Teaching for Information Literacy: Online Professional Development Challenges

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Abstract

Awareness of the need for *all* teachers to be information literate has prompted a proof-of-concept project to create an online resource for use in self-directed study by teacher-librarians and teachers. The resource includes information literacy theories and teaching strategies that are modelled in supporting adult educators and students as learners. The professional development gains for participants, evidence of student learning resulting from teaching for information literacy and factors to be considered in moving from live workshops to online environments for self-directed study are examined. Questions are raised concerning the nature of online in-service education to promote information literacy. Implications for teacher-librarians as collaborators and information leaders are discussed.

Background

In many schools in New Zealand, the concept of information literacy is now attracting greater attention. There is a growing awareness that to promote information literacy, *all* teachers, not just teacher-librarians, will need to be confident in the retrieval, management and manipulation of information in all modes of delivery and presentation. Previous research (e.g. Slyfield, 1997, Moore, 1998) confirms a need for professional development in this field at both primary (elementary) and secondary (high school) levels. Thus, online access to a professional development resource appears attractive.

The Ministry of Education has prompted and funded initiatives to provide information literacy resources for self-directed study. Online delivery does ensure nation-wide access to appropriate information literacy resources free of charge to users, but it also highlights several issues. For example, information literacy awareness and practice is usually developed through continuing education programmes that attract academic and professional credit. An online resource for self-directed study provides no such extrinsic reward, has no specific time allocation and competes for attention with a variety of curriculum and other initiatives in schools. Thus, efficacy of the approach is likely to be a function of the way the resource is used as a professional development tool by teacher-librarians and teaching staff. This and

other issues have required the project to be conceived as a proof-of-concept activity, to be evaluated from a variety of vantage-points.

The completed evaluation will examine evidence of the impact of the resulting *Teaching for Information Literacy* resource, as a function of participation in the resource development process and compare professional development benefits for teachers both developing and evaluating the resource. In addition, the ways in which the resource is used by evaluators will be explored in relation to professional development gains and student learning outcomes. At the time of writing, the evaluation phase of the project was in progress, having been delayed by events beyond the researchers' control. The current discussion therefore centres on:

- evidence of student learning attributable to teachers' participation in developing the resource
- essential factors to be considered in the metamorphosis of information literacy professional development from workshop to online environments for self-directed study,
- reported professional development gains for participants, and
- indications of ways in which evaluators use the resource as a professional development tool.

The project is due for completion in June 2002 and a full report will be available from the Ministry thereafter.

Resource Scope

The requirement was to provide a website that gives access to user-friendly models of, or approaches to, information literacy through:

- self-directed professional development support materials for primary and secondary teachers
- curriculum materials and guidelines for the evaluation of learning activities and the information literacy learning they facilitate for students, and
- materials to aid senior management in developing strategies to ensure continuing attention to information literacy among staff and students.

The benefits of introducing concerns and practices of librarianship in an educational setting shared by teachers and teacher-librarians have been shown to significantly increase understanding of collaboration, resource-based learning and information literacy among pre-service teachers (Asselin and Naslund, 2000). Inclusion of similar material in this resource provides professional development opportunities for teacher-librarians as well as for teachers. The intention was to illustrate the synergy that should exist between the library and learning and to raise awareness of the ways in which teaching for information literacy needs to be supported at an organisational level.

Theoretical Framework

In all, four concepts provide the theoretical framework for this professional development resource. Examination of information literacy itself is achieved through modelling resource-based learning, constructivism, cognitive apprenticeship and a related emphasis on metacognitive development, all of which are familiar in many classrooms. These supporting concepts have in common a central concern with the learner. For example, constructivist theory assumes that literate people deliberately and inventively make meaning

and crystallise relationships between events and ideas (Greene and Ackerman 1995). In this case, the key task was to enable teachers, with and without library responsibilities, to make sense of a wealth of information literacy models and literature in a manner best suited to their needs and those of their students.

The cognitive apprenticeship approach (Colins, Brown, and Hollum, 1991) was applied because of the cognitive, and often covert, nature of information literacy and the suitability of this approach to web-based learning environments (see for example Oliver and Herrington, 2000). In cognitive apprenticeship, 'experts' make their thinking public, so that learners can begin to build the conditional knowledge essential to strategic application of learning and prediction of outcomes in other settings. The authors were concerned to provide guidance for teachers that enabled them to go beyond dependence on any model lesson to independent creation of flexible, responsive strategies that utilised available resources to the full. Development team teachers were encouraged to reveal their decision-making and critical reflections in instructional design as insights for resource users. They discussed classroom management, pedagogical issues and the observed learning outcomes of students. Thus users of the resource are assisted in the identification of points at which learning activities would need to be adapted to suit their own students and teaching and learning environments.

One conundrum to be addressed was that continuing education usually attracts either academic or professional credit, yet this professional development resource would do neither. Such rewards are not always the reason for studying, but in face of competing activities, they contribute to maintenance of focused and sustained learning. Provision of evidence of learning outcomes attributable to teaching for information literacy was expected to provide intrinsic rewards in that it relates specifically to goals users share with developers.

A second conundrum was that the intended users of the resource were known to range from absolute novices to relative experts in either information literacy or use of information and communication technologies (ICT) personally and in the classroom. Therefore, the resource needed a variety of entry points to match the purposes and information needs of users. To address this, rubrics, as often applied in assessment of information literacy, were developed specifically to aid teachers in identifying those sections of the website most relevant to current information and learning needs.

Within this theoretical and practical framework, the development team brought together existing online information literacy resources and created others specifically to illustrate teaching for information literacy within the National Curriculum for English and Science.

Participants

The development team consisted of the authors with 16 teachers from the Wellington area. (Two withdrew due to pressures of other school activities.) The teachers were known to have participated in some form of information literacy training (e.g. all or part of a teacher-librarianship diploma or completion of masters level information literacy courses). The group was evenly divided between primary and secondary schools and while most teachers elected to work individually, two primary principals and their lead teachers chose to work in pairs.

The proof-of-concept status of this project dictated that evaluation methods were embedded in all phases. An initial survey assessed development and evaluation participants' formal experience of information literacy, use of ICT and the extent of school library and ICT resources. The development team had considerably more information literacy understanding than the evaluation team, but the evaluation team had undertaken more short courses in ICT. (There are 14 self-selected participants in the evaluation, evenly representing primary and secondary schools.)

Only one library supporting a member of the development team was described as poorly resourced and lacking in reliable computer facilities. However, comments on the staffing of all libraries reflected a highly variable situation. Staff included teachers with library responsibility (TLRs), full time teacher-librarians, librarians and part-time teacher-aides. Primary school responses indicated the lack of library qualifications held by teacher-aides and 'librarians'. In contrast, the secondary schools each had at least one full time qualified librarian. Three school libraries were in the process of being redeveloped or relocated.

The small number of participants and the variability in the contexts in which they work has resulted in a number of parallel case studies rather than a study from which findings can be generalised.

Website Resource Development Process

Content selection and organisation

The overall content of the resource *Teaching for information literacy* was selected to enable users to interact critically with relevant literature in making educational decisions. Users' likely professional development needs were defined in consultation with teachers in the development team.

The resource website makes extensive use of existing information literacy-related materials reflecting the international range of approaches. Some guiding commentary and descriptions of learning activities specifically created to meet the demands of the New Zealand curriculum have been added. Where possible, sites by New Zealand authors were selected as starting points for exploring information literacy, however, the number of relevant sites by peers of the target audience for the resource was small. Although many New Zealand teacher-librarians are known to be modelling excellent practice in their own schools, few are maintaining or contributing to information literacy specific websites.

Where appropriate, an authoring tool suited to classroom teaching (Berger, 1998) was used in constructing a path through websites, drawing attention to information literacy issues and inviting critical examination of underlying assumptions. For example, a learning activity on persuasive language and debating for Year 7 students has an associated web tour on genetic engineering. Commentary focuses on the nature of the information available at each site and issues to raise with students. The same tool has been used to introduce teachers and teacher-librarians to a variety of information literacy models appropriate to students of different ages. This approach has the added advantage of supporting those teachers lacking confidence in use of the World Wide Web, while it introduces an easily applied technological tool.

To provide a 'friendly' framework for organising the material, underlying theoretical examples have been categorised loosely as relating to three overlapping factors: Acting on information, Thinking with information and Feelings centred on the information process.

In accord with the cognitive apprenticeship approach, users of the resource have access to 'expert' thinking. Models and scaffolding are provided for establishing their own evidence-based teaching with regard to teaching for information literacy. Non-hierarchical graphic displays are used throughout the website to illustrate organisation.

Collaboration process

The development team participated in one half-day and two one-day workshops, one of which introduced the project and centred on achieving a common understanding of information literacy concepts in terms of acting, thinking and feeling. A variety of information literacy models and approaches were discussed (e.g. Eisenberg and Berkowitz, 1990; New South Wales, 1993; Kuhlthau, 1993; Stripling and Pitts, 1988; Bruce, 1997; Moore, 2001) and participants were encouraged to introduce and apply other relevant models.

The structure of the workshop reflected the fact that the website development process was defined as an information problem, one that would encompass each of the stages commonly identifiable within models of the information process.

The development team defined the expected information needs of new-comers to the teaching practices that lead to information literacy. From discussion of their own needs in relation to new teaching techniques, it emerged that while websites that provide lesson plans are useful, they leave many contextual and outcome questions unanswered. Topics considered important in developing a practical understanding of information literacy were identified and the potential of applying cognitive apprenticeship to professional development was affirmed by teachers themselves. A writing framework (Wray and Lewis, 1995), consisting of questions based on the identified information needs, was developed to provide a scaffold for the development team in capturing and recording their thinking during planning, teaching and evaluating learning activities.

The second workshop focused on using ICT in teaching for information literacy. The authors were concerned that delivering professional development online would confirm the erroneous message that information literacy is concerned with ICT alone. The second workshop therefore explored the relationship between ICT and information literacy in teaching and learning and the need to refer users of *Teaching for Information Literacy* to print and other resources was emphasised. To take advantage of online resources, developers learned how to use the authoring software, Tramline. Tours created for students were used to model ICT use in teaching.

The final day-long workshop provided explicit support in curriculum design and systematic data collection concerning evidence of student learning outcomes attributable to teaching for information literacy. Participants' curriculum objectives and information literacy objectives for learning activities were discussed and shared, as were approaches to teaching. Templates used in lesson planning included an explicit focus on information literacy. In other words, workshop activities reflected the collaborative planning and evaluation elements of the teacher-librarian's usual role. The difference was that team members (apart from those working in pairs) would not have support in actual teaching, although they could call on colleagues or the authors for observing students' learning. Few

of the development team teachers requested assistance in the classroom and/or library during the weeks that followed, most were confident to proceed independently.

In addition to completion of writing frameworks mentioned above, each participant was interviewed about their expectations for students, the challenges of the project and their information literacy goals for the future. Development team participants had limited, funded release time throughout the project.

The professional development outcomes for participants were evident from workshop feedback sheets, written materials for the website, follow-up interview data and the authors' field notes. In some cases, students' completed work was submitted as evidence of learning outcomes. Analysis of these sources and consideration of evaluation findings to date has provided insights that have implications for teacher-librarians and professional development leaders.

Before discussing the findings, a brief outline of the evaluation phase is provided to complete the context of the proof-of-concept project.

Web Resource Evaluation Process

The evaluation of the project is being conducted over a period of 13 weeks, spanning two school terms. This allows the 14 participants time to study using *Teaching for Information Literacy* in the first term and to plan to apply learning in the second term. An initial two-hour meeting introduced participants to the project and website access. Participants were offered assistance in classroom observations of students' learning if required, but were otherwise to use the resource in a self-directed manner.

The evaluation process has three levels. Each participant has completed a survey concerning the teacher-friendliness of the website. (The website itself was not intended to be highly sophisticated and this information is to be used in improving the navigation and presentation aspects of the site, as well as intellectual access to content.)

Reflection on personal learning and its application to teaching practice is scaffolded by provision of a writing frame similar to that described above. The intention is to encourage evaluation team members to add to the initial database of tested learning activities. However, this group has only the time available to them that would be available to those engaged in self-directed study and such detailed output is unlikely to be produced.

A second writing frame will scaffold reflection on students' learning outcomes.

Written reflections are being supplemented by follow-up interviews using a schedule similar to that used with the development team, but including specific attention to the ways in which evaluators have engaged with the resource personally and used it in professional development with colleagues.

Findings and Discussion

"Teaching for information literacy" and learning outcomes

The international literature provides evidence of benefits related to teaching for information literacy, but the intended audience for the resource is unlikely to use it if it relates only indirectly to local learning communities and conditions. There is some evidence of information skills gains for New Zealand students (e.g. Moore 1998, 2001), but not in settings where a range of self-selected approaches to information literacy were applied in a self directed manner. Development team members had experience of information literacy concepts and indeed, some had been teaching within a resource-based learning and information skills framework for many years. That experience centred largely on single models of "acting on information", thus the task of critically applying one or more models relating to acting, thinking and feelings, as well as revealing personal decision-making, presented a sharp learning curve.

At the end of the first workshop, most participants reported feeling rather overwhelmed by the task of designing, trialing and providing written reflection on teaching for information literacy. However, eleven of the fifteen mentioned excitement, extension of their previous thinking and, true to Kuhlthau's (1991) affective description of the information process, decreasing confusion and greater clarity of purpose emerging alongside increasing confidence. The language used in written feedback reflected adoption of Kuhlthau's approach and the concept of cognitive apprenticeship. One participant, who had been highly vocal and was reported to be inspirational by others, sounded a note of caution however, "Of course, my enthusiasm will be overwhelmed once I'm back at work and busy..."

The obvious implication is that engaging teachers in reflection and creation of materials for others demands both intellectual support and time to think. A clear overview of the purpose, process and product in terms of an information literacy provides a 'cognitive map' and a model for teaching.

Effects on students' learning

In general, developers did not collect learning outcome data as systematically as planned. They did however refer to indicators of student learning that could be monitored by teacher-librarians and colleagues beginning to focus on evidence-based practice.

For example, for children just learning to read, one participant noted that changing the use of non-fiction text from shared narrative to shared, purposeful information seeking, prompted greater engagement with the topic and intensified interest in reading. Evidence emerged spontaneously in parental comments in "home" notebooks and in an increase in requests for teachers to read text around those words children could read. Sentences from year 0 to year 2 children became more complex and communicated a higher level of relevant information. This effect was maintained during two later learning activities and teachers felt challenged to modify the curriculum because of the students' unexpectedly rapid advances.

Other teachers reported that students had learned to:

- "recognise steps in an information literacy model"
- "be selective when searching for information"
- "recognise which questions could be answered using computer resources"
- "distinguish between fact and opinion"
- "make notes from video, computer text and print"
- "rework their own notes/brainstorms into more comprehensive sentences and paragraphs"

- "organise information visually and in text", and
- "think about how they feel about tasks and to recognise that their feeling may well change as they become familiar with the work."

In each case, teachers could substantiate their claims if asked, "How do you know students have learned this?" For example, thinking about feelings was made concrete in a primary school by creation of a chart that drew attention to uncertainty as well as satisfaction with process and product. Each child placed a self-portrait on the continuum, engaging in discussion of feelings and moving it during the course of the learning activity. The teacher reported that a new, trusting relationship had emerged between the children and herself as a result of this focus.

Changes in attitude towards learning and self-esteem were evident in several classes, but the evidence was more anecdotal. For example, five other teachers commented on students' articulation of aspects of the research process and changes in behaviour:

> "you just hear them talking and they say 'oh that was really easy' ... so at least they're verbalising some of what's going on ... certainly it makes them aware of things that they are trying to learn that they don't know" (Intermediate school teacher)

> "I even had one kid try to get in touch with me over the holidays 'cos he was so enthusiastic about it, which is scary from a third former." (Secondary school teacher).

> "It was the fact that more of them got finished, some of the ones that have never handed in anything, never even attempted anything, set tasks, made an effort and even the boy that has ... big issues with his reading and writing ... made an attempt at an article and I think more because everybody else was doing it and nobody wanted to be distracted from it! So in the end he did it in spite of himself." (Secondary school teacher).

This teacher suggested that the information literacy focus allowed the students to separate out "the thinking and the ideas from the skills-based writing" (production skills) and helped to overcome learning barriers they perceived.

Where a focus on information literacy is novel, teacher-librarians and others have the opportunity to provide a better evidential basis for conclusions about learning achievements. Base-line data needs to be collected and the same measures need to be repeated after teaching for information literacy for comparison. Even at this anecdotal level, it was apparent that perceived improvements had a strong motivational effect on development team members. However, this study suggests that methods need to include by-products of the learning activity, not additional tasks for teachers. To ensure that the data *is* collected and analysed systematically, teachers may need classroom assistance in observing how students learn.

Only two teachers did not report positive learning gains for students. In each case, completion of the learning activity had been disrupted by school events that competed for attention. Not surprisingly, these teachers' enthusiasm was not sustained throughout phase one of the project.

Teaching for information literacy does imply that the students will become involved in, and aware of, information processes and that appeared to be the case in the above examples. However, an interview question revealed that there is a difference between

planning to teach for information literacy and *actually doing so*.

During workshops, the development team identified specific information literacy objectives and planned specific activities that would support their achievement. Participants reported that it was easy to focus on information processes and skills, but in retrospect, three recognised that they had relied on "environmental osmosis", rather than explicitly drawing students' attention to aspects of information literacy. Each thought that learning outcomes would have been improved significantly had they taken personal responsibility and scaffolded acting, thinking and/or feeling in relation to information literacy. In support of this view, two others found that the detailed planning for information literacy development resulted in the weaknesses and strengths of students being highlighted in the classroom. What was surprising was that one of the three teachers who had not taught explicitly had been applying an information skills framework for many years, but had not thought of this before!

Given the assumption that information literacy should be part of every learning activity rather than being limited to those occurring when teacher-librarians are present, the implication is that during collaboration or mentoring, one must emphasise a retrospective ability to answer the question, "What did you actually *do* to bring the target information skills and information processes to student attention?" Articulation of a plan to reduce the level of scaffolding would of course be a valid response, providing indication that it was not simply overlooked.

Essential factors in designing online information literacy resources

In electing to use a web-based environment for self-directed professional development both the limitations and the potential of the medium for enhancing learning need consideration. ICT may give people access to information where and when they require it, but the content and formats must be adjusted to take advantage of the characteristics of the medium. The first factor considered here is the difference between curriculum and professional development online resources.

As mentioned previously, development team discussions identified a weakness in existing online curriculum resources in that they usually include databases of lesson plans that, while valued, often leave pedagogical questions unanswered. They contribute to satisfaction of a need for "a quick fix", a lesson to use with year 8 tomorrow, but do not aim to develop underlying theoretical understanding.

In contrast, a *professional development resource* offers opportunities for engaging critically with examples of practice and underlying theoretical frameworks, in ways that support teachers in problem solving and decision making to achieve the best outcome possible for their students. This implies considerable depth of information processing on the part of the users, as opposed to simply marketing what has been found in a new setting. Users of *Teaching for Information Literacy* may initially treat it as curriculum 'fast food', in which case the range of theoretical and practical models might be an overwhelming banquet that challenges digestion.

The demands of producing the resource for other teachers has prompted participants to significant processing. As a secondary teacher said, the development project encouraged her

> "to think more deeply about what I did and to know that there was a lot of theory behind the activities. It was helpful to discuss the ideas and theories with a colleague

before formally planning and teaching the unit."

The two principals and lead teachers working in pairs also highlighted the benefits of having a knowledgeable colleague on hand. For them, the main challenge was the intellectual one of choosing among information literacy models, and being prepared to articulate the basis of that choice. They reported that having a partner was both a support and a critical stimulus. Thus, two important factors influencing learning for the development team were the depth of reflection needed to meet task requirements and the presence of others, be they teacher-librarians or other colleagues, with whom to share new thinking.

While several of the team chose to apply Moore's (2000) and Kuhlthau's (1991) models in combination, others referred to Stripling and Pitts (1988), Gawith (1988) or Eisenberg and Berkowitz (1990). Connections between these information literacy models and a variety of complementary teaching and assessment techniques were also made, thus demonstrating ways of integrating teaching for information literacy with familiar approaches (eg Whitehead, 1996 and Murdoch, 1988).

Interview data suggest a high level of "ownership" of concepts and teaching methods. Four participants, already skilled in aspects of teaching for information literacy, reported that selecting a model was "liberating", as was the opportunity to focus on the whole information process or a small part of it as dictated by teaching purposes. This sense of ownership is revealed in a comment from a primary teacher who admitted to years previously setting aside a model of teaching for information literacy because it did not match her understanding of her students' learning. She now reported being able to create some strategies of her own, "to fiddle with what really is only guidelines, I hadn't really seen that before." The interviewer gained the impression that understanding how and why particular models worked was the well-spring of this teacher's enthusiasm and success in adapting them to her needs. However, engaging with the *Teaching for Information Literacy* resource to a similar extent may be a challenge in a self-directed study situation.

From the evaluation so far, it is clear that the majority of participants find the content of the resource relevant to their needs. Most participants would prefer, however, to see less text and more summaries or bullet points. In view of the development team's comments on thinking, one wonders whether the tight information packages that summaries and bullet points represent could be unwrapped sufficiently for inferential comprehension by new-comers. In other words, is the concept of information literacy one that can be taught using bullet points? Given that many professional workshops, like class lessons, do not require high levels of sustained reading, the use of video clips of resource developers talking about their experiences and working in classrooms might appeal to some users. This does, however, raise some technical issues that suggest that CD-ROM may be a better platform for the resource than the web.

Another factor to consider is that the development team had a clearly identified task that fostered personal learning. Learning activities for users of the resource are less well-defined, as the timeframe for 'completion' and contexts for application are self-determined. Users are encouraged to "adopt, adapt or create learning activities" and to evaluate them in terms of results in their own classroom. There are tools to assist them in this, but there is no mechanism for ensuring it happens. This is likely to undermine the effectiveness of professional development. For example, McCahon (1998) found that tertiary students studying at a distance perceived a need for regular assessment to aid them in completing

courses. Thus where there is no assessment and no academic credit, perseverance with study may fail unless it is intrinsically motivated or supported within the professional development goals of schools as a whole. If the evaluation phase confirms a need for assessment, inclusion of a range of clearly defined authentic learning activities and criteria for self-assessing outcomes could be an option for the future.

The website has been structured to take advantage of the medium by providing links at the point of expected need to summaries of underlying theory, and thence to in-depth material on each approach. The evaluation will indicate whether the adoption of the cognitive apprenticeship approach of revealing expert thinking actually prompts examination of underlying theory.

A further critical development factor is the variety of users' purposes for studying information literacy. The development team were introduced to aspects of theory little by little. The online user with little prior knowledge may be overwhelmed by the possibilities. Learning objectives and a suggested order of study are available to those who prefer a structured course. Alternatively, to model an information literacy assessment method, rubrics were developed for self-evaluation and identification of an appropriate starting point. Personal, teaching and professional development activities may not reflect similar levels of information literacy and ICT confidence, thus a set of three-point rubrics was developed for each arena. These describe competencies in terms of a journey that mirrors transition from dependence on direction or modelling by others, to scaffolded performance, to the prompts that are associated with coaching. Verbal feedback during the introductory sessions with evaluators suggests that the language used in titles and descriptors: Just starting out, Escorted journey and Independent traveller, engendered confidence that this resource was at an appropriate level. The ability of the rubrics to direct users to information appropriate to actual needs will be exposed by the evaluation team.

In sum, factors to be considered in the metamorphosis of information literacy education from workshop to stand-alone online environments centre largely on differences between the cognitive demands of the two contexts. The same information must be packaged differently in each and the delivery medium offers different opportunities for conceptual engagement, interrogation and personal support. Further, learning tasks in workshops have clear boundaries, standards for achievement and timelines, but are less well-defined in a self-directed study environment. The learners' purposes are equally varied in both settings, but while the workshop can be highly responsive, the online environment can only be responsive if the developers were able to predict accurately the users' purposes. The material can certainly be packaged for self-directed learning, but the question remains as to whether the manner in which it is done is effective in promoting information literacy among teachers.

Project involvement as professional development

From the beginning, participants in the development and evaluation teams were expected to derive different benefits from involvement in the proof-of-concept project. Learning gains for teachers using *Teaching for Information Literacy* without the evaluation requirement are expected to be different again.

At the time of writing, it is apparent that the 13 week evaluation period is insufficient in some respects. Many teachers are reporting that finding time for the self-directed study is difficult. There have been numerous disruptions to plans, including competing curriculum development initiatives as well as the introduction of the National Certificate in Educational

Achievement. This latter implies a substantial change in the ways secondary schools assess student performance. These events would disrupt the tenacity of any staff using the resource in a self-directed manner and indeed, confirm the predictions of development team participants. However, there are indications that some, mostly primary school teachers, have engaged effectively with *Teaching for Information Literacy*. For example, one initially printed off material, but once engaged with the topic, found herself able to cope with the technological demands. She checked her understanding of concepts with the authors by email, writing in a style that exuded confidence and enthusiasm. Another is reported to have begun to take on a leadership role in the school, encouraging two others and mapping out future action.

Nine interviewees from the development team reported that in the past, despite previous professional development, inclusion of information literacy concepts had been an incidental undercurrent to achievement of other goals. Only three indicted that they usually included information literacy goals in planning with a further two agreeing, but commenting that the cognitive apprenticeship element made this project different. Overall, this project prompted more thoughtful planning and greater attention to the underlying thinking demanded of students than previous professional development involvements. Surprisingly, for one participant, this resulted in less certainty of outcome:

> "[Previously] I thought I knew what was going to happen, whereas with this, I wasn't sure what was going to happen ... with this it was a little bit more uncharted I guess... I knew where I wanted to head, but had no idea whether we would get there ... the children had the empowerment." (Primary teacher)

From interview data, three factors emerge as important in prompting reflection: having a specific focus, having what one referred to as "good brain space time" and having the opportunity to question and explain thinking. Participating in workshops, sharing ideas and experiencing the enthusiasm facilitated this.

The task of producing written resources was instrumental in prompting learning for developers. However, it is interesting that the writing frame constructed around group-identified information needs, was not used as intended. This appears to be a function of the complexity of the task since in the context of teaching, the needs and responses of students take precedence, not the information needs of users of the resource being created. Although the writing frame was helpful, a collaborative writing context was needed in some cases to ensure that originally identified information needs were met. In other words, those who would be quick to note where students had answered the wrong question or not provided sufficient information, exhibited the same problems themselves. Discussion was needed to assist teachers in moving from a focus on student needs back to professional development needs of their peers. Teacher-librarians, with their greater understanding of information literacy, have an important role in ensuring that effective strategies they and their colleagues originate are used as a professional development resource to create a learning community.

Learning about their students was a key consequence of the project for some developers. One secondary teacher discovered that often students do not know what they need to know at the beginning of a unit "but the key to it is to work backwards from where they have to get to." Another found that her assumptions about student performance were challenged, as they completed some tasks easily and struggled with others she had thought simple. For this teacher, and two others, the enthusiasm generated among "a mediocre" class of students was very exciting.

Many future goals of participants concerned professional development for themselves and others. School-wide information literacy initiatives were prompted in two primary schools and in a secondary school, the whole science department quickly adopted the tested approach for scaffolding students' research. Participants also reported on implications for library and ICT facility development. In one case, a Principal/lead teacher pair expressed a subtle but important shift in perception. Their focus was not to be "so much on the library environment as on the teaching and learning of information literacy". Professional development activities would reflect this.

That a focus on teaching and learning can affect policy was demonstrated in one school too. Restrictions on printing and downloading were challenged in light of the way children actually processed information from the screen. For example, reading tables and remembering the category of information in each column is not easy for year 4 students scrolling through the information. Comprehension and evaluation for relevance to the current purpose demanded printing which was strictly limited.

Overall, it is apparent that most team members adopted and adapted models of information literacy to their teaching with ease. They were able to focus on common elements of models and apply those where a learning activity did not involve the entire process. Two participants did experience some difficulties in addressing information literacy issues however. One was the secondary school teacher who predicted her enthusiasm would wane. It did so when she encountered a low ability class and found that her workshop experience of providing scaffolding for information literacy success was not sufficient. Had a teacher-librarian been working on site with her, the result might have been different. A primary teacher also experienced difficulty and revealed that despite the planning workshop activities, she had not had clear information literacy goals for lesson planning. These two examples suggest that two and a half days exposure to information literacy planning and teaching is insufficient for some, especially where on-going support is lacking.

In sum, the development team already had experience in teaching for information literacy and intensive workshops enabled most to integrate information skills objectives more effectively in both English and Science activities. In contrast, the evaluation team have had little exposure to information literacy concepts and must fit self-directed study around overloaded schedules. However, this is the common challenge to be overcome in all schools and there are indications that, in some circumstances, participation in the evaluation phase of the project is influencing classroom practice.

Teaching for Information Literacy *as a professional development tool*

Regardless of the strengths or shortcomings of *Teaching for Information Literacy*, the factor determining its effectiveness lies in the manner of its use. Given the challenges of self-directed study, there is no guarantee that the opportunities such resources offer will be taken, unless someone takes responsibility for leading development activities. For information literacy, the ideal person is the teacher-librarian, but some education systems leave funding of that role to individual schools and there is a broad knowledge gap among other staff. *Teaching for Information Literacy* tries to bridge that gap and draw attention to the advantages of having a staff member with specific responsibility and skills in teacher-librarianship. It is however impossible to predict the effectiveness of the resource in promoting information literacy beyond the limits of the proof-of-concept trial.

Initial reactions of evaluators, particularly to the need to engage with text, raised questions about expectations for professional development activities that were not apparent in collaborating with development team teachers. What level of sustained reading is expected in self-study situations? Can information literacy really be comprehended on the basis of bullet points? Is there a general expectation that one can "do a workshop" and tick off a checkbox somewhere saying information literacy has been "done"? If this is so, will self-study of "information literacy" be put in the "too hard" box?

Conditions under which *Teaching for Information Literacy* is effective will be indicated by evaluators. For example, in one primary school *Teaching for Information Literacy* is being used to complement application of Capra and Ryan's (1999) *Information Literacy Planning Overview*. At the secondary level, in one school three science teachers are working in association but independently, while in another four are collaborating. In this latter school, each will observe the effects of the same learning activities on different classes. The evaluation interviews and notes will reveal some of the challenges and student learning outcomes for each condition.

However, an alternative approach deliberately draws on the critical success factors of the development phase. In a primary school, a trained teacher-librarian is supporting three new colleagues in their use and application of *Teaching for Information Literacy*. Given the positive experience of a staff member involved in the development of materials, he suggests that at some point the website should become part of the school's intranet. This would allow staff to gradually extended it with lessons developed from the same cognitive apprenticeship frame of reference. In this instance the intranet serves a cluster of five schools and staff at the lead school would then be able to assist those at other schools. The vision and leadership of the teacher-librarian, the TLR and Principal is pivotal.

Given that many schools in New Zealand are too small to support a full-time teacher-librarian, this cluster based model to share professional development resources and support has much potential to promote information literacy nation-wide. However, this would be strengthened if academic and professional credit accrued to participants.

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