ABEL Participant Experience Evaluation

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Executive Summary

This report presents the findings from a small-scale participant experience evaluation of the Advanced Broadband Enabled Learning (ABEL) program. The main goal of the study was to develop an understanding of participating teachers' experiences with and perspectives on the ABEL program and its impacts on teaching and learning over the 2006-2007 school year. Forty-five teachers who were active members of the ABEL community completed an online survey that gathered rating data on their use of ABEL tools, services, and resources, changes in their teaching practices, technology use, and student outcomes consequent to ABEL participation, and their assessment of ABEL's various offerings. An additional eight teachers who had been nominated as exemplary users of ABEL by ABEL management were studied in more detail by means of open-ended interviews, in order to illuminate how these teachers implemented their ABEL-augmented teaching initiatives, and understand the outcomes of these initiatives for students and for their own professional growth.

Findings. The most common forms of ABEL-augmented initiatives incorporated the use of online tools (Moodle and blogging software) for course management functions such as posting course handouts and schedules, linking resources, and uploading assignments, and for enabling and facilitating student discussions. Videoconferencing and a educational video streaming service also received occasional use by some teachers. Most teachers reported observing positive impacts on students when ABEL activities, tools, or resources were used in the classroom, primarily in terms of increased student engagement, participation, and focus. The interviewed teachers who made use of discussion forums typically found most students engaged in more educationally significant dialog than previously, and were more inclined to demonstrate self-initiative in their online discussions. Teachers with proportionately high numbers of ESL students in their classes were struck by the high levels of articulate participation in online discussions by the ESL students who would typically never contribute to verbal discussions in class. Teacher assertions of improvement in the quality of student project work were less common, but there was general agreement that students enjoyed their courses more when these tools were used.

Both the survey and interview data suggested that as a consequence of their ABEL-augmented initiatives, teachers were employing more student-centred and constructivist teaching strategies, giving students more opportunities for assuming agency in their learning and placing more emphasis on facilitating student-to student-discussions and peer assistance and collaboration so that students could engage in more knowledge-building and less rote learning.

Both groups of teachers felt that ABEL participation had been of substantial benefit for their professional growth and had led them to reflect upon and rethink some of their ideas about teaching and learning. It had also increased most teachers' sense of comfort with using technology, and led them to collaborate more often with colleagues to learn from each other and develop new teaching strategies. Most of the "exemplary" teachers

assumed a leadership role either in their school or more broadly, assisting colleagues, facilitating sessions, and leading workshops.

In their assessments of ABEL's components, teachers expressed the highest levels of satisfaction with the tools being provided (especially Moodle and blogging software), and with the quality and timeliness of the technical support offered. They were less enthusiastic about other elements of the program, such as the ease of use of the ABEL web portal, or the value of the portal forums for professional discussions or finding colleagues with whom they could partner in classroom projects. Perceptions of the quality of the professional development offerings were mixed; some of the interviewed teachers did not find the workshops they attended met their needs well, and those surveyed generally felt that ABEL needed to offer more substantive professional learning activities.

On the basis of the analysis of the teacher interview and survey data, a series of recommendations for strengthening the ABEL program were made:

1. Work with school boards and other possible sources of funding to institute release time for ABEL leads to provide embedded ongoing professional development support.
2. Increase the responsiveness and pedagogical focus of professional development sessions devoted to ABEL tools and resources.
3. Conduct a usability study of the ABEL portal with ABEL teachers to better shape it to meet their needs.
4. Where possible, provide ABEL teachers with unimpeded access to their ABEL colleagues' course resources such as class Moodles and blogs.
5. Provide short and highly focused training videos for on-demand, just-in-time training in tool use.
6. Increase storage space affordances for large file uploads such as student video files to Moodle and blogs.
7. Implement easier use of scientific and mathematical notation in blogs and forums.
8. Source more Canadian content for video streaming.

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I. Introduction

This report presents the findings from a small-scale participant experience evaluation of the Advanced Broadband Enabled Learning (ABEL) program conducted in the late spring of 2007. The main goal of the study was to develop an understanding of participating teachers' experiences with and perspectives on the ABEL program and its impacts on teaching and learning over the 2006-2007 school year as reported by the teachers themselves, paying particular attention to "success cases", teachers who had made exemplary use of ABEL tools, services, and resources over the year in order to portray how these teachers implemented their ABEL-augmented teaching initiatives and delineate the outcomes they achieved.

Study design. The study design incorporated two elements: a survey of teachers active in the ABEL program, and individual interviews with eight teachers who had been nominated by ABEL management on the basis of their knowledge of member activities as the teachers making the most exemplary use of ABEL tools and resources in their teaching over the 2006-07 school year.

The survey used rating scales to gather data from teachers on several factors:

- teacher background
- levels of use of ABEL tools, resources, and services over the 2006-07 school year
- changes in teaching practices and technology use as a result of ABEL experiences
- changes in teacher collaboration practices as a result of ABEL experiences
- perceived benefits of ABEL participation for students – changes in initiative levels, work quality, attitudes, engagement
- perceptions of other professional impacts
- assessment of ABEL tools, resources, and services

Survey responses were solicited in late spring 2007 from approximately 100 active "ABEL teachers" by means of two separate emails from the ABEL program manager. Teachers responded to the survey online over a one month period.

The eight teacher interviews were conducted by telephone in May 2007. Teachers were asked to describe in detail the two ABEL-facilitated teaching projects or activities of the 2006-07 school year they considered most significant; to discuss the impacts of each, in terms of student outcomes, their own professional growth, and any shift in their teaching the projects brought about; and to review any ABEL-related limitations or problems they had encountered in their described initiatives. They were also asked what they considered ABEL's greatest strengths were in terms of helping them become better teachers, and what changes or additions could be made to the ABEL program and its tools, services, and professional development activities to improve its effectiveness. The teachers were provided with the interview questions several days in advance of the interview to give them time to reflect and develop their responses. The interviews were recorded, transcribed, and then subject to qualitative coding and analysis with the aid of the *Atlas.ti* qualitative analysis software.

The next section of this report presents and analyses the findings of the teacher survey. Following that, descriptions of the eight “exemplary” teachers’ ABEL-related projects and their reported outcomes are provided, together with a comparative analysis of various aspects of these teachers’ experiences and reflections. The final section of the report presents a synthesis and discussion of the findings from both teacher groups, organized along several key dimensions, before concluding with a set of recommendations for strengthening the ABEL program based on the evaluation findings.

II. ABEL Teachers: Survey Findings

Forty five teachers completed the online survey by the end of June 2007, giving a response rate of about 45%.

Teacher background

The great majority of the teachers who participated in the survey teach at the high school level (see Table 1).

Table 1: Division taught

	Primary	Junior	Intermediate	Senior
Number of teachers	1	1	4	39

The participating teachers specialized in a wide range of subjects, but there were some definite imbalances in the distribution of respondents across disciplines (see Table 2). The sciences, social sciences, and language Arts/English were the most heavily represented. Only two teachers who specialized in mathematics and two who focused on language teaching took part, and one art teacher. There were no participating history, physical education, music, or geography teachers. Even after making allowances for the high proportion of LA and science teachers in the secondary school teacher population, this highly skewed distribution suggests that ABEL is not currently attracting the participation of teachers in certain disciplines that might benefit from its services and resources.

Table 2: Main subject specialization

Number of teachers	LA/English	Math	Computer	Business	Sciences	Art	Music
	8	2	3	5	10	1	0
	Phys Ed	History	Languages	Social Science	Geo-graphy	Technical	
	0	3	2	7	0	4	

Table 3 gives the distribution of responding teachers by years taught. Teachers in the ABEL community tend to be highly experienced, with less than 10% having four or fewer years of teaching experience. This distribution runs counter to the stereotypical view, which holds that older teachers are less willing to take up the pedagogical challenges and opportunities afforded by the new digital technologies. The relative lack of participation by younger teachers is something that ABEL management may want to address.

Table 3: Years teaching

Years	0-1	2-4	5-10	11+
Percentage of teachers	0	7	29	64

As shown in Table 4, a majority of ABEL teachers collaborate with and mentor peers around the use of technology for teaching. This would suggest that some of them play an important leadership role with respect to technology infusion in their schools.

Table 4: Number of times collaborated with or mentored another teacher in technology use in the past year

Count	0	1-2	3-5	6-9	10+
Percentage of teachers	4	16	31	18	31

Most of the teachers completing the survey has only been members of the ABEL community for a relatively short period of time—60% for one year or less (see Table 5). It is possible that this reflects a high turnover rate in the membership, but this would need to be confirmed by examining other relevant data. If ABEL management determines that there is in fact a high turnover rate, further study is recommended to determine the considerations leading participants to withdraw so that where possible these might be addressed and retention levels strengthened.

Table 5: Years actively participating in the ABEL project and community

Years	<1	1	2	3	4+
Percentage of teachers	36	24	24	9	7

ABEL use

The teachers were asked to report the frequency of their use of the major ABEL tools, resources, and services over the 2006-07 school year. Their responses are presented in Table 6. (In this table and all subsequent tables the cell data consists of percentage of surveyed teachers selecting that option or value.) Moodle (a course presentation/management system), blogs, and United Streaming (a library of indexed educational video segments) were the most frequently used tools/resources, with about 40% of respondents indicating they had used these tools at least two or three times per semester or term. The distribution of frequency of use for these three, as well as for wiki and Ontario Education Resource Bank use, was very wide across the respondent group, and a substantial minority did utilize these offerings (considered singly). Podcasting and videoconferencing were on average less frequently used. The low occurrence of podcast development is hardly surprising as most schools do not have the resources to acquire the needed hardware for portable playback and cannot count on students to possess it. What is perhaps more surprising is the relatively low participation in videoconferencing, given

its role as the cornerstone technology for most activities in ABEL's early years of operation. About half of the group made no use of videoconferencing, and another 29% only used it 1 to 3 times over the year. Whether this reflects a shift away from the centrality of videoconferencing in the project's programs over the past few years or a reduction in its use due to ongoing technical issues and operational limitations is unclear.

Table 6: Frequency of use of ABEL tools, resources, and services in the 06/07 school year

	Once per week or more	1-3 times per month	2-3 times per semester or term	Once a semester or term	1-2 times per year	Never
Moodle	24	7	13	11	9	36
Blogs	11	16	13	7	9	44
Wikis	4	13	7	7	9	60
Podcasting	0	2	13	2	5	78
Videoconferencing	0	2	20	11	18	49
United Streaming	13	20	16	7	9	35
Ontario Education Resource Bank	4	7	15	7	16	51
PD sessions at York University	0	0	9	9	35	47
abelhelp@yorku.ca	0	20	24	9	27	20
ABEL-provided site-based PD	0	0	11	13	36	40

Of the three forms of professional development and support inquired about, the ABEL help line was used most frequently, with over half of the respondents calling the line at least once a semester or term, and only 20% making no use of it. This suggests that the help line is a resource valued by many community members as a key learning resource. Site- and York-based professional development was utilized in roughly equal degrees, anywhere from once a year to few times a term or semester by a slim majority of respondents. Professional development clearly remains a significant part of the ABEL program's activities.

Changes in teacher practices

The teachers were asked to indicate if they were engaging in a range of teaching, collaborative, and technology use practices more or less frequently as a consequence of their ABEL experience. The survey questions were designed to tap the degree to which ABEL experiences had helped teachers move towards employing more constructivist teaching practices, engaging in more collaborative work with colleagues, and making greater and more varied use of technology to enhance teaching and learning.
Teacher responses to the survey items on teaching practices are summarized in Table 7. (For ease of reading, the items have been sorted so that the item for which the most change was reported is listed first, the item with the least change listed last.) The vast majority of teachers indicated that their ABEL experiences had led them to seek out new

ways of teaching topics and content, and to rethink some of their ideas about teaching and learning. Forty per cent indicated that they now did these much more frequently.

Approximately 70% of respondents reported that they learned more frequently from their students, had students teach or coach peers, provided more opportunities for students to take the initiative in their learning, and put greater emphasis on engaging students' interest. Considered together, these results suggest that a substantial majority of the teachers had incorporated more extensive use of constructivist, inquiry driven, and student-centred strategies in their teaching as a result of their ABEL experiences—a major goal of the ABEL program.

In addition, the use of several other such constructivist strategies was reported to have become more frequent by a majority of teachers: having students work collaboratively on substantive tasks; eliciting students' opinions and ideas; making use of alternative modes of assessment; acting as a learning coach with individuals or small groups; and providing students with opportunities to pursue topics of personal interest, and to present and communicate their understandings. Virtually no teachers used any of these strategies any less as a result of their ABEL exposure.

There were a range of practices asked about for which the teachers' responses were divided approximately equally between those which indicated no change in the use of a specific practice and those which pointed to the practice being used more frequently. Included in this category were the responses about giving students opportunities to figure things out for themselves; letting students partly influence topics covered; placing more emphasis on developing students' depth of understanding; engaging students in inquiry driven discussions; providing out-of-school audiences for student projects and demonstrations; getting students to justify and explain their reasoning; and engaging in larger scale projects. There were three practices for which the majority of teachers indicated that there was no change in their frequency of use—having students explore a topic on their own without direction, having students formally assess their own or a peer's work, and engaging in direct whole-class teaching of facts and concepts. The latter practice would not be expected in increase in a more constructivist, inquiry-based pedagogy; nonetheless, about a third of the teachers indicated that this behavior had increased to some degree. The fact that the first two of those three practices only increased in frequency in a minority of cases is probably explained by the more extreme constructivist and student-centred qualities of these teaching strategies, which most likely went beyond most teachers' current "comfort zones".

Table 7: Reported changes in teaching practices as a result of ABEL participation (by percentage of respondents)

	Much less frequently	Somewhat less frequently	No change	Somewhat more frequently	Much more frequently
Seek out new ways of teaching topics and content I have taught before	0	0	7	53	40
Rethink some of my ideas about teaching and learning	0	0	9	51	40
Learn from my students	0	0	29	42	29
Have students teach or coach other students	0	4	29	60	7
Provide opportunities for students to take the initiative in their learning	0	0	31	53	16
Put greater emphasis on engaging students' interest in their academic work	0	0	33	50	18
Have students work collaboratively to jointly develop projects, solve problems, or complete tasks	0	0	36	49	15
Elicit students' ideas and opinions	0	0	36	49	15
Make greater use of alternative modes of assessment (such as product or portfolio evaluation) and less use of quizzes and testing	2	0	36	53	9
Act as a learning coach and facilitator with individuals or small groups of students	0	0	40	49	11
Provide students with opportunities to pursue topics of personal interest within the curriculum	0	0	45	42	13
Provide opportunities for students to present and communicate their knowledge and understandings	0	0	45	33	22

	Much less frequently	Somewhat less frequently	No change	Somewhat more frequently	Much more frequently
Give students opportunities to figure out things for themselves rather than being told or shown	0	0	47	46	7
Let student interests partly influence topics covered in lessons	0	0	47	46	7
Place more emphasis on developing students' depth of understanding of a topic than on covering off all areas of the related curriculum	0	2	47	40	11
Engage students in inquiry driven discussions	0	0	49	42	9
Provide out-of-school audiences for students' projects and demonstrations	2	0	53	29	16
Get students to justify and explain their reasoning	0	0	53	36	11
Engage students in larger-scale projects that take two weeks or more	2	2	53	27	16
Engage in direct whole-class teaching of facts and concepts	2	7	53	29	9
Have students explore a topic on their own, without direction	2	0	58	38	2
Have students formally assess their own or a peer's work	0	0	67	26	7

Table 8 gives the teachers' responses to inquiries about the frequency with which they collaborated with colleagues. About 80% of the teachers reported learning more frequently from the experiences of peers, and collaborating more often with colleagues to develop new teaching strategies. A slimmer majority (about 60%) reported collaborating more frequently to develop new curriculum, and to plan and carry out classroom projects. ABEL' goal of increasing collective learning and collaborative practice amongst educators seems well on the way to being realized, especially with respect to collaborative, classroom-based learning and pedagogy development.

Table 8: Reported changes in collaboration practices as a result of ABEL participation (by percentage of respondents)

	Much less frequently	Somewhat less frequently	No change	Somewhat more frequently	Much more frequently
Learn from the experiences of other teachers	0	0	20	60	20
Collaborate with other teachers to develop teaching strategies	0	0	22	58	20
Collaborate with other teachers to develop new curriculum	0	0	40	50	9
Collaborate with other teachers in planning and carrying out classroom projects and activities	0	0	44	40	16

Changes in technology use

Most teachers report that their ABEL program experiences have led them to make more frequent use of different technologies for teaching, and to provide students with greater access to the tools and resources of the digital world (see Table 9). More well-established uses of technology such as the incorporation of digital media in teaching, student use of digital media, and student use of the internet for conducting research showed the strongest gains in frequency of use. But even more cutting-edge Web 2.0 applications such as blogs, wikis, and course management systems received more frequent use by about half of the teachers reporting. Availing themselves of ABEL's technology, resources, and training, the majority of these respondents have made a significant advancement in their pedagogical application of technology in the classroom—a major goal of the ABEL program.

Table 9: Reported changes in technology use as a result of ABEL participation (by percentage of respondents)

	Much less frequently	Somewhat less frequently	No change	Somewhat more frequently	Much more frequently
Incorporate a range of digital media (such as graphs, images, sound files, and video clips) in my teaching	2	0	20	38	40

	Much less frequently	Somewhat less frequently	No change	Somewhat more frequently	Much more frequently
Encourage students to use digital media in their projects to represent ideas in various ways	2	0	27	47	24
Use blogs or wikis with my students	9	0	35	27	29
Use a course management system such as Moodle to provide access to learning materials, and to post and receive assignments	4	0	36	33	27
Have students make use of the internet for research	0	0	38	27	35

Teacher perceptions of ABEL impacts

Teachers were asked whether they agreed or disagreed with a number of statements about ABEL's impact on their professional life. The results are shown in Table 10.
About ninety per cent of the teachers either agreed or strongly agreed that their ABEL experiences had made them a better teacher, and that the use of ABEL tools and resources had made their professional life more rewarding. Only slightly smaller majorities thought that the way in which ABEL has introduced them to new technologies and supported their use had increased their confidence in using technologies for teaching and learning, and that ABEL tools and resources have provided unique opportunities for their students to learn. Two thirds of the teachers were of the view that their lesson content was deeper when ABEL tools and resources were used, and over one third felt that ABEL use had changed their perception of students and their achievements. ABEL is clearly seen by most of the respondents as having had a significant and often markedly strong positive impact on the caliber of their teaching, their sense of efficacy and comfort around technology use, and their professional satisfaction.

Table 10: Perceptions of ABEL's professional impact (by percentage of respondents)

	Strongly disagree	Disagree	Uncertain	Agree	Strongly agree
I feel that my ABEL experiences have made me a better teacher.	2	5	4	70	20
The content of my lessons/units is deeper when I use ABEL technologies and resources in my classroom.	0	2	31	51	16

	Strongly disagree	Disagree	Uncertain	Agree	Strongly agree
My use of ABEL tools and resources in my classroom has changed my perception of students and the nature of their achievements.	5	11	42	33	9
The way in which ABEL has introduced me to new technologies and supported my use of them in my classroom has increased my confidence in using technologies for teaching and learning.	2	9	11	65	13
The tools and resources offered through ABEL have provided unique opportunities for my students to learn that they would not have otherwise received.	0	4	20	54	22
The use of ABEL tools and resources makes my professional life more rewarding.	4	0	18	49	29

Most teachers reported observing positive impacts on students when ABEL activities, tools, or resources were used in the classroom, primarily in terms of increased student motivation and focus (see Table 11). Over three quarters indicated that students would be more engaged and on-task, and that a wider range of students can be engaged in learning; and a slim majority noted that students would take more initiative and demonstrate better self-management. Ninety per cent indicated that no more time would need to be devoted to classroom management, despite the complexities and potential distractions that technology use in the classroom introduces.

But these teachers were more divided when it came to assessing the impact of ABEL-enhanced activities on work product generated. While 21% reported seeing an improvement in the quality of student project or assignment work, nearly half reported seeing no differences.

Table 11: Perceptions of ABEL's impact on students (by percentage of respondents)

	Strongly disagree	Disagree	Uncertain	Agree	Strongly agree
I have found that students tend to be more engaged and on task when I make use of ABEL resources and tools in my teaching	0	2	22	65	11

	Strongly disagree	Disagree	Uncertain	Agree	Strongly agree
Less time has to be devoted to classroom management issues when students are involved in ABEL-supported work.	4	7	49	38	2
The quality of student project or assignment work has been higher overall when ABEL resources and tools have been used	0	4	45	3	18
Students take more initiative and demonstrate better self-management when undertaking ABEL-supported learning activities	0	7	38	46	9
I can engage a wider range of students in learning when I use ABEL tools and resources in my classroom.	0	2	22	65	11

Teacher assessment of ABEL tools, resources, and services

Teachers' perceptions of the utility and usability of several ABEL tools, services, and resources were assessed (see Table 12). Their responses suggest that ABEL has effectively met some of the teachers' needs and desires for resources, support, and collaborative networking, but by no means all. They expressed the highest levels of satisfaction with the quality and timeliness of ABEL's technical support; over 2/3 agreed or strongly agreed that these were satisfactory. But only a bare majority reported finding it easy to use the ABEL web portal for accessing information, discussions, and resources of interest, with almost 40% finding it not easy. And just a quarter of the teachers had found the ABEL forums to be of value in thinking about their teaching practices. While a slim majority did not find ABEL tools and technologies too time consuming to use regularly, a substantial minority—one third—did.

The professional development services offered by ABEL were an area that about 75% of the responding teachers indicated were in need of improvement. They stated that they needed more support to make effective use of ABEL tool and resources in the classroom, and felt that ABEL should offer more substantive professional development activities in their area of specialization. There are clearly opportunities for ABEL to better meet the professional development needs of its community members and in so doing increase its effectiveness in promoting teacher growth and technology infusion in a manner that supports more constructivist practice.

Table 12: Perceptions of ABEL tools, services, and resources (by percentage of respondents)

	Strongly disagree	Disagree	Uncertain	Agree	Strongly agree
I find that it is easy to use the ABEL portal (web site) to find the information, discussions, and resources I am interested in.	11	27	13	42	7
I find the discussions in the ABEL forums have been of value in reflecting upon and improving my teaching practices.	7	13	53	25	1
Employing ABEL tools and technologies requires too much time for me to make regular use of them in my teaching	11	42	11	31	5
I need more professional development support to make effective use of ABEL tools and resources in the classroom.	2	9	11	47	31
The ABEL technical support I have received has been sufficient and timely enough to meet my needs	0	20	11	51	18
ABEL should offer more substantive professional learning activities in my area	0	2	22	42	34

III. Exemplary ABEL Teachers: Interview Findings

Teacher background

The eight teachers who had been nominated as exemplary users in the 2006-07 school year by ABEL management constituted a heterogeneous group in terms of their subject specialties, their prior technology expertise, and their years of involvement in the ABEL program. Two taught computer science or technology courses, another business and co-opportunity courses. Also interviewed were 2 physics teachers, an English and French teacher, a social science teacher, and a design teacher.

There was a great range in their self-reported technical proficiency with digital technologies as well. The computer science, physics, and technology teachers considered themselves quite proficient; others, less so. Typical of the latter group was a teacher who mentioned that while she could use Word for preparing documents for her students, and was vaguely familiar with PowerPoint, she had few other computer competencies. The "power users" on the other hand were comfortable with Web page development and had used a range of more specialized tools (such as WebCT) in the past.

All of those interviewed had at least several years of teaching experience, but most had only started participating in the ABEL program in the past school year. (One teacher, though, had been involved since its inception over six years ago.) The schools where they taught were mostly urban and suburban, and several had substantial numbers of ESL and first-generation immigrant students in their classes. Although these schools' catchment neighbourhoods had SES levels that ranged from working to upper-middle class, all of the teachers interviewed indicated that the great majority of their students had computer and Internet access at home.

ABEL-enhanced teaching activities

This section presents a summary by teacher of the major ABEL-enhanced teaching activities undertaken in the 2006-07 school year, the teacher's reasons for pursuing them, and their perceptions of the teaching successes achieved and the difficulties encountered. These brief case reports also present relevant teacher background data and outline the ways in which the teachers learned to use the ABEL tools and resources employed and the types of support received form the ABEL project. (In order to maintain the teachers' anonymity, pseudonyms are used throughout this report.)

Sarah Dyson

Sarah, a science teacher who had been participating in ABEL since its inception, had used web sites and WebCT to present science projects to students in the past. At the start of the year, she conducted an online exploration of ABEL's Moodle course management system. "I found it to be so intuitive and so easy that I decided to use it not just as a project, but as a complete package resource tool for the students." She found she was able to learn how to use it on her own with only a few minor questions directed to the ABEL helpdesk along the way. She sought help occasionally from a colleague who was also

learning to use the tool. “If we had a problem, we kind of turned to each other.” She frequently made use of the Moodle documentation, which she found to be an excellent reference that rarely needed supplementing.

Her primary use of Moodle was in her grade 11 enriched physics course, where she employed it as the central resource for the course. She moved course materials she had previously located elsewhere into the Moodle course, and added all course handouts and outlines, as well as links to several videos to explain and demonstrate physics principles sourced from United Streaming (a provider of an extensive online library of indexed educational video clips that ABEL members can access). She also linked to a few humorous YouTube videos and asked students to discuss the physics principles involved in these videos in the Moodle course forums. “I always ask ‘making connections’ questions where the student had to explain things and I find that the students are not very good at that.... the students are practicing so that when they go to do it on a test, they are a little more attuned to what I expect to see. So I give them feedback online.”

Her Moodle-augmented course incorporated two online projects that students had to complete. For one project students had to photograph a physics concept of their choice (as embodied in some phenomenon) using a digital camera. Students uploaded the photos with accompanying physics explanations for the phenomenon; these were then reviewed and commented on by Sarah. She was able to configure Moodle so that only she could see the draft version of the assignment, and post back her comments privately. The final version of the assignment was posted in the class forum where peers could see and comment on it. Sarah noted that “it raised the bar a little bit” for students “when all of the sudden everybody has to see the assignment”.

The second project was an evolution of her online energy project, which she had done in past years. Students worked in pairs on different questions they had to answer in project form. They used a private wiki to collaboratively develop their project in response to their question. The Moodle was used to present the project in its final form.
Students would make frequent use of the Moodle chat facility to ask Sarah questions; ones to do with deadlines would be referred to the course calendar, also maintained in Moodle.

Sarah found that she was able to keep student participation in Moodle at about 90 to 95% in the grade 11 course. Participation in the discussion forum where students practiced making connections between phenomena and physics principles would vary somewhat, and overall she thought it had declined a little in the second semester section of the course, possibly because forum use was talked about by her more frequently in the first semester. Students also used a general forum to post and answer questions about homework. “I try to encourage other students to answer so I don’t have to answer everything.” Sarah pointed out that in this enriched course participation levels and engagement were always high, so that she could not be certain that the use of Moodle had significantly changed anything in that respect, but felt that students appreciated its application in the course.

Sarah's other main ABEL-related activity for the year consisted of providing technical support and leadership for other teachers in the school who were conducting class-to-class videoconferences with other schools that included guest speakers. The first, at which Barbara Hall was the guest speaker, used the older VSee videoconference system now phased out of ABEL; the second, with a forensics professor, employed the PVX system that was being used in York Region, for which Sarah received good support from Obadiah (ABEL's technical specialist) and an Ontario region ABEL lead, Steve. Both sessions went ahead without any significant technical glitches, and Sarah observed that the students were very focused and engaged in both videoconferences.

Debbie Newsome

A teacher-librarian, Debbie's primary use of ABEL was not to support classroom teaching but to augment three sections of an Additional Qualifications course in librarianship that she taught online over the full year. Through ABEL she found out about and obtained a Breeze account for videoconferencing and document sharing. She was attracted to the use of videoconferencing as she did not want her course to be a traditional distance education experience in which her role would be primarily one of providing materials, lecturing, and marking, while students only read and wrote. "This [tool] put me more in the position of mediator rather than instructor. And I think that makes for effective learning in an online environment." With Breeze it became easier to step back and allow students to take the lead in the course, and to interact in an educationally powerful fashion.

Each WebCT-based course section had only five or six participants, which made whole-class videoconferencing feasible and so made possible whole-group chats and presentations in a virtual environment. All but a few students from the far north who were on dial-up were able to use video in the conferences. But even those who only heard audio were still able to see the PowerPoints and web sites being presented to the group. Breeze was used on a regular basis for discussions and then towards the end of the course for student presentations of final projects. Debbie found the technology significantly enhanced the human face of her course:

> I know some people were horrified at the thought that I was asking them to try something different. But most of the people involved found it really effective and liked the fact that they saw a face and they heard a voice. It was a real time feeling because the major complaint I find from people in online learning is it's not like face to face. They miss that human connection. So this kind of made that for them. I was just completely sold on it. I am hooked on Breeze, I love it.

Asked about the quality of student work in the course relative to traditional distance education versions of the course, Debbie stated:

> I would say that the assignments were better. Much better because they were different. They were looking at other things. And they knew how they were going to share them too. And I also found that there was much more discussion having

> had that contact in the synchronous chat. There was much more communication and people felt more comfortable questioning something.

In their end of course evaluations, nearly all of Debbie's students indicated that they had found the use of video- and audioconferencing a valuable part of the course experience. "I would say probably every single one of them said something to me about it was so great to try different technologies, I would have never done it otherwise, and now I feel much more confident."

Debbie learned how to use Breeze primarily through experimentation and conversations with Obadiah. Eventually in February she did attend an ABEL session at York on Breeze, which allowed her to "figure out some of the little glitches".

Debbie had been exposed to educational use of blogs at the 2006 ABEL Summer Institute, and a colleague at her school had very successfully used one in his science course. Encouraged by this, she used a blog with her high school book club as a vehicle for encouraging discussion around books being read. Twenty students were in the club. She found discussion participation was not as high as she had hoped, primarily, she thought, because the books used were "not so great". "I tried to keep it pretty low key because I don't want to torture them with reading, and I didn't want to force them into writing either. So I just sort of offered it to see how it would go. And some of them liked it and some of them didn't." She intended to use the blog again, but in a different manner.

Debbie has participated in and assisted with videoconferences at the school, both for classes, for staff meetings, and for professional development. She is currently enrolled in an online Master's program in educational technology. She likes to explore the potential of any new technology that comes into her purview. Asked if she makes any use of other ABEL tools or resources, she stated:

> Yeah, I use everything. I've used United Streaming. Not as much as I thought I would only because the content is very American. I thought I'd use it way more, but I don't. I have a wiki that I play with. And I play with Moodle, but I don't have a purpose for Moodle yet other then the fact that we might be moving from WebCT to Moodle, so I will have a purpose then.

Carl Berringer

Carl, a physics teacher who had been at his school for five years, was very proficient in computer use and had been employing simulations and his own web page in his teaching. The 2006-07 school year was his first year of ABEL participation. He had begun using Moodle in his grade 11 physics class. He discovered as he started to use it that it provided a major pedagogical advantage over his course web page in that it permitted much greater interactivity, making it possible for students to post and discuss problems and solutions rather than simply access course information and resources. Carl had first been exposed to Moodle and its potentials at the 2006 Summer Institute. As he had been appointed the ABEL coordinator for his school, his thinking was that since he had to teach other staff about ABEL tools he had better start using them himself, even though he was at that point relatively satisfied with the functionality of his course web page for the delivery of

course resources. That fall he set up the course Moodle, into which he incorporated discussion forums and student blogs, posted student assignments and resources, and added links to external online quizzes. He made extensive use of the calendaring function in Moodle to keep students apprised of upcoming deadlines in the course.

Carl was able to convince his students to stop using instant messaging when they sought help with a homework problem and to make use of the forum instead, so that others could benefit from and contribute to the ensuing discussions when they had the same problem. He was very encouraged by how students took ownership of this medium:

> What was really fantastic was to see this forum just come alive as the kids start realizing the power themselves. I stopped replying to it. It became a forum for the students only, where they were having homework issues. And [they] really kept it to class related stuff. They were really good about not straying. I never actually had to deal with those sorts of issues. Kids would have troubles with homework or have questions about doing a lab report and would post and within an hour, someone else from the class had replied to it with the answer.... At one point, some students were away for a couple of days on a trip, and other students scanned their notes and posted them in the forum for those kids who were away. It was one of those things were students really began helping each other.

Carl found that the forum engendered a lot of discussions that took place between students that normally did not communicate with each other. He noted one drawback of forum use for his course that arose due to difficulties in writing formulas into the discussions. This limitation tended to inhibit complete discussions of course concepts. Students were impressed with the fact that Moodle was being used in the course and that its use became an integral part of the course, which the students thought was “cool”. Asked if there had been any improvements in student performance in-class or on assignments or tests as a consequence of Moodle use, Carl replied:

> I think a little. Because students were asking each other questions about labs, and working together at 11 or 12 at night when they wouldn’t have been able to get anyone, and first thing in the morning it was due. So I think that there was some improvement in certain areas.

Carl relied on his own skill with computer technology to master Moodle use:

> Really I just poked around for a couple of hours until I figured out what it was all about and realized ‘Hey, I can do this and I can do that!’...When I open up a new piece of software or a new tool, I am going to play with every single button to see what it does.

Carl had not found his exposure to Moodle at the 2006 Summer Institute “all that positive” in terms of learning to work with it. He had consulted Obadiah a few times, and sent several email queries to the helpdesk, but there had been difficulty in getting his emails accepted as they had been sent from his Board email rather than the ABEL portal

and so they were being filtered out as junk. “I sent them a whole bunch of things, and I wasn’t getting any response.” He was eventually able to sort this out through a telephone inquiry.

Carl’s second major ABEL-related initiative during the year centered around his role as the school’s ABEL lead. He gave talks about ABEL and the opportunities it offered with the staff as a whole during staff meetings at the start of the year. He then worked with interested teachers individually, primarily at lunch time. He was provided with a period per day of release time for ABEL support and training, which gave him time to work with any teacher who wished to make use of ABEL, as well as time to learn how to use different ABEL tools and resources. “Teachers would say to me, ‘Hey look at what this other person is doing, let’s try and do that’.”

Carl observed that the response to his efforts had been very positive, with high levels of take-up. He estimated that there were by the end of the year about 35 Moodle courses running in the school, and almost every teacher had requested an ABEL account. The school had a tradition of technology use, and some of the oldest teachers had been the most receptive to ABEL.

Carl had seen only one significant limitation in the different ABEL tools and resources he had explored, one which impeded professional collaboration:

> ABEL is all about collaboration and sharing. And that was really, you know from discussions with Janet and the whole group that started this ABEL project, it was all about being able to work together and bring people from different spaces to the same spot. And then of course you built a Moodle and there are 5 or 6 other grade 11 physics Moodles out there, but they are all blocked with a key. And so I look at that and I say, “Well wait a minute. They have stuff in there that is fantastic. I am sure that these other teachers at other schools, some in my board and some in other boards, are doing great stuff. But I can t look at it.” I know that they are there, but I don’t have access. Having to send an email to the teacher just seemed a little bit, you know? Although, how hard is it to, it would literally take 30 seconds or a minute, but it just seems like more than I want to do. So one of the things that I have done here a was really try to convince staff to not put a key on their Moodle and have a guess access. Allow guest access without a key.

Val Jenkins

Val had been made little use of technology in her previous years of English and French teaching at a middle class high school, and in fact had bought her first computer only about a year prior to the start of the 2006/07 school year. Her participation in ABEL had begun with her joining the school’s ABEL committee at the start of the year. The principal had approached her and a colleague (Joan) saying that he wanted them to integrate ABEL use into the English department and see how it went. Neither she nor Joan had had much experience with computer use at that point other than using Word and having “a vague notion about PowerPoint”.

Their principal arranged an ABEL PD session for his teachers at York, were they were introduced to the uses of Breeze and podcasting in teaching. Upon returning to their school they installed the needed software and were given further training by an ABEL staffer in the potentials for blog and Moodle usage.

For their first project, learned@ and Joan decided to bring iPod use into the classroom by having students bring in songs that related to a theme that was being studied in a novel. In her French class, learned@ wanted students to share French songs from different regions around the world. The teachers started off by creating a blog for the sharing and discussing of the songs. While the discussions were excellent, the blog did not meet all their needs. So they migrated the project over to the new YRDSB Moodle, which allowed a more structured layout for the provision of course materials, resources, and links. "It wasn't visually appealing with the blog. It didn't seem to be organized as well. With the Moodle it was." However the ABEL blog continued to be used as the posting location for the MP3 audio files as the Moodle did not provide sufficient server storage space to allow these files to be uploaded—instead, links to the files in the blog were created in the Moodle.

The teachers posted audio book versions of two Shakespeare plays for their grade 11 and 12 academic English courses that incorporated an audio commentary they had added into the digital file using a digital recorder. The commentary was designed to explain what was happening and highlight themes. Each class had a discussion forum in the Moodle in which the teachers inserted assigned discussion questions pertaining to the works being studied.

Later voice recorded lesson podcasts were added. Through ABEL, contact was made with Apple, and Apple staff brought a set of laptops into the school provided training for Val's students in creating podcasts, and loaned iPods to those that did not own one (about ½ of the class). At the time of the interview, students were being prepared to contribute their own podcasts on curriculum topics to the blog.

The Moodle was also being used for the posting of upcoming assignments and for notifying students of deadlines and due dates by means of the Moodle calendar. Poetry submissions were now made via Moodle, which had the advantage, Val noted, of allowing students to read each others' work.

Val saw the way she and her colleague had applied these new technologies to their courses as promoting students' development of crucial self-management skills:

> The student has the ability to take complete and total responsibility for all of their learning because anything that we do is organized on the Moodle, and the iPod has helped us record and play audio recordings and things like this. That's been all integrated into it. So they can't say that they're missing an assignment or they are going to be away for a week on vacation and what do they need. They know where to go, so there is quite a mature development that's happening there. They know where to go, they know what to do, and the idea is that it will lighten the

> workload and the responsibility of the teacher to get everything altogether constantly for all these students who are here, there and everywhere.

Student response to the use of the Moodle and podcasts was largely positive. Talking about forum participation, Val indicated that:

> The ones who are excited about the technology are on there first. And those who love English and love discussions, they are also on there first and quite quickly. There are very very few who don't participate.... They thoroughly enjoyed being able to discuss something outside of the classroom hours and take a question and really think about it and then come back to it and answer it clearly.

When she asked students about their experiences using the Moodle and the blog, responses were uniformly positive:

> They responded in a variety of positive ways. To me, within the blog, within the Moodle. They were so pleased to be learning English in such a manner. And they said that it was interesting, it was stimulating, it excited them. So I was really pleased with all the energy that this all developed in this environment.

This new way of teaching is being carefully evaluated:

> One way we are evaluating is looking at the effort and the insight that students have made as they're answering the discussion questions. And the other thing we are doing this semester is simply reflecting on how well all of this has added to the course. This is just a big pilot project right now, and we are doing a couple of little marked things to evaluate and it's mostly a reflection from the teachers and from the students, seeing where this has added to their learning.

Summing up the professional growth she gained through her ABEL-supported initiatives this year, Val stated:

> The satisfaction lies in discovering a new way of teaching that I hadn't ever thought about before. And it has been overall completely and totally beneficial to myself and the students. So I am going to be continuing it.

Lindsay Belmont

A social science teacher, Lindsay created a structured blog to use as a course management system for a senior course on psychology, sociology, and anthropology, using the front page to post significant course events and timelines, and links to other blog pages with assignments and coded grades. Students submitted completed assignments, consisting of answers to research questions or written reflections on an article, to the blog for marking. The assignments typically required online research to develop documents such as biographical summaries or annotated bibliographies.

Students were also required to read and comment upon their classmates' posted work.

Lindsay had been introduced to educational blogging at the 2006 Summer Institute, but she had been frustrated by her exposure to it there:

> One of the common complaints that people had last year was that we didn't get enough time to use it. Like we weren't given our own blog, which is probably what should have happened. They should set up 50 blogs, and people should go on and they should play with it, and sort of get their hands into it instead of just being shown. They attempted to do it one day, but they were trying to show us too much and we weren't getting into anything significant. So that was my general feeling and I know that other people felt the same way that they kind of came away with all this information but not any know-how.

(A student from her school had been in attendance at the SI as well, and was later able to help her learn how to enter links into her blog.)

Lindsay wound up learning how to build a blog by exploring the tool on her own with very limited ABEL support:

> They set it up for me. And then I tweaked it. I would say it took me two semesters to sort of get my head around all the things that the blog can do. 'Cause at first you just sort of figure it out. And second semester I was able to put pictures in and I was able to do other things that you don't typically associate with the blog.

She found that the support she did receive had significant limitations:

> I like to have access to [the tool], play with it and figure out what I don't know or can't do, and then call. I did send an email to their help desk. First they put you through that filter so they send you a thing confirming that it is you that is sending the email. And then you have to send it back. So that takes time. Because you want to know almost immediately what the deal is. What the problem is. And also, the responses that I got back weren't typically step by step instructions on how to use it. It was more like, go to this website.

In her interview, Lindsay brought up several pedagogical considerations around student blogging that arose from her initial experience this year:

> I think that you have to set the tone of what role the blog is going to play in your course from the very beginning. And you have to make it worth something to the kids. That sounds very obvious, but I found that going back and forth to it didn't really work. It was almost like they had to relearn it every time. So if they only went to it 10 times in the semester over 4 months, is that enough for them to become comfortable with it and use it to its potential? I don't know. ...There is also the issue that they put on there is public. When kids hand in their assignments to me, I know who has handed it in and who hasn't. But when they do it on the blog, everybody knows who didn't do something. Which is maybe a small thing, but maybe not, I don't know.

Her students accessed the blog both from school and home. She had surveyed her students and found that they all had access to the internet at home. “If they don’t, then you really have to question how equitable you are being by using the blog. If you don’t fully expect it to be done in the school time. So I think that as long as you are diligent about figuring out your demographics then you are okay.”
Lindsay had taught this course once in the past without the use of blogging. She found the level of motivation and interest to be “definitely” higher with the addition of the blog, despite the fact that about ¼ of her students would forget some operational procedures between their periods of use. ESL students especially seemed to benefit from blog use:

> I had several students who were ESL. And one of the most amazing things that I found about the blog was that those students who were weaker with their English skills and which caused them to be not as confident to participate in in-class discussion, were much more comfortable having posting comments or having discussions online. And I think it actually improved their English skills in a lot of ways because they were very conscious of what they were writing because they knew it was going to be public. But they also had an opportunity to edit before they posted. So it was a very safe environment for them.

Lindsay’s second major ABEL initiative was a collaborative class-to-class project she undertook in partnership with a New Brunswick teacher. The project got initiated when she read one of the email notifications of events from ABEL that she gets “bombarded” with, a letter seeking out partners for class projects from New Brunswick’ education office, and responded to it. Her partner is teaching grade 11 Sociology, and her own class in the project is a grade 11 World Religions class. Mr@ described the project:

> Her students in New Brunswick and my students here are in mixed groups and they are doing a collaborative assignment. What they are doing is coming up with a hypothesis and building a survey together. They also have to do research on StatsCan and two other journal articles through Ebsco, or Knowledge Ontario. And then they have to do some sort of analysis comparing the results of the survey. And it is the same survey done in New Brunswick as in Toronto. Her students are looking at sort of social attitudes and stereotypes, and my kids are dealing with world religions. So some of the surveys are about, they are in general about what people know about world religions, or different cultures that practice certain religions. And obviously I have to be very careful because of the ethics around asking what their religious backgrounds are.

Breeze videoconferencing was used for a class-to-class meeting and several teacher planning sessions. The first attempt with Breeze involved Obadiah; this one had technical issues which were ironed out with Obadiah’s help, and subsequent videoconferences went smoothly. The class meeting was devoted to introducing the four cross-class group members (two from each class) to each other—“putting a face to a name”.

The teachers used wikis as the channels for the students from the two schools to work together. Setting up wikis for the groups was quite a challenge for Lindsay, as even after the Summer Institute her understanding of wikis was very limited:

> I completely misunderstood as to what a wiki was. I remember sending an email to the ABEL help desk asking then to set up pages for me. Actually, I think I asked them to set up seven wiki because I have seven groups. Like I had not even, after the summer institute, fully conceptualized what the wiki could do. Like there could be all these pages within, do you know what I mean? So, I had to learn all of that, and learn how to build it. But again, I go back to my opening comment is that that's how I do things. I have to play with it first to really get a handle on what I am dealing with.

Students used the wiki to discuss their work and add and edit questions for their survey. The final survey created was posted on a separate product page. Discussions had to be monitored closely by the teachers, but aside from one insensitive joke that was posted there were no problems with inappropriate comments.

At the time of the interview, the project was ongoing; the final phase of printing the surveys out, conducting the surveys with respondents, and graphing, analyzing, and writing up the results had not yet been done. Talking about these upcoming phases of the students' work, Lindsay commented that

> They will have to have a conversation about what that data means and how it is similar or different between the two regions. And they will have to think about if there are differences or similarities, why they think those exist. And then they will have to come up with a final conclusion.

Because of the scope and complexity of the project, it wound up becoming the major project for the course for both teachers. Asked about the time and effort involved in developing the initiative, Lindsay stated:

> It's a major burden. At the beginning it is. After you get it up and running, it's fine. It sort of does its own thing. Other than the Breeze meetings, it really does. I mean, it's funny. Because Jennifer and I probably exchanged over 250 emails, at least, just figuring out dates, and due dates, and when are we going to start this, and what about this and what about that. And what we actually ended up doing was creating a parallel wiki that was just for her and I and her tech support people that isn't accessible to the students. [HW: Did that prove quite useful?] It did. So it was somewhere where we could all sort of gather instead of all these emails because with emails, just sort of start to kill you.

Talking about the collaborative process involved, Lindsay noted that she considered herself fortunate in whom she wound up with as her teaching partner:

> We are very lucky that we see things the same way. Because if you didn't you'd be in big trouble. So that compatibility cannot be underestimated because we are okay with the fact that it had its bumps, that it's taking longer than it was supposed to, and that it is going to run into probably close to the end of the school year, and all of that stuff. If you were really really strict about all that stuff, you would have probably given it up a few months ago. In fact, we did have a conversation with her and myself and her tech person as to whether or not we were going to continue at one point. Just because we were feeling overwhelmed, you know?

While she found ABEL staff willing to offer support when asked she wondered if they were proactive enough in their efforts:

> They're quick to sort of recognize that you are doing the work. But not necessarily-- there's not been a phone call saying, you know, I mean…how can I say this? They're very willing. They are always like, call us if you need any help, if you need anything. But that almost adds to the amount of work. So you are almost better to figure it out on your own.

Despite the challenges, Lindsay and her partner were encouraged to continue with the project by the substantial benefits they saw it offering their students. In addition to the high levels of engagement and excitement she observed in her class, she also perceived an important growth in communications skills and literacy:

> They are learning about the etiquette of how to communicate with people you've never met before. And that there is a very professional attitude that has to be, a mature attitude that has to be taken up by them. Which is forcing them to go beyond their MSN Messenger and Facebook, and that kind of dialog. So that they are becoming dual technology users in my mind. Like, there is that one very casual sort of dialog that they have in one realm of their technology world. And then they have the academic technology world. And I am trying to teach them that you can't say this and you can't say that. And really think about the words that you are using. And make sure that you spell things correctly because that person is going to think that you can't spell! Because they don't know you. And this is all the power of the words. And it is actually, like I said, it goes way beyond curriculum, for me. I just thought that's probably the most striking I have seen.

Students were also seen as learning about other cultures in a way that would be very difficult without external partnerships:

> The kids are learning so much about the fact that these kids are from the same country as you but from a completely different setting. We are in a very diverse, multicultural, environment here in our part of Toronto. And these kids in St. Steven's, there isn't any such environment. My students to have to deal with that cultural difference even though they are in the same country. And I don't think my students took into account how different you can be from one end of the

> country to another....It has been a really wonderful moment for me to see now that they are really trying to take the information they know about a certain culture, or a certain face and how to word things in a way that is appropriate and not offensive. Just seeing them go through that process, it's been really wonderful. Because it takes it to a whole other level, a higher order thinking skills. Like they are taking what they know, and now they have to apply it and do so much more with it. Almost manipulate it in order for it to be a functional piece of what they are doing.

Peter Sanroon

Peter had recently been made a technology consultant in his district, but up until February 2007 he had been a classroom teacher teaching business and co-op classes. He was highly proficient is using technology. He had initially requested access to WebCT from his board in the summer of 2005, but the board was about to switch over to Moodle as their supported course management system so it connected him up with ABEL so he could obtain get a Moodle account.

Over the course of the 2005-06 school year, Peter developed and implemented a Moodle course structure to support two senior co-op classes. He saw it as a way to give students who were frequently off-campus access to course content and resources. As he started experimenting with Moodle he saw that it could also be used by students to submit assignments and to provide links to web sites:

> What it started off as just this small resource bank, where we were just going to keep important documents that they can print off and so on. But turned into a more of an interactive—students go in there, they get updated on the course, they can hand things in.

As he did not want to spend time monitoring online discussions Peter did not use the forum capabilities of Moodle, but he did post topics for discussion to be responded to in journals and discussed later in class. Students were expected to go online several times a week, and weekly assignments had to be submitted online (such as resumes, business letters, and reflections on readings). The nature of the specific assignments given were tailored to a student's placement type, and templates for assignment documents provided. In addition, Moodle's calendaring features were used to provide guidance on due dates and deadlines.

Course development was a solo effort for Peter when he started, as nobody else in his district was using Moodle, and there was limited support for it within ABEL at that point:

> I got the manual and sort of played around. I actually have gone through most of the documentation and it is pretty good. But I found that it is actually easier to play around and just use the help icons throughout Moodle .So really what it took was one semester of setting up. I just put a couple of kids in to experiment. And then the second semester I ran it with the full class. Overall if I had to rate it, the difficulty out of 10, if 10 was the most difficult, I would say it was probably about

> a 6 or 7 at the time. It was probably about a 7 at the time. And now it is probably, I think friendly user at this point, it would probably be a 5 at first. It is fairly simple to use. At that time it was just intimidating because there was no one else on there. There was no other Moodles to look at. You didn't know if what you were doing was the way it was supposed to look.

Despite prior experience taking WebCT based courses he came to prefer Moodle for classroom use:

> I was a little disappointed at first when I was given Moodle instead of WebCT, but then once I started playing around with it, the end result is a much more friendly environment for the students. WebCT looks very bland, and it's not very engaging because it is very limited in what they are capable of doing. Where Moodle is much more in line with what you see on the web. I found, in terms of use, as a teacher, I find it quite simple to use.

Asked if the use of a Moodle course management system freed up class time from management concerns to pursue more substantive pedagogical goals, Peter indicated that it made little difference since it was being used as a supplement rather than a substitute for the normal discussion of assignments and expectations. He felt that relying solely on Moodle for course management was not realistic with high school students who could not yet be depended upon to function as fully self-regulating learners.

Students required little training to become functional within Moodle, and Peter was encouraged by the response of his students to the use of the course management system:

> It can help with keeping kids motivated because they see it as their area. As their own little learning environment. So they go in and complete what they need to complete. They see "Oh, I have this assignment assigned outstanding" or "I have this I have to do." So it is their little workspace, they go in, they do what they need to do, they get their own customized feedback so it can keep them moving forward.

He also found it valuable in monitoring and assessing student work:

> We are better able to track work. So for example, if I have 30 essays coming, I would actually have to count and look through 30 essays to see who got it in. Whereas on Moodle, they submit it online and I can see what time they handed it in. I can quickly, by a click of a button, see who hasn't handed it in, and I can track those students down immediately. I can provide feedback in a quick manner because it is all electronic. So they get that instantaneous feedback. So if there is a problem they can resubmit and so on.

The students themselves responded positively to Moodle use, as indicated in their responses to a survey undertaken by Peter. They have found the Moodle helpful in keeping themselves organized, and that having all their course resources online makes it easier to work from different locations, as everything they need is in one place.

Asked how the use of Moodle extended what he normally did in the classroom, he responded:

> There is a lot of linking to external sites that have activities and resources that you normally wouldn't have the time to discuss in the class. [HW: Enrichment, almost]. Yeah. For example, there is this online quiz thing that you can do to tell you what your skill interests are, what kind of job area you might be interested in, and so on. So in order to do that in a regular class you would have to book out a lab, have the students all sit there and go through it. And they many not be interested at that given moment. But having it on the Moodle site, I noticed that some students…I never asked them to do it, but I had it on there. And some students just did it out of their own interest.

Over the summer of 2006, Peter participated in a summer writing project for the board, building on his classroom Moodle experience to use Moodle to develop online learning modules for co-op courses. In the 2006-07 school year, he expanded the number of courses using Moodle, and began training three other teachers in his school in how to use it. Teachers had seen what he was doing and came to him wanting to use the same technology for their own courses. In his current consultancy role one of his formal duties is to further expand Moodle use across the board and into other subject areas. He is building a master course for co-op teachers to use as a strategy to quickly get teachers on board and using it effectively. He has run Moodle training for some teachers at York in collaboration with an ABEL trainer, and then supported them afterwards. He found them able to develop a comfort level with Moodle fairy quickly:

> They have been pretty okay. They just had to get past that initial shock of the knowledge, and do a few things on their own and now they are pretty comfortable with experimenting.

There will soon be a transition of the existing courses in his board, which are currently on the ABEL Moodle server, over to the board's own servers. Peter has greatly appreciated what he considers to be the strong support he has had from ABEL management in scaling up the use of Moodle in his board but realizes that its use in his district will soon outgrow the capacities of ABEL to support and will need to be transferred over to utilize the board's own systems and support structures.

Susan Blanchard

Susan has been teaching technology, graphics, video, and communications courses for two years at an academic school which draws its students from lower to middle income homes, and which has a high proportion of first-generation immigrant students. She has altered her courses so that all documents and resources are now accessed by students only in digital format—even her textbooks are read online, through a subscription service (she has 17 computers in her classroom). She considers it important that she make use of current technologies and up to date sources of knowledge for her courses:

> I think that it is fairly redundant at this point that I would be teaching with a chalkboard and chalk. I think that we have to catch up to the students, because the students are born into this technology. If I hand them a text book from 1995, it is pretty redundant. Whereas I could download articles from yesterday and have students post about them. So I think that was my main objective is to make sure that the delivery system of the content was applicable to their current technological development.
>
> I don't teach anything analog, except as the reference point for a historical process. And I just think that given the content of what I am teaching, it has to be delivered in a manner so that it makes sense. Like even a PowerPoint is pretty outdated at this point.... It is very important too that within the communication and technology umbrella, which is the fairly wide scope that I cover, the courses look at different media and different mandates, and they are production based classes. If I am going to present students information, I want to use real case scenarios, and things that are current that they can deal with.

Susan's major ABEL-supported initiative this year was the development of a communication technology blog that was used in all her courses. She received some background information on blogging at the Summer Institute in 2006, her first experience in the ABEL community, and then attended a further ABEL training session at York in the fall "to get a little more specific information related to what I wanted to do". One specific goal for the blog was "to compete with MySpace and Facebook" for student attention and focus; a second, to provide a resource for guided Internet searching. She also wanted to use it to promote students' technical literacies. Finally, its use would help her achieve her intention of running a paperless classroom.

Susan found the blog relatively easy to use and the templates provided for it very well done:

> The blog was great because I am just not really that interested in spending my off hours programming a website for my students. They don't pay me to do that. So I thought that was very good, the word platform and template are extremely user friendly. Otherwise, I don't think that I would have taken it on as a project. I have enough to do already.

Susan structured the blog so that it presented the assignments and full reading material for her courses, including chapter work and diagrams—"anything that I would normally photocopy". Schedules and events were also listed. She designed her reading links so as to encourage student reading:

> With any sort of articles that I was interested in them reading, I would just mostly post either a couple of quotes, or just something that I felt that was a bit of a hook to get them to actually read the article. We have a reading program in the school where students are expected to read for 15 minutes a day. But to actually get them to read and not to pretend to read is substantial. But if I let them turn on the

> computers during this reading time, well, whoa they are getting away with something, so they think that they got a hook over me. And I direct them to the blog, then they can read 3 or 4 lines which then I put in a hyperlink and they can actually read the whole article. And I would say it was about a 60% of students that actually would then go and read the entire article. Which sounds fairly low, but considering how it was before that, it actually increased for me. That is a substantial jump up and then of course, once the kids started commenting on it, I would find that people would go back and read it later and say, "Oh, so and so said this, so maybe I will go read the article".

Susan also made a concerted attempt to cater to student interests by seeking out interesting exemplars of design and media communication principles being taught in her courses and linking those media into her course blogs, which would encourage students to do the same:

> A lot of the stuff that I would hook up and place there for them was just neat. You go with the neat-o factor. We did Flash animation, so I would start posting things that don't talk about Flash, but examples of that type of work. We looked at graphic design, I post examples of interesting designs. And then that would get the students in turn more often then not, saying "Look at this Miss, look what I found Miss". And I think that kind of viewing—if I was an art teacher I would take them to galleries. But I don't teach that, I teach technology and so it is getting them to filter through and look at things and look at them with a critical eye. And I found that [the blog] was very supportive of that, because otherwise, we are again back to the textbook and so everybody is looking at the same material, whereas this way, the variety was more than I could ever pull up on my own.

The blog also provided an alternative writing approach for students, which (in contrast to traditional student journaling) proved very attractive to her students. Susan had done technical journaling in her first year at the school, and students had found it "very painful". "But if all of a sudden I call it a blog and we are looking at commenting and thread commenting as opposed to journaling, it was a different kind of concept to it." She found herself wresting with one consequence of that approach—the use of text messaging syntax and writing style (what she refers to as "text speak") in student blog comments:

> I am at a point now where I have to make a decision of whether to allow for that as a presentation model, to use that language, or as an educator, should I be moving away from that and expecting that they present the material with proper language and grammar. To be honest, that is something that I am considering. And I am not really sure at this point which way to go with that. I mean, I do promote technical literacy, but then on the other had, I do think that if you look at changes in our language that occur, who is to say that in five years from now, that won't be the acceptable language.... At this point, it is more important that the students participate and add their voice to it, or is it more important that they

> participate in a particular manner. And I think that sometimes there has to be given a take, I guess. And I find it an interesting question.

Susan found that an interesting contrast in written language practices existed between her native English speaking students and her ESL students:

> The Caucasian children use text speak only, and the high ESL, so that would be kids that have only been here for a year or 2, use proper English. And I think that was another thing that one of the things that I found over the year was that with the kids with English as a first language, their grammar, spelling and overall use of language was very much text speak. The ESL students that hardly ever speak in class and have difficulty with the language, they would go home and use tech translators and their commentary overall was more intelligent, legible and thought out. The kids with English as a first language would just bang it off and not consider the fact that it was all text speak.... The blog promotes for the ESL students the use of proper English, and also I found that it encouraged them to participate. Because that is usually the group of kids that sit at the back of the class and during discussions, they won't really participate if it is a verbal discussion, I guess for fear of making mistakes. But given the opportunity not to have that pressure to answer verbally in class and given the opportunity to think about it and go home and reflect their answers were often much more sophisticated than those from other kids.

Susan stated that another benefit of using her blog and digital media for all student production work lay in the opportunities it engendered for students to participate in the larger digital media production community and garner an authentic audience for their work. Talking about students' video productions as an example, she noted that

> Their videos got posted to YouTube. And that sort of again, it wasn't a direct link, but that sort of came out of the use of the blog and having the material presented in that manner. That was one of the things that sort of evolved out of that, that most of our final projects [go online], I have the kids change a few names to make sure that they still have anonymity, but at the same time they really love it. And again, well, it is the saying, it is a small world after all, I find that that's one of the things that have come out of it is the idea that all of the sudden our community becomes larger and our world becomes smaller. That they feel that they are part of a community that is out there and it is a cyber community and they belong to all these different cyber communities. So it has been linking the classroom up to their world.

While Susan had found the Summer Institute to be excellent, and the ABEL email helpdesk responsive, she had not been as impressed with the outcomes of two ABEL sessions on blogging that she had attended at York in the fall:

> To be honest, I came with very specific questions, and I wasn't overly impressed with the instructor. Look, I had specific questions that I was looking for specific answers for, and I just kind of found I could do it eventually, doing it on my own.

She had a similar experience in June when she attended a Moodle session with specific questions that she had submitted to ABEL two weeks prior to the event (she is beginning to explore Moodle for future use):

> The questions were pretty specific. It was like, "How do you access the Hot Potato quiz tool?" Now that is the second time I had gone up there, and the second time I attended a Moodle session, and the second time, it's like, oh that is a really good question. At this point, I am sort of kind of going, like I was answering some of the questions. And like I said, computers isn't my background. I come from the film world. So this is something new for me.… If I am going down there and I have someone else manage my classroom and taking the day off and spending the gas and driving all the way up there, I really want somebody that can embarrass me with their smarts. I want someone to say, well not only can I show you that, but here is something else. Like I want to walk away thinking, wow, my head is spinning.

At one ABEL workshop she attended the issue of copyright was discussed but she found little resolution for her concerns in that area:

> To me, as a teacher, that is very important to me. Because I teach the student about copy write. Again we are looking at a particularly grey area. But I guess my thing is that under the umbrella education act, I'm allowed to copy so much material through a photocopier. Now how does that work when I start putting that stuff on the internet? And I wanted some specific answers about content and about hyper linking things back and forth.

Susan felt strongly that there should be freer access to content on other teachers' class blogs. "I am totally into content sharing and I post my content up all the time, because as an educator, I am not reinventing the wheel. So I think that there should me more free access to content." She had kept her blogs password-free, which had the advantage of giving parents access to view student work and upcoming assignments—something she made parents aware of.

Vina Halzeer

A teacher of business and computer science courses, Vina was introduced to ABEL at the 2006 Summer Institute. On the basis of that introduction, she concluded that blogging would be the simplest way to start exploring technology use in her teaching. She then set up two ABEL-based blogs for himself and ones for all of the 83 students he had enrolled in her fall courses. She had no problems learning how to use the blog on her own, and received no additional professional development in its use.

Vina used blogging with two fall courses (grade 11 accounting and grade 11 computer science) as well as three winter courses (grades 10, 11, & 12 computer science). For her accounting course, she has students respond to questions about case studies at the end of each chapter of the text by blogging rather than on paper. She offered two reasons for this strategy:

> First, because the kids like to write on the blog more than write on paper. And second, because when they write their responses on paper and then hand them into me, I am the only person who sees them. When they post them on the blog, other people see them and read them, and some kids who don't even bother to post answers, get some kind of input from somebody else besides me about what the correct responses are.... Let's say there is a case study asking if Mr. Michaels is allowed to claim buying his car as a business expense. And the question is asking "Explain your answer". Now one person will write "yes", and somebody's going to say "I don't agree with it". So the kids would respond instead of just writing it and submitting it to me. Through the blogs they have more access to the answers of other kids. That allows them to also plagiarize. But it doesn't matter because the purpose of the case studies is more like a discussion than anything else.

The strategy proved effective, as Vina found that the percentage of students responding rose dramatically "because they like accessing the internet and they like being on the blog." After some direction from her, students started to develop more extended discussions of their case study answers on the blogs. She also allowed them to be authors of their own blogs and to start their own discussions. "I allow them a little bit of freedom so they can actually find it fun".

When asked if these discussions simply replicated interactions that would normally take place in the classroom, she demurred:

> No not in accounting because generally, the population in our school here, we have a lot of ESL kids and they are shy to speak. And I can relate to that because I am also an ESL person. It is easier to just write the response. I read all of them. They have passwords and everybody uses their student number so it is kind of anonymous. I know who they are, but the rest of the kids might not know. So that gives them some freedom to express their opinion, but at the same time they know that I am monitoring everything....
>
> As a discussion tool, the blog is extremely useful because if you are in the classroom, you see every time I ask if anyone has any questions, no one has questions. Or I ask "Is there any input to this? Do you want to add something?" Or I ask a question, very seldom, somebody is actually going to put their hand up. So that is a good way to make them ask questions or discuss. In computer science, I have noticed that the kids put questions there. "Do you know how to input the character?"

Vina had all her students start using the blogs by introducing themselves to their classmates, which eventually led to discussions about various topics on the blog. This in turn led to better inter-student communication. Over the first term, students were using blogs for roughly 20% of their class time. However by the start of the second term Vina had to shut down internet access during class as it was causing students to get distracted

and off-task. When she had something on the blog she wanted students to have, she had them access it at home.

A primary function of her blogs was to serve as an access point for resources of various types. Vina would post questions for students to answer for every task they undertook, and then a day or so before a unit test covering that task she would post the answers to these questions so students could check their work. She also posted example code for her computer science courses. In the grade 12 computer science course, students had to post their draft presentations on a topic such as network architecture in advance of the presentation date so it could be reviewed, commented upon, and graded by peers prior to formal presentation, allowing the authors to modify it. Vina thought this helped improve the quality of the presentations, and it generated questions and discussions in the blogs as students looked to answer criticisms and find new information.

Vina found there was a direct correlation between the age of students and their blog participation levels, with older students participating more frequently on average and using it in a more "professional" manner. She had noticed some transfer of the heightened motivation generated in students by blogging to their other course work during the time periods that blogs were actively being used, but as those periods were limited, this transfer was similarly limited in extension.

Vina considered her biggest challenge around the use of ABEL tools being the amount of time it consumed:

> It is just that it takes time. It takes time to set it up, it takes time to get the kids to get used to it, and probably the longest time is to implement it well, to make sure that you are using it in the best possible way. Because to learn to use it is nothing. But to actually make it useful and learn how to make it useful is another issue.

Leadership and diffusion

All of the teachers interviewed assumed either formal and/or informal leadership roles over the year with respect to the infusion of ABEL technologies and resources within their schools and (in some cases) their board or the province as a whole. The precise vectors this leadership role took varied from teacher to teacher, but several commonalities emerged from an analysis of their interviews.

First, regardless of their formal status (such as their membership on ABEL committees or assumption of an ABEL lead position in their schools) these teachers led by example, following the classical "bottom-up" model of innovation diffusion. Colleagues would hear about what they were doing with one or more ABEL tools, and begin to ask questions and seek advice. In certain cases, inspired and encouraged by what these teachers were able to share of their knowledge and enthusiasm, these colleagues would begin to take the steps needed to pursue similar initiatives with their own students.

While this approach was reported to be successful in getting several small groups of teachers from different schools to begin using ABEL tools and resources in one or more

of their classes, it is only effective at a local school level. And where the leadership is only informal, the lack of additional resources (primarily release time) available to the leader prevents him or her from being able to devote the amount of time to knowledge sharing and colleague training and coaching required to make these techniques optimally effective. This limitation was addressed in distinct ways at three of the schools. In one case, the teacher-leader was a teacher-librarian who had more time to test, notify, demonstrate, and provide professional development to colleagues, who had constant access to computers, and who worked in an open setting where teachers could readily come to see technology demonstrated. In a second school, the teacher-leader was made part of a three-person leadership team for ABEL so that the training and other leadership responsibilities were divided up and the time burdens for any given individual made less onerous. The model implemented at the third school had the teacher-leader formally designated as the ABEL lead for the school, and given a course release for one year so that he would have time to promote ABEL, and to train and coach teachers in their classrooms on an individual, ongoing basis. This model proved most the most effective of the three; by the end of the year almost every teacher in the school had requested an ABEL account, and approximately 35 Moodle courses were operating in the school.

Beyond the school level, the diffusion of ABEL technologies and resources into teaching was promulgated in two ways. In the first, a school board promoted a teacher-leader who had been the first in his district to begin using Moodle to augment his courses and who had inspired several teachers in his local school to do so to a consultancy position, where he was assigned formal responsibility for advancing the use of Moodle across the board, training teachers from an number of schools (in conjunction with ABEL staff), and developing a Moodle-based master class for co-op education. The second approach to leveraging local teacher-leaders was implemented by the ABEL management. Ongoing monitoring of ABEL use at participating schools and boards made it possible for the management team to identify local leaders and solicit their participation as speakers, facilitators, panelists, and workshop leaders at a number of regional and provincial ABEL events, including Summer Institutes, where they would talk about their experiences using ABEL tools and resources with their students, demonstrate their approaches, and discuss their positive outcomes. Given that the majority of the teachers interviewed were inspired to begin using ABEL tools as a direct result of attending such sessions themselves, there seems little doubt that this approach to diffusion can be effective in sowing new seeds for teacher professional growth.

Community building

According to the exemplary teachers, ABEL had been more successful at encouraging the use of its tools than in building a larger learning community focused on the reflective refinement of practice and the development of productive teacher partnerships for building class-to-class teaching opportunities. Virtually none of the teachers interviewed make any use of the ABEL forums for discussion about their teaching practices; many claimed they were too busy to devote time to them, and none indicated that they considered them to a significant part of their ABEL experience. Nor did any teacher report participating in any videoconferences that focused on pedagogy.

While one teacher had been successful in establishing a contact with another teacher outside their board that grew into an effective teaching partnership, several others reported having difficulty establishing such connections with other teachers (or in one case, an academic). As noted earlier, several teachers were frustrated that they could not readily access the growing number of Moodles to learn what teachers were doing and to share resources.

One teacher felt ABEL was not doing enough to proactively facilitate connections between those with less technical expertise or pedagogical experience using a tool (such as herself) with others who were more experienced:

> What ABEL has not taken into account is that I am not a technology teacher. I am a social science teacher using technology. And I am sure that there are still, in the delivery of technology, teaching skills or delivery skills a teacher of technology uses that are different from those of someone who is only using the technology. So I am wondering if those teachers have any insight on how I can better use the blog. Or how I should be teaching how to use the blog. So instead, I teach them how to use the blog based on how I learned to use the blog. And I am not necessarily sure that as a teacher, that's the right sort of way to go about it.

A computer science teacher stated that "I would like to have the opportunity to talk to other computer science teachers that are using the tools and see how they are using it. Because I am running out of ideas." A second computer science teacher offered a suggestion to address the issue of sharing ideas and projects:

> Right now I am trying to make something for a final project for my students. And I would like to give everybody a different one, and I am running out of ideas. If we had a wiki for computer science and everybody had a number of final projects that included the solutions, then that would be a very good resource for everybody.

Perceived ABEL strengths

The interviewees were asked what they felt the greatest strengths of ABEL were in helping them become more effective teachers. Most replied by first talking about the access ABEL provided to the tools they had used—primarily Moodle and the blogging software—and how that use had enriched their teaching. Several teachers mentioned how ABEL had opened their eyes to the educational potential of tools and environments they had not been aware of before, potentials which they found transcended the limitations of passive web pages by providing greater opportunities for student contributions and interactions. Access to the tools was found to be straightforward, the tools themselves were considered generally easy to work with, and the support ABEL provided in getting user accounts and making storage space available for embedding learning resources in Moodle courses and blogs thought to be excellent. Responses provided to queries to the help line were typically very useful, if not always easy to obtain due to email filtering issues. Several teachers complimented the ABEL staff as being extremely helpful and supportive when called upon.

It is worth noting what elements of the ABEL program were *not* cited by anyone as strengths. No one talked about the ABEL community itself as a useful resource except for the teacher who found a partner for a collaborative cross-class teaching project. The use of the ABEL forums for reflective discussion, or the availability of any of the other professional development resources such as streamed media of guest speakers, online articles, or links to other sites did not get mentioned. The ABEL portal was not mentioned either, but one teacher-librarian did appreciate the automated emailed notifications she could pass on to colleagues and another valued receiving the emailed ABEL newsletter. A teacher cited the Summer Institute as a major strength, but nobody talked about the training sessions explicitly in response to this question (although it was clear that the consultant interviewed valued the trainings ABEL provided for his board's teachers).

All of these teachers were planning to continue or even expand their involvement with ABEL in the next year, a testament to their sense of its value for them, given the added time the use of ABEL tools and other resources required. Those teachers who had used blogs over the year were reviewing the additional potentials that Moodle made available, and most were planning to begin applying Moodle to one or more of their courses the following year.

Teacher recommendations for changes in the ABEL program

In the teachers' comments about what might be done to make the ABEL program more effective for them, three types of suggestion were predominant—the need for more time and/or embedded support for learning about and using the ABEL tools and resources; the need for more focused and responsive training and professional development opportunities; and the need for stronger collaboration and sharing in the ABEL community.

Nearly all of the teachers commented on the additional and sometimes stressful time demands that making use of ABEL technologies in teaching imposed on them, and a few suggestions were offered to address this issue. Sarah, who had been part of the original contingent of teachers in her board to get an period a day of release time to participate in ABEL, suggested that one member of a school's teaching staff be given a course release so that he or she had time set aside every day for assisting other staff plan and implement ABEL augmented initiatives. (Recall that this was in fact the model used at Carl's school, and it had proved very effective in scaling up the use of ABEL resources in the school.) Sarah explained the need for such support in a compelling fashion:

> Tom is currently the one teacher who is supporting the whole board [in using ABEL]. And so he does what he can do in terms of technical support and does a great job of it. But he is not going to knock on my English teacher's door who is not a part of ABEL and say "Hey, look at this great opportunity to have a discussion with this author (which is one of the things that is online right now) and have your students participate." And I can't either because this other teacher is not in ABEL. I would have to do 100% of it. And I don't have the time to do that. I think the potential is absolutely phenomenal, and I have always said that, which is why I am still here and

> doing all these things. But that piece of having a person that can coordinate these things...

Another teacher talked about the need to provide sufficient time (and mentorship), both in the short and long term, to build and sustain the transformation of teaching:

> I think you need more time, it takes more than one year. And I think you need to look at it in a five year picture and I think that is the best case scenario. But if you want to effect change, you have to keep giving time and you have to keep providing the PD, or at least the mentorship. And as soon as you honour people, like, someone says "I'm interested in doing this" and somebody says "Here's time to do it", it is so powerful. Because right off the bat they are going to do it again and they are going to tell other people.

Several shifts were suggested in the professional development and training services ABEL offers. Several teachers wanted to see more training that involved direct participant use of the tool being talked about and included specific pedagogical applications. One teacher talked about learning about blog use when discussing this need:

> I would have really benefited from an afternoon, or a day. I could have actually gone in and had a blank ABEL blog with my URL, and have someone sit with me, or sit with a group of 10 of us and sort of walk us through all the different things that this can do. That would have been helpful. I don't know how much I would have retained, but I would have at least seen the possibilities. I would have had a better conceptualization of where I could have gone. Not just learning the software, but learning what it should be able to do.

Another teacher echoed the need for attention to be paid by professional developers to the concrete pedagogical applications of the tool or resource being talked about:

> Provide teaching tips and strategies and look at just how online teaching is different then classroom teaching. And what to look out for and things like that. Because right now the focus I think is on how to use the technology. But not so much on how to use the technology in terms of instruction, as in instructional strategy. So simple things like taking an instruction and breaking it up into 1-2-3-4, into points. Because a normal instruction that you can give out in class—well, now when you put it online it actually has to go in very question and answer type of format in order for there to be understanding, and that sort of stuff.

A few teachers thought ABEL should provide some streamed training videos that were short and sharply focused on stepping users through the operations of more complex tools or resources. These videos could then be used on-demand. "It would be neat just to access a resource and just in a couple of clicks get all that was needed to get started" suggested one respondent. Another teacher pointed out that while excellent resources for learning about Moodle already existed, it had taken him considerable time to find them, and that ABEL could provide a useful role by providing links to the best and most applicable existing training resources.

Suggestions for better structures and opportunities for collegial sharing were also made. Subject-focused areas for sharing unit and lesson plans, curriculum materials and resources were requested. One teacher stated “I would really love to see what other people in science are doing. I haven’t really seen too many science-specific resources”. The use of a subject-specific, teacher-only wiki was suggested as one mechanism by which collegial sharing could be encouraged. Bringing teachers together by subject rather than school in professional development events was also thought likely to promote better levels of sharing and more sharply focus sessions on classroom practice. As discussed earlier, several teachers were frustrated that they did not have open access to colleagues’ ABEL-hosted Moodle courses and blogs to see what they and their students were doing, and to reciprocally share educational strategies and content. A design teacher had the following to say about the need for free and easy access:

> I think if you part of the ABEL community there should be an automatic key set up that anybody who is part of the ABEL community can actually look at somebody else’s Moodle. I just want to see how other people are using the template, because I think the template is kind of crap. But, I am coming from the graphics end of it. It is not the best. And because we don’t have administration rights, there is not a lot I can do with the template other than email ABEL and ask them to make changes to it. But I’d like to see what other people are doing. And as it is now, if I want to see what’s happening in your course, and like I said, there are only 3 or 4 that are actually open, I have to enroll in them. ...If you are going to be a part of a community, you should be sharing. And it isn’t that I am interested in using someone else’s content. I just want to see how it is delivered. This is a new tool for me and my experience with virtual courses is from the university level. If I am doing it on my own, I am probably missing a whole wide spectrum of uses that I won’t pick up on just because I am going in this direction.

There were a number of additional suggestions offered by individual teachers for enhancing the utility of ABEL. These included providing more Canadian digital video content (United Streaming videos were seen as too American oriented); enabling easier input of mathematical and scientific notation into blogs and Moodle forums so these could be more extensively used in science and math courses; and making better provisions of space for very large video files to be uploaded (currently there is a 100 megabyte limitation on uploading that can only overridden through requests to the ABEL office).

IV. Discussion and Recommendations

This section develops a comparative analysis of the online survey findings and the experiences and outcomes reported by the eight "exemplary" teachers who were interviewed. It examines the teachers' patterns of ABEL tool and resource use, changes reported in teaching practices and collegial collaboration, the nature of student outcomes, and teachers' assessment of various components of the ABEL program. The report concludes with a short list of recommendations for improving the program developed on the basis of the data analysis and the teachers' own suggestions.

Discussion

Patterns of use

Both groups of teachers (those surveyed and those interviewed) reported parallel levels of use for most of the ABEL tools, resources, and services. In each case, Moodles and blogs were the most commonly used tools; videoconferencing was only used by about half of the respondents; wikis were used by a minority on an occasional basis; the ABEL help desk was periodically consulted over the year; site-based professional development was rarely or never used; and podcasting was only used by a small minority. Clear use level differences did exist in a few areas, however. Teachers in the exemplary group had all participated in one or more professional development sessions at York University, whereas only a minority of those surveyed had; and the latter group appeared to have made more regular use of United Streaming media (although not all of the interviewed teachers fully discussed the minor uses they made of ABEL resources, so this difference remains uncertain).

Changes in teacher practices

The eight teachers interviewed had applied the new communicative potentials afforded by ABEL tools to their teaching in ways that had significantly shifted their classroom pedagogy in a more constructivist and student-centred direction. By employing Moodle forums, blogs, wikis, podcasts (and, less commonly, videoconferences) as media for students to put forward, develop, and discuss ideas, articulate potential solutions to problems and comment on those offered by others, present or post projects for peer consideration, and evaluate the work of others, all with minimal teacher intervention, these teachers had appreciably expanded their students' opportunities to work collectively in constructing their own knowledge and to take greater overall responsibility for their own learning. The common use of Moodle and blogs to provide students with access to their readings, assignments, course resources, and a calendar of deadlines and due dates further shifted the locus of control for learning away from the teacher, increasing students' responsibility for self-monitoring and work management. These ABEL tools also provided powerful new affordances for greatly expanding students' exposure to and interactions with the larger world beyond the classroom, engaging student interest, and giving students access to authentic audiences for their work—affordances which several teachers took advantage of, through initiatives such as Lindsay's religious attitude survey project undertaken in partnership with a class from a remote and culturally distinct region

of Canada, and Vina's incorporation of real-world exemplars in her graphics, video, and design courses, and her students' posting of completed student projects to external sites such as YouTube.

The majority of teachers surveyed reported making shifts in their teaching practices as a consequence of ABEL technology use that paralleled those discussed by the exemplary teachers. About 70% indicated that they put greater emphasis on engaging student interest, and provided more opportunities for students to take the initiative in their learning, and over 50% said they had students undertaking more collaborative work, were eliciting students' opinions and ideas more frequently, were giving students more opportunities to figure things out for themselves, and were providing more opportunities for students to present and communicate their knowledge and understandings. The use of inquiry-driven discussions and the provision of out-of-school audiences for student projects was said to have increased by about half of those surveyed. Nearly all members of both teacher groups reported actively seeking out new ways of teaching their course topics, and rethinking their ideas about teaching and learning as a consequence of their exposure to ABEL and participation in ABEL-augmented projects. Taken together, the survey and interview data strongly suggest that teachers who make use of ABEL resources and technologies make significant shifts towards more constructivist and student-centred teaching practices.

Professional collaboration

Nearly all of the interviewed teachers reported some form of collaborative interaction with colleagues related to ABEL use. Several had one or colleagues using the same tools with whom they would collaborate, assisting each other in the resolution of technical or operational issues, discussing and sharing teaching strategies, and in one instance co-developing teaching plans. In three cases this collaboration was formalized either by membership on the school ABEL committee or designation as the school ABEL lead. Most of the exemplary teachers provided formal or informal professional development or training to those interested in following their lead in the use of a given tool or technology, either on-site or in a broader context such as an ABEL workshop.

The surveyed teachers also noted an increase in the frequency of their collaborative activities as a result of being involved in ABEL. Eighty per cent reported collaborating more frequently to develop new teaching approaches and learning more often from the experiences of other teachers, and the majority indicated that they were more frequently cooperating in the planning and implementing of projects and activities. Overall, participation in ABEL does appear to lead to higher levels of meaningful professional collaboration between teachers, although the data from the teacher interviews suggests that the great majority of this collaboration is at the school and workshop level. There is little evidence for significant participation by most ABEL community teachers in remote or "virtual" collaboration enabled by either the ABEL portal or technologies such as Breeze, and indeed frustration was expressed by several of those interviewed at the difficulty in making contacts with remote colleagues for collaborative work.

Student outcomes

All of the teachers interviewed, and three quarters of those surveyed, stated that they found their students more engaged and on-task when ABEL resources and tools were being used of teaching and learning. The exemplary teachers found that their students were with some exceptions more focused on what they needed to do (the differences was not so apparent in an enriched class, where nearly all the students were already highly motivated to participate). Teachers used words such as "excited" and "stimulated" to describe their students' response to the use of ABEL tools. Students who typically would not respond to questions and discussions or write in their journals began to contribute to forum discussion threads and offer written responses in blogs. In one course, links to articles generated substantially more student reading than reprints had, and fewer deadlines were missed in another course. Design students became directly involved in seeking out exemplars of design concepts on the internet and posting them for peers to see and comment upon. In two classes with a high proportion of ESL students, both teachers found that the use of blogs and forums for writing tasks and student discussions prompted the submission of well crafted text and thoughtful arguments from students whose difficulties with English led them to rarely respond to oral questioning in class. These communication tools provided a safe environment for responding, free from the real-time pressures and the dangers of self-exposure inherent in classroom discussions. Three quarters of the teachers surveyed agreed that they could engage a wider range of students in learning when they used ABEL tools and resources, and a majority thought that students took more initiative and demonstrated better self management in ABEL-supported learning activities. This increased initiative manifested itself in most of the exemplary teachers' classes. In Carl's class for example students took ownership of their forum after he asked them to use it to discuss homework problems rather than using instant messaging. He stopped responding in the forum himself and let the students use the forum to help each other, which they did to great success. He noted that a lot of the discussions took place between students in different cliques who would never talk to each other in class.

Improvements in literacy were one type of student outcome mentioned by a few of the teachers interviewed, although the kind of literacy varied. ESL students' intensive participation in forums was observed to develop their English literacy skills. The capacity to communicate appropriately in new contexts with others from culturally distinct groups was another literacy skill seen to be developing in the cross-school survey project. It was widely acknowledged that digital literacies were also being developed as students learned to apply different tools and resources to their learning needs, participate in the larger digital world, and assume appropriate voices for engaging in educational discussion in blogs, forums and emails.

Other professional impacts

Both the surveyed and interviewed teachers thought that their ABEL experiences had led them to become better teachers and had made their professional careers more rewarding. Most agreed that it had increased their confidence in applying new technologies to education, and that ABEL provided them with unique resources to help their students

learn. ABEL experiences had also led many to change their perceptions of students and their achievements (as, for example, when ESL students were able to communicate much more effectively through blogs and forums than in class discussions).

Professional development and support services

There was a large degree of agreement across both groups of teachers that the professional development services provided by ABEL were not as extensive or focused as they should be. Most of the exemplary teachers made little use of the ABEL portal, and only half of the survey respondents found it easy to find the resources and discussions they were interested in on the portal. A large majority of those surveyed wanted more professional development in order to make more effective use of Abel tools and resources, and thought ABEL should offer more substantive professional learning activities in their subject areas. As discussed earlier, several of the exemplary teachers expressed frustration at a lack of pedagogically focused, hands-on work in professional development workshops, and an inability of instructors to effectively respond to specific questions even when these had been forwarded in advance of the workshop. Others seemed more content with what was offered; but it needs to be kept in mind that most of the teachers interviewed were part of the small minority of the teaching profession who are experimenters and risk-takers by nature, whose personal learning styles and high intrinsic motivation led them to take the initiative in mastering new tools with far less reliance on external professional development support than a typical teacher would require. If ABEL is to appreciably scale up its reach, it will have to better position its professional development services to meet the needs of the more typical teacher.

The teachers were generally satisfied with the technical support they had received. Many of the exemplary teachers heaped considerable praise on the help provided to them, often on short notice. A few teachers had some difficulties in getting timely responses through the help email system as their email was either filtered out or inquired about because they had not mailed their help requests through the portal. Over two thirds of survey respondents thought the technical support they had been provided had been both sufficient and timely enough to meet their needs.

Recommendations

All of the teachers interviewed and the large majority of those surveyed thought that their involvement with ABEL and the use of its tools and resources had contributed in a very significant way to their professional development. It was reported to have improved the quality their teaching, shifting it away from a reliance on traditional direct teaching strategies to a style incorporating more student-centred and constructivist approaches that enhanced the extent and quality of student discourse and collaboration and increased student initiative. But the teachers' strong appreciation for the program and its effects was mixed with some pointed remarks about its perceived limitations, suggestions for improvement, and a general view (evidenced in the survey results) that ABEL could be doing more to support their professional growth. Based on the relevant teacher comments and survey responses described earlier, this report concludes with a set of recommendations for strengthening the ABEL program. If acted upon, these can increase ABEL's capacity to effect the changes sought in teacher practice and enhance its ability

to scale up its operations by better addressing the needs of average teachers, who typically require greater levels of support when undertaking new professional development initiatives.

1. *Work with school boards and other possible sources of funding to institute release time for ABEL leads.* Leads would then have the time to work in-class and on-site with teachers individually and in small groups, using coaching and modeling strategies to provide embedded and tightly focused professional development support over an extended period that directly meets teacher' needs, and addresses emergent concerns and changing requirements in a timely manner. The research on educational change has clearly shown that ongoing, embedded support is nearly always essential for the successful transformation of teaching. The way in which the leads' release time is made available need not follow one rigid pattern. Leads might be given one-course release and work within their own schools (as one of the interviewed teachers did so effectively), or they might work on a half- or full-time basis supporting a cluster or family of schools.

2. *Increase the responsiveness and pedagogical focus of professional development sessions devoted to ABEL tools and resources.* The presenters need to have the requisite expertise to answer the usage questions that participants raise during training sessions. Pre-existing issues and questions should be solicited from attendees in advance of the session date to ensure they will be fully addressed. The sessions need to provide direct-hands-on experience in tool use as PowerPoint presentations or even live demonstrations are not nearly as effective a training medium. Finally, the sessions need to place use concretely in the classroom context, providing both a pedagogical rationale for tool usage and working through educational applications relevant to the audience. Where possible sessions should be populated with teachers from only one discipline so that the session leader can tightly focus on applications in the subject area and courses of concern to the group.

3. *Conduct a usability study of the ABEL portal. T*he portal was not extensively used as a professional development resource by these teachers, and a substantial minority reported that it was hard to locate information or discussions of interest on it. A usability study conducted with several ABEL teachers could pinpoint sources of difficulty in the usability of the site which might lie in it design or user interface, as well as areas where the site's content needs to be altered or expanded to better meet teachers' informational needs and promote meaningful professional discussions within the ABEL community. Attention will also need to be paid to finding better ways of connecting teachers in specific subject areas with each other to foster more collaborative class-to-class projects and a greater sharing of strategies for using ABEL tools and resources within a given discipline.

4. *Where possible, provide ABEL teachers with unimpeded access to their ABEL colleagues' course resources such as class Moodles and blogs.* Doing so should accelerate the development of best practices with these tools across a broad range of subject areas, as teachers will have new opportunities to build upon their

colleagues' efforts. In addition, access to high quality course exemplars should inspire new teachers to apply these tools in their work, and lower the perceived barriers to entry by making available course designs and resources these teachers can modify and adapt to their own needs.

5. *Provide short and highly focused training videos* that teachers can access in a just-in-time, on-demand basis when they are experimenting with and applying new tools and resources in order to help reduce frustration and learning times. Most teachers will not persist for long if they have to struggle to master a new teaching technique or tool. High-quality streamed training videos can make a significant contribution to keeping teachers involved long enough to reach that critical point where they begin to see successful outcomes from their efforts.

6. *Increase storage space affordances for large file uploads.* As the use of digital storytelling in schools becomes more common, the need to provide for large video file uploads to blogs and Moodles will become more important. The current upload limit of 100 megabytes will be increasingly seen as inadequate by teachers with large files to upload. As one teacher remarked, the process for posting these big files needs to be as easy as the one YouTube employs.

7. *Enable easier use of scientific and mathematical notation in blogs and forums.* Science and mathematics teachers find that in their current forms these tools inhibit the pursuit of mathematical and scientific discussion due to the relative difficulty of entering mathematical expressions and scientific formulas into their text areas.

8. *Source more Canadian content for video streaming.* Teachers appreciated the educational potential of the United Streaming videos, and, as the survey indicated, many made use of it. But several interviewees thought that the content was "too American" and that there was a need for more Canadian content to be made available in subject areas such as history, geography, and science.