communities that crossed boundaries of sites and subject domains.

In this paper, the focus is on the activity of teachers as they worked systematically and collaboratively to create new knowledge about educating boys. They were supported by access to elements of the existing evidence base which were made available to all through the NQSF website, and by a team of academic consultants across the country. At the outset, most teachers had not worked closely with their colleagues in other schools on issues of mutual interest, and certainly not on a national scale. They may have developed classroom communities with their students, or communities of teachers within the school, but they had less experience clustering across schools to engage in innovative teaching and learning. This paper does not suggest that they immediately formed communities for building knowledge, but rather, it attempts to chart their development towards this. Wenger (1998) suggests that indicators of a community of practice include sustained mutual relationships, shared ways of engaging in doing things together, rapid flow of information and propagation of innovation, and knowing what others can do. It has also been suggested that a successful online community needs a well-defined domain that underpins purpose (Wenger, McDermott, & Snyder, 2002), a variety of perspectives in the context of daily practice (Schlager, Fusco, & Schank, 1999) and a commitment to meeting the needs of others (Brook & Oliver, 2003). In knowledge-building communities participants additionally take collective responsibility for advancing knowledge in the broader community. We return to these issues in analyses of teacher engagement. It is unlikely that all these characteristics would be evident at the beginning of such a large-scale project, but they could develop through the work.

Method

The purpose of BELS was to improve education for boys immediately at the local scale, and to build professional knowledge about better ways to educate boys. It was established as a professional development project, rather than research, so this paper takes a retrospective view of the activity. The paper considers the extent to which the professional learning of teachers through the BELS Stage Two Project (effectively over less than two years) could be considered as contributing locally and nationally, and gives some examples of the professional knowledge that was created.

First, the project method is described in detail. The data come primarily from the cluster reports generated by participants and published on the web site, and the records of the experience of the management team. They were analysed and coded according to Wenger's (1998) three infrastructures for learning in communities of practice: engagement, imagination, and alignment, following a belief that clusters exhibiting characteristics of communities of practice were likely to support knowledge building. To provide perspective on the extent to which a knowledge-building community was developing an additional coding category was added: innovation.

A limitation of this method is that it relies heavily on participants' reports. Through the quality assurance process, and through online dialogue, the management team was able to engage in some dialogue with teachers, but we rarely saw them at work with students. Hence there are gaps in the 'story'.

The BELS Stage Two Project used a framework designed by its Director, Professor Cuttance, with the intention of developing a critical mass for improvement and innovation with potential national impact. This framework had some similarities with an action research model, which is intended to be collaborative and aimed at improving practices, understandings, and situations (Kemmis, 1999). It has clear parallels to

knowledge building communities with symmetries in knowledge advancement within and between communities. The work therefore represents a participatory form of professional development. It values data collection and reflection and assists teachers to undertake their own research through treating their own ideas, theories, practices, and work settings as important areas for analysis and critique. While action research is sometimes seen as too practitioner-oriented (Kelly, 1985) or too context-specific (Somekh, 1995), in this case teachers were seen as practitioners and co-researchers, in partnership with academic consultants, and with the support of the national management team, who were able to balance context-specificity with reflection on the projects at the broadest scale. In addition, from the outset there was a strong evidence base, collected over time by the national team, and made available on the web site.

On the website, a searchable 'Resources' repository was populated in two main ways to build the evidence base. First, existing resources in the form of research papers, reports, and tools were scrutinised for relevance to school improvement or innovation, trustworthiness, and clarity of expression for the school-based audience, and then linked through the NQSF portal. Secondly, school members were encouraged to submit their action research project reports so that others across the nation (and not only in the project) could find the information and make contact with other schools.

The BELS framework (drawn from the NQSF) used templates for four staged reports entitled Your School Project and Your Cluster Project (YSP/YCP), which were available on the web site. Two cycles of documentation were completed by each cluster, and after quality assurance, these were published on the site, with the intention of building a rich resource for schools.

YCP Stage 1 required schools to describe the cluster context and the essential and distinctive features of the project. This document included goals and targets, an explanation of the rationale for the project, and how available resources were to be used.

In YCP Stage 2 clusters identified assessment tools and data collection strategies to monitor and measure the outcomes of the project. It was expected that an evaluation strategy would be in place and baseline data collected at the commencement of the project, so that improvement could be measured.

YCP Stage 3 provided guidance in identifying the strategies and processes to be used in implementing the project. Clusters indicated how they would address the relevant NQSF dimensions of quality schooling though their projects, and any additional resources required to support implementation.

YCP Stage 4 provided a structure for presenting, reviewing, and analysing the data and evaluating the outcomes of the project and its impact on student learning. Clusters were encouraged to include both qualitative and quantitative data.

The NQSF also facilitated links to web-based collaborative tools "looking outward". One of these was Think.com (www.think.com), an international online community for learning sponsored by the Oracle Education Foundation, which allowed part of its site to be used for BELS project schools. Tools on this site enabled students and teachers to publish, share files, and interact with others in a protected community space.

Pressure and support (Fullan, 1993) were employed in the project. Grant payments to clusters were linked to the completion of the reporting documents, while under the terms of the contracts, schools and clusters retained copyright over all contents added to the forms. Support included several face-to-face workshops for every cluster, where the researchers met and worked with the teachers. Andy Hargreaves (2003a) suggests that different kinds of schools and systems need to use different ways to tackle improvement, and that sophisticated professional learning communities seem to work best with high-capacity teachers in high-capacity systems. The cluster model, with school leaders appointed to manage the project, and support from local consultants and the national team, was intended to address the situation of differential capacity. Workshops in 2004 and 2005 focused on developing the cluster capacity to achieve the project outcomes; the evidence-based model underpinning the documentation; how to collect and analyse qualitative and quantitative data; and writing of cluster documents. Teachers were given time and support from local project consultants to identify appropriate data, analyse it rigorously and write for the audience of practitioners and the education community nationally. This was intended to provide an evidence base for future work.

Looking at evidence from research and practice can reveal tensions and gaps in understanding between

the two fields, thus providing opportunities for dialogue and dialectic. A smaller-scale study using collaborative practitioner research in conjunction with university researchers, discovered an apparent lack of explicit and agreed language of learning for teachers to value and present their work, apart from the system-generated language of standards and outcomes (Cherednichenko, Hooley, Kruger, & Moore, 2001). It was felt that a national project using the methodology described above might assist in developing a shared knowledge-building discourse (Scardamalia, 2002) as part of a large-scale community of practice.

As indicated above, the reports were analysed and coded according to Wenger's (1998) three infrastructures for learning in communities of practice: engagement, imagination, alignment, with innovation added as a special indicator of a knowledge building community. In terms of engagement, this included references to school teams, meeting together as a cluster, and voluntary involvement in the online environment of the BELS web site and Think.com. In considering imagination, evidence of cluster identity, such as shared language, symbols, and shared project focus, as well as a sense of teachers' professional identity, was recorded. The third infrastructure, alignment, included references to shared vision, the formal YCP documentation, the rigour of the data collection and analysis, and reaching out to affect a wider community. The fourth facet, innovation, focused on teachers as agents of change, rising above current practices to create pervasive cultures for idea improvement and transformative assessment. Table 1 shows a summary of the themes that were considered in each infrastructure, based on Wenger (1998) and Scardamalia (2002), and with Knowledge-Building principles underlined.

Table 1: ***Engagement, Imagination, Alignment, and Innovation in BELS Projects***

Engagement	**Imagination**	**Alignment**	**Innovation**
Coming together	*Reinventing self and the world*	*Common purpose*	Improvable ideas
Meeting face-to-face and online	Sense of location in a wider world	Vision, leadership and management	Rise above
Shared discourse	Shared project focus	Rigour of data collection/analysis/reporting	Epistemic agency
Disseminating professional knowledge	Trying new practices	Linking with other communities	Pervasive knowledge building
Commitment to sustainability	Evidence of reflection	Influencing decision-makers	Transformative assessment
Symmetric knowledge advancement	Idea Diversity	Collective responsibility for knowledge advancement	Democratizing knowledge

The intent in analysing the data was to show representative material from teachers in relation to developing community interactions, rather than a quantitative display of themes. Since clusters reported their experience and gave advice to others through the YCP documents, they built a body of practitioner knowledge that could be useful for policy-makers, practitioners, and researchers. The examples are extracted from cluster reports, with the source shown by cluster identifier.

Findings

While the projects were designed to focus on learning outcomes for students, teachers in schools and clusters around the country reported that they had experienced enormous professional growth. One cluster asserted that "developing teachers is the first, and foremost, outcome in any project that seeks to achieve long term success for boys in mainstream schooling" (Cluster A, YCP 4, 2005). Using the facilities of engagement, imagination, alignment and innovation outlined in Table 1, the next section considers the ways in which BELS teachers in clusters displayed characteristics of communities, building knowledge around the education of boys.

Engagement

Engagement requires a means of coming together and working on joint tasks. BELS funding enabled schools to release teachers to work together, and many reports indicated that professional learning teams had been established at individual school level. These teams used regular meeting times to share and reflect on practice, as did representatives of metropolitan clusters who were able to travel to other

schools. Rural schools had more difficulty coming together. Although most clusters were based on geographic proximity, due to the size and density of Australia's population some clusters comprised schools located hundreds of kilometers apart. Two national clusters, made up of schools in several states, arranged for large numbers of staff to meet at occasional face-to-face conferences, but regular teleconferences and email were used to maintain contact throughout the project.

Several schools and clusters reported on the value of shared discourse, an important aspect of a community, and one that can be inclusive of students, teachers, and parents. One school that implemented a specific project to improve students' behavior and motivation reported:

> *Program Achieve* language is now used daily by teachers at any opportunity that presents itself. As it is common language across the school, all teachers are able to use it with students. From observation students are increasingly using it themselves to reflect upon their behavior and articulate it during follow-up conversations with staff and parents. (Cluster B, YCP 4 2005).

Teachers reported that coming together to learn something new, and then continuing to use this knowledge, had an impact on culture and student outcomes. A dispersed national cluster, focusing on spoken language skills for students, reported:

> Common language to discuss and implement has created a more positive attitude through the centers. (Cluster C, YCP 4 2005).

Another national cluster looking at writing, commented:

> Moderation of student work is emerging as a way of enabling conversations between teachers to build a common understanding of boys' writing, interests and next steps. (Cluster D, YCP 4, 2005).

Engagement includes keeping people informed, within individual schools, within clusters, and as part of a national community. The national team published a regular electronic newsletter which was widely distributed to educators in and beyond BELS schools. Some schools developed strong local strategies, such as distribution of monthly newsletters containing relevant, explicit professional reading to all teachers using the web site (Cluster E, YCP 4 2005) and newspaper articles, newsletters, parent workshops, and guest speakers on Boys, Literacy and Books (Cluster F, YCP 4 2005). However another reported:

> One of the goals of the project was to change the culture of our school communities so that the creative and performing arts were regarded as being as worthwhile and important as academic and sporting activities in schools, and that it become commonplace for the boys to be involved in these activities rather than it being the preserve of the girls. While we have encouraged, and so far, succeeded in increasing the boys' participation and enthusiasm in creative activities we have found it diffficult to motivate our parent communities. We realise extra effort, resources and input is needed at this level if the changes we are implementing have a chance of remaining in place and really making a difference. (Cluster G, YCP 4 2004).

Other clusters incorporated information and marketing strategies into the curriculum, with students producing websites, newsletters and youth magazines, and videos.

The website was developed for the project by the national team, with a view to fostering community interactions. Text resources were searchable by relevant topics, and as the YCP reports were quality assured, they too became resources for those in and outside BELS. In addition, each cluster was encouraged to use Think.com to promote discussion and share knowledge and experiences across schools in the project. Some clusters did so, but the site did not achieve the anticipated level of use by teachers in terms of publication and interaction. However in relation to student use, one Cluster reported:

> Think.com was an absolute blessing. It enabled students to store their work on line. They were then able to access it from home. However the main benefit was the way it afforded interaction. I would email children to suggest improvements in their work. They would send 'stickies' to one another giving positive and quite explicit feedback. (Cluster S, YCP 4 2005).

Apart from high levels of student use in the project, the major activity on Think.com was regular professional development sessions such as conversations, brainstorms, hot seats and debates, often

facilitated by the national team using teleconferences, synchronous and asynchronous text-based communication, and later, podcasting led by teachers or researchers. However the capacity for archiving material generated in this way was limited, so that the knowledge bank had to be transferred to another space.

Wenger suggests that a community of practice must have a longer-term commitment for sustainability, and this is of particular interest in a funded project. Schools developing successful projects commonly reported a desire to sustain the gains made, and to improve teaching for all students, such as this one:

> The collegiality that emanated from this project augurs well for continued teacher-led projects in schools. Perhaps, now, a sustainable model of shared leadership can be created in each school in the cluster, so that teaching and learning approaches can be continually refined to support both boys' and girls' learning. Cluster A, YCP 4, 2005).

Imagination

Imagination, according to Wenger (1998), is a about creating an image of who we are in a wider world. The self-esteem and confidence thus developed assists members of a community to look out to other communities. In addition to the professional connections engendered by the national team, individual BELS Projects used various strategies to create a sense of identity. Several appropriated the lighthouse symbol, either on documents or as a physical artefact, to emphasise membership of the Boys' Education Lighthouse Project.

The value of focusing on projects owned by students and their local communities was realised in several instances. These included connecting curriculum to community action such as painting a bus shelter, producing a regional youth magazine, and community service programs such as construction projects and repairing bicycles. One cluster wrote:

> Probably the most overwhelming finding from our pilot was the impact of using classroom projects that have an authentic purpose, and linking with the Community as part of those projects. These features will definitely be pursued. (Cluster H, YCP 4 2004).

However there is no simple answer to the question of "who we are," and this was highlighted in projects involving both indigenous and non-indigenous Australians. One such project reported:

> The programme must involve Yolŋu and non-indigenous people in the planning, development, implementation and evaluation. Non-indigenous people who are identified for the program need to have good cross cultural skills, be prepared to be flexible, to learn and work in different ways and understand the importance of Yolŋu driven curriculum and pedagogy. (Cluster J, YCP 4, 2005).

Several clusters reported the importance for teacher professionalism of celebrating "the many successes joyfully and collectively" (Cluster K, YCP 4 2004), while more than one was surprised at the sense of identity and the expertise that developed:

> The most unexpected outcome of the project within the cluster was the strengthened collegiality and sense of team that developed amongst the teachers who participated. (Cluster A, YCP 4 2005).

Clusters recognised that resourcing the project allowed rich professional learning to take place:

> Perhaps the most interesting realisation that has arisen from the first part of our project is the very strong re-affirmation of the skills and capabilities of we teachers. Again, we have been forced to look closer to home and within our own ranks of fellow teachers to find support and expertise and have discovered wonderful talents and opportunities, with only the cost of a relief day to access them. The luxury TIME & MONEY (sic) (for example, to provide transport for students to different venues) is probably the main ingredient missing in our normal teaching lives and one which, we now realise, can make such a difference to planning and achieving outcomes. (Cluster G YCP 4, 2004).

An action learning project requires teachers to try something new, and reflect on the outcomes. "Teachers were most receptive to the hands-on approach to teacher in-service" reported one cluster (Cluster L, YCP 3 2005), while another concluded that "Schools need to look outside the square to find

ideas for improving outcomes for students, especially when barriers are identified" (Cluster M,YCP 4 2004). One or two schools however, had expected that the funding would be provided with "no questions asked," and were less interested in innovation. Clusters generally acknowledged the importance of reflection in creating knowledge, and working with academic researchers to do so. One principal commented:

> It is often the part that we leave, we'll often try things as practitioners, go and utilise them in the classroom and very briefly we'll comment as to whether it worked or not. This project makes people critically reflect on what the important parts were." (Cluster N, YCP 4 2005).

In creating a sense of professional identity among the wider education community, some teachers valued the opportunity to work side by side with academic researchers, and to present at conferences and publish. This accords with other reports of knowledge-building activity that indicate a fusing of the two cultures of teaching and research, while maintaining the expertise of each (Bereiter, 2002; Hartnell-Young, 2003).

Alignment

Alignment is supported by vision and common goals, and many clusters developed these, particularly as the projects went on, based on research, professional reading and practice. Schools were encouraged to take a whole-school approach to boys' education, which they tackled in different ways. Some incorporated a sub-committee into existing structures, while others set up a task group to manage the projects. One cluster (Cluster E, YCP 4 2005) was intent on building collective moral purpose, putting in place structures for success, based on the ideas of Fullan (1993). Another identified three interrelated goals and developed a shared understanding so the project had a clear purpose, which enabled the cluster to go "5 miles deep rather than 5 miles wide" (Cluster O, YCP 4 2005). In their advice to others running a project, many clusters reported along the lines that "Principals need to be committed to the whole project and ensure that follow up occurs" (Cluster P, YCP 4 2004).

The rigour of data collection, analysis and reporting required of schools involved in BELS was probably higher than in any previous projects they had undertaken. At first, some were overwhelmed by the task. However, as time went on, cluster reports became richer and more useful to others, thus encouraging dialogue, and they indicated that schools saw value in the process:

> By working through an action research based model the group was able to break down the task into more achievable and realistic targets. The most useful tool in this process was the YCP report. (Cluster Q, YCP 4 2005).

The set of YCP reports was recognised as a tool to support professional learning about project management as well as substance. Hence a cluster stated "we also found that we were using the data in many of the mandatory planning tasks expected in the running of our schools" and "The use of the NQSF framework tools was an excellent way to review planning targets in our schools, not only the project goals but the other goals associated with the schools' directions" (Cluster G, YCP 4 2004). Those schools used to focusing on social competencies and emotional well-being were concerned by the rigorous approach, but, as Hargreaves (2003a) points out, both aspects are necessary for a professional learning community. One cluster acknowledged this:

> For teachers unfamiliar with research and data this was a threatening proposition…we thought our commitment to social learning and well-being of students would be compromised. On reflection it was probably enhanced as we struggled with the connections between well-being, effective pedagogies and learning outcomes. After all, what is the point of spending a huge amount of time, energy and resources on enhancing well-being if we are not also improving learning? (Cluster R, YCP 4 2005).

Teachers claimed their knowledge of, and skills in, data collection procedures and processes had developed through their involvement with the project. Some teachers recognised they had improved their understanding of assessment as a diagnostic process. One report stated

> With a more formal emphasis on collecting evidence, both measurable and anecdotal, many teachers made significant comments on the value of reflecting on their practice and the literacy behaviours of their students. Some indicated that they had developed a new awareness of the literacy needs of

> students that were not obvious before (Cluster U, YCP 4 2005).

Due to the issues of low engagement and attendance identified among some boys, many clusters reviewed data in these areas. A national cluster of schools found that these data showed patterns across the five states that indicated improvements should be made. Consequently the project's aim was to reach a 30% improvement in return rate of assignments, a 30% improvement in attendance at scheduled lessons, a 20% increase in retention rates, and improved student participation in lessons (Cluster D, YCP 4 2005). On the other hand, even by the end of the project, some schools found the documentation a burden:

> The amount of paperwork has made it difficult to concentrate on constructing and implementing the project with stakeholders. (Cluster J, YCP 4 2005). And at times it is exceptionally frustrating to balance the stringent accountability of the reports with a daily teaching and administrative load. (Cluster E, YCP 4 2005). While the management team accommodated the difficulties, and provided support to schools to meet their commitments, the relatively short time frame did not allow for iterations of the document format.

A true community of practice, says Wenger (1998), looks outward to other communities and seeks to influence the world. In knowledge building terms there are symmetries of knowledge advancements. Numerous clusters reported examples of crossing boundaries, including greater understanding between primary and secondary teachers, police and welfare agencies, and visiting speakers. At a conference of Cluster D, several teachers reported that their daily work was isolating, and they valued national collaboration with teachers in a similar setting. One said "change is more effective when more are united." Another reported on a locally-developed resource "that is both useful for our school, that will be transferable to other like schools, and that informs education across Australia."

It is attitudes like this that indicate a mature community of practice is forming, echoed in the following description of a conference convened by another cluster, and the intention to impact on government policy:

> Over 200 teachers attended and all of the cluster schools provided a workshop. This was an important professional development event for the schools in this cluster; many had not previously been involved in cluster event such as this; many had not previously presented their work outside of their own school context. The conference evaluation indicated that teachers really enjoyed hearing from their colleagues. The cluster also invited officers from the Department of Education and Children's Services (DECS) and representatives from other clusters. It is hoped that this conference has had some impact on the way DECS devises policy on the education of boys in the future. (Cluster N, YCP 4 2005)

Innovation

As a result of interaction to share innovations in practice, new knowledge appeared in the form of tools, concepts, and theories about boys' learning. The BELS projects clearly indicated that students who are 'disengaged' in their normal classrooms can be intensely engaged in environments that provide a different range of boundaries, expectations, feedback, and rewards.

Wenger uses the term imagination to refer to people building an image of the world and themselves. For teachers this includes being members of a profession and asking the question 'who are we?' Being involved in BELS gave teachers an opportunity to reflect on their roles within a school, as collaborators within a cluster on an important area, and as researchers and co-researchers. Perhaps most importantly, they came to see themselves as innovators. In their communities, BELS projects engaged optimistically with issues of gender construction and ethnicity and socio-economic identity, and provided authentic learning experiences situated in students' everyday life and teachers' work. In some cases, teachers were surprised at their own abilities, and saw that they had much more to contribute than they had anticipated. The element of reflection, encouraged particularly by YCP 4, showed many teachers that it was valuable to make time to review data, share progress and actually write about it, thus creating both a resource for others and a historical record of a learning pathway. This was supported by funding to allow release from classes, but even without project funding, could be supported by creative scheduling at school levels. The importance is reflected in the extent to which learning advances in one place helped with breakthroughs in another context. This "symmetry of knowledge advancement" was seen throughout the network.

The cluster model was itself an innovation for many schools, which had previously focused on their own projects, or even competed with their new partners. Strong leadership, from principals and leaders allocated time for the task, was an important element of successful projects. Although for most clusters it took time to come to terms with the data requirements, many found that it was possible to combine a data-driven approach with a pre-existing commitment to student well-being and change. Professional learning about project management spilled over into other school planning exercises, again supporting a culture of innovation.

Knowledge created and shared through the BELS Project

Normal classroom learning environments are unlikely to address the needs of 'all boys,' or for that matter 'all girls.' Some students do not learn effectively in everyday classroom environments, and it is unrealistic to expect that teachers can provide learning opportunities that will result in all students in a classroom reaching their potential. One likely reason for the success of many of the BELS projects was the increase in the amount of individualised learning support that students received.

According to data from project reports, teachers deemed literacy to be the most critical factor impacting boys' learning outcomes, and developed projects to address this. In one cluster the project resulted in modelling of different genres of teaching, increased scaffolding, greater use of templates and graphic organisers, such as Venn diagrams and fishbone plans (Cluster S, YCP 4 2005).

In another, major improvements in test results occurred over the cluster, suggesting that the many changes in practice added to a whole greater than the sum of its parts. Nearly every student improved their results for both fiction and non-fiction testing. Both girls (76.2%) and boys (74.2%) improved their reading age by as much as one year, and 41 of 48 boys greatly improved in their reading abilities and comprehension. (Cluster P, YCP 4 2005). Yet another established a Buddy Reader Mentoring Program where Year 6 and 7 boys who were trained then mentored preschoolers and Years 1 and 2 in reading and writing. The boys were trained before the mentoring programs were implemented at each site. All resources–teacher release, support and materials–were provided by the schools. The Cluster reported an increase in caring by older boys of the younger boys; an increase in enjoyment of reading by both groups; a noticeable improvement in the concentration span of the younger boys; and development of reading strategies by both groups.

One Cluster focused on information and communication technologies (ICT) as a tool to improve student learning, and to do so, had a goal of improving teacher knowledge and practice. The cluster reported that teachers believed they had improved their knowledge in various practice areas as well as ICTs, and overall saw the incorporation of ICTs as a norm in their classes. Teachers in this cluster believed they had "revolutionised pedagogy" by establishing twenty-three creative businesses that used ICT in classroom teaching. Ninety-five external businesses were contacted via the project and classes worked with twenty external enterprise marketers (Cluster T, YCP 4 2005).

An important outcome from BELS appears to be a shift from a pathological view of boys towards addressing boys in terms of their relationships: with their school, their peers, and themselves. Since relationships underpin communities of practice, this is a positive development. Many clusters focused on projects to improve literacy and improving relationships in school, including more use of male role models, as had been suggested by previous reports. A major outcome for many teachers was the realisation that the changes put in place, such as spending more time scaffolding tasks, improved learning for a wider target group of students than originally planned. Clusters reported that their programs were of benefit to girls and to boys who had not been identified as at risk. After one school introduced Think.com, a parent wrote that it had motivated her daughter, "who previously had a negative attitude to ICT [information and communications technology], to engage in this technology. Through Think.com she has been learning how computers can connect her to the world" (Cluster B, YCP 4 2005). In addition the data showed this cluster that Think.com gave many boys something to do at home, a past time, and consequently increased their engagement.

Some teachers were unwilling to focus on boys to the apparent exclusion of girls, and to overcome this, they involved whole classes in new activities, but particularly tracked the outcomes for boys. Even the Rock and Water program, which was designed specifically for boys, saw girls experience as much success when they were involved. (Cluster B, YCP 4 2005).

Tools that teachers developed for wider implementation included a Teacher Capacity Self-Assessment Rubric (Cluster R), and a kit supporting spoken language (Cluster C).

Conclusions

This paper has considered the development of communities in the domain of boys' education, which are characterised by sustained mutual relationships, shared ways of engaging in doing things together, rapid flow of information and propagation of innovation, and knowing what others can do. The call from Alloway, Freebody, Gilbert and Muspratt (2002) for more empirical inquiry into the life and learning of particular boys in particular contexts, has been addressed through the local examples of the large-scale work reported here. The knowledge thus created is in the process of being shared more widely through reports and other publications.

Rather than depending on external, academic evidence, BELS supported a democratic structure, whereby clusters identified the issues they perceived as having a negative impact on boys' learning outcomes, and designed the strategies they felt would be most effective in addressing such barriers to learning. This approach was noteworthy because it facilitated the development of knowledge and strategies in a field of education where little previously existed, and it allowed for the creation of strategies that addressed boys' education problems particular to specific regions.

However while some teachers and clusters readily developed their expertise, others remained at the periphery after two years, suggesting that time and readiness, among other factors, are important in knowledge-building initiatives.

In terms of engagement, a common language and opportunities for a national discourse emerged during the project. The will to engage overcame the distance factor in several cases, particularly in the two dispersed national clusters. Many clusters spoke of their plans to sustain the benefits they had observed during the project. The rapid flow of information was facilitated by the web site and email communication, which clearly helped in finding out "what others can do." A higher level of online engagement in non-metropolitan schools, compared with their city counterparts, indicated that online communities may provide access to the research and knowledge base, and opportunities for knowledge creation, that can not be readily accessed otherwise. However online involvement was affected by the differential telecommunications coverage in Australia that impacted on access to the Internet for schools and individuals. This issue must be addressed by the national government as a matter of educational and social policy.

A lighthouse model implies that one school is expert, but in reality, BELS was not like this, perhaps due to a general perception that few teachers had expert knowledge in boys' education. Teachers in the lighthouse schools took on the role of brokers, responsible for making connections between the school communities within the cluster and the wider BELS Project. All were learning together in a relatively democratic model. However not all clusters were high achieving. Some formed strong communities around boys' education, while in other cases, schools remained relatively isolated. In some contexts, experts were asked to offer professional development opportunities, while in others, the teachers felt confident and knowledgeable enough to manage this themselves. Some used well-known and commercially-available strategies, while others devised their own. As Hargreaves (2003a) suggests, different approaches might work best in high-capacity and low-capacity schools , and schools perhaps found their own level in this project. However those that had low capacity often fell behind the reporting schedule, and their grant payments were delayed, leading to a stressful spiral. This was possibly due to feeling, as Hargreaves says, that it is no use sharing knowledge unless there is something worthwhile to share.

There is as yet no evidence of this recent work influencing national policy. However the BELS Project and the National Quality Schooling Framework have provided the opportunity for teachers to identify shared concerns and amass a body of evidence that could have influence. However, as the political environment that influences education funding is uncertain, it is not clear to what extent the online communities developed to date will be supported in future.

This paper has attempted to provide an account of a process of professional knowledge building in the Boys Education Lighthouse Projects. It could only do so because the methodology of evidence-based planning, data collection, project implementation and reflection has allowed teachers to document their work in a common format around the nation, and share this through a national web site. The scope of the

BELS Project means that the bank of evidence around boys' education has grown enormously, but the major outcome, it is argued, is the knowledge about the process of professional knowledge building, illuminated by empirical research. Future partnerships of practitioners and researchers could implement this model at small or large scales, working together to improve their knowledge in global communities.

Acknowledgements

The Australian Government Department of Education, Science and Training funded the BELS Project. Thanks are due to Marlene Scardamalia for her feedback on this paper.

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