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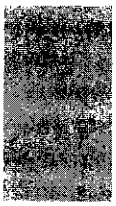

By
Ross J. Todd

Introduction

This chapter provides an overview of the concept of evidence-based practice as it applies to school library programs. It situates the elaboration of this important concept within a discussion of the core beliefs around which an effective school library program is based. It provides an overview of the emergence of the notion of evidence-based practice within the health sciences and social sciences fields, and defines this concept within the profession of school librarianship. Though a recent research study undertaken in 2002-3, it identifies and discusses some of the approaches and strategies to evidence-based practice, as well as presents some of the barriers and enablers.

Core Beliefs: Difference, Intervention and Outcomes

The provision of effective school library services and ensuring the vital future of school libraries rests on three key beliefs which are the mandate and for the professional role of school librarians. The first key belief is that the provision of information and information services makes a DIFFERENCE to the lives of people. If we do not believe that our information services can make a difference to people, then there is no point to their provision. An enormous body of research in librarianship and information science over several decades shows that people are not merely passive recipients of information, empty receptacles into which information can be poured; rather, people engage actively and highly selectively with information that surrounds them, and this engagement with information has some effect – their existing knowledge is changed or transformed in some way. This "effects" or "difference" orientation is faithful to the Greek and Latin roots of the word "information": *in* = within; *formere* = to shape or form; that is, information's effect is inward forming. Conceptualizing information as it is internalized by people, and in terms of the differences or effects that information makes to people puts emphasis on the user of information, and shifts the professional responsibility from a concern about the transmitting and transferring of information - an access and exchange orientation - to

a concern for understanding the human dimensions of how information enables people to build new understandings and move on with their lives.

Second, learning in complex and diverse information environments does not happen by chance, and nor can it be left to chance. The key role of the school librarian centers on pedagogical INTERVENTION that directly impacts on and shapes the quality of student learning through their engagement with information. Explicit, systematic and planned pedagogical intervention must be the distinguishing and observable characteristic of the role of the school librarian. This role revolves around working closely with classroom teachers to design authentic learning experiences and assessments that integrate a range of information and communication abilities needed to meet curriculum objectives, and to provide learning opportunities that encourage students to become discriminating users of information and skilled creators of new knowledge. Underpinning this approach is the belief that people's engagement with information is something that does not happen by chance, and which cannot be left to chance. Information literacy, as the centre piece of the instructional role of the teacher-librarian, is about pedagogical intervention. It is about the systematic and explicit provision of a range of intellectual scaffolds for effective engagement and utilisation of information in all its forms (electronic, print, popular culture) and for constructing sense, understanding and new knowledge. Instructional intervention is about moving beyond chance encounters with information to a more formal systematic and explicit approach through embedding learning scaffolds into the teaching and learning process. The research evidence to date suggests that deliberately planned pedagogical intervention impacts positively on mastery of information scaffolds, mastery of content, and attitudes to self, to learning, and to schooling in general.

This essential role is clearly expressed in the International Federation of Library Associations and Institutions (IFLA) Manifesto for School Libraries (http://www.ifla.org/VII/s11/pubs/manifest.htm). It states that "the school library offers learning services, books and resources that enable all members of the school community to become critical thinkers and effective users of information in all formats and media", and that core school library services center on dimensions such as "supporting and enhancing educational goals as outlined in the school's mission and curriculum", "developing and sustaining in children the habit and enjoyment of reading and learning, and the use of libraries throughout their lives", and "working with students, teachers, administrators and parents to achieve the mission of the school". It is also clearly expressed in *Information Power: Building Partnerships for Learning* (1998): "An effective instructor of students, the library media specialist is knowledgeable about current research on teaching and learning and skilled in applying its findings to a variety of situation--particularly those that call upon students to access, evaluate, and use information from multiple sources in order to learn, to think, and to create and apply new knowledge ... Working with the entire school community, the library media specialist takes a leading role in developing policies, practices, and curricula that guide students to develop the full range of information and communication abilities. Committed to the process of collaboration,

the library media specialist works closely with individual teachers in the critical areas of designing authentic learning tasks and assessments and integrating the information and communication abilities required to meet subject matter standards". Very clearly, pedagogical intervention is at the core of being a school librarian. The importance of this centers on actions, changes and effects – effects in relation to personal, social, intellectual and emotional needs and well being; effects that make a difference to the lives of people. It is about outcomes. Outcomes are the transforming effects of pedagogical intervention.

Third, the role of pedagogical intervention is to bring on TRANSFORMATION. Learning takes place, and the lives of our students are transformed. The knowledge, skills, attitudes and values of learners are shaped and grow though their engagement with the school library and its pedagogical intervention. Learning outcomes matter. Learning outcomes, as the transforming effects of the school librarians' pedagogical (and collaborative) intervention, are the raison d'être for school libraries. *Information Power: Building Partnerships for Learning* (1998) asserts: "In their unique roles as information specialist, teacher, and instructional consultant, library media specialists actively participate in both the planning and implementation of outcomes-based education". AASL's position statement on the role of the school librarian in outcomes-based education establishes that the school librarian "has an essential role in curriculum development. Outcomes-based education is a curriculum practice which establishes clearly defined learner outcomes based on the premise that all students can be successful learners. High expectation outcomes, which are essential for success after graduation, require carefully aligned curriculum, instructional strategies and performance-based assessment. In their unique roles as information specialist, teacher, and instructional consultant, library media specialists actively participate in both the planning and implementation of outcomes-based education".

An outcomes focus of school libraries is also clearly in line with syllabus developments across many countries, where emphasis is given to specifying learning outcomes, establishing measurable indicators for these outcomes, and providing feedback to the learning community of the achievement of these indicators. An outcomes focus is directed towards maximizing learning experiences of students, and where attention is given to identifying, understanding, and coming to terms with the real effects of information literacy interventions.

Lorenzen, Library Instruction Coordinator at Michigan State University defines outcomes-based education as a "method of teaching that focuses on what students can actually do after they are taught. All curriculum and teaching decisions are made based on how best to facilitate the desired outcome. This leads to a planning process in reverse of traditional educational planning. The desired outcome is selected first and the curriculum is created to support the intended outcome" (Lorenzen, 1999:141). Boschee and Baron define outcomes as" future oriented, publicly defined, learner-centered, focused on life skills and contexts; characterized by high expectations of and for all learners, and sources from which all other educational decisions flow" (Boschee & Baron, 1994). Towers posits that "education that is outcome-based is a

learner-centered, results-oriented system founded on the belief that all individuals can learn" (Towers, 1996: 19). Spady and Marshall further define outcomes as "clear, observable demonstrations of student learning that occur after a significant set of learning experiences. ... Typically, these demonstrations, or performances, reflect three things: (1) what the student knows; (2) what the student can actually do with what he or she knows; and (3) the student's confidence and motivation in carrying out the demonstration. A well-defined outcome will have clearly defined content or concepts and be demonstrated through a well-defined process beginning with a directive or request such as 'explain,' 'organize,' or 'produce.' (Spady & Marshall, 1996: 20,21).

Speaking from a constructivist perspective, Wilson (1996:3) claims that learning which emphasizes "meaningful, authentic activities that help the learner to construct understandings and develop skills relevant to problem solving" is the central mission of the school. Hein (1991) emphasizes the idea "that learners construct knowledge for themselves; each learner individually (and socially) constructs meaning as he or she learns. Constructing meaning is learning. There is no other kind". These are powerful words. He goes on to say that "Learning is a personal and social construction of meaning out of the bewildering array of sensations which have no order or stature besides the explanations which we fabricate for them". The instructional interventions of school librarians centering on information literacy are about providing the best context and opportunities for people to make the most of their lives as sense-making, constructive, independent people. The provision of information does not necessarily mean that our learners become informed. Information is the input; through this input, existing knowledge is transformed, and new knowledge - as understanding, meaning, new perspectives, interpretations, innovations – is the outcome. Empowerment, connectivity, engagement, and interactivity define the actions and practices of the school library, and their outcome is knowledge construction: new meanings, new understandings, new perspectives. These new knowings are the heart of outcomes-based education.

Against this backdrop, take a look at this scenario, a cry that is being repeated time and time again in many school libraries around the world:

> I am a school librarian at x. We are confronting a serious situation. Because of the financial crisis in our community, our school board is addressing a proposed substantial budget cut. One of the proposed strategies is to drastically reduce the number of school librarians in the area claiming that school libraries can be effectively run by aides to ensure services are provided and the library remains open. This is despite the fact that I have hundreds of students in the library each day, and teach in the classroom regularly. I have voiced my objection, but I am told that such reductions will not impact on student learning in any way.

The focus on difference, intervention and transformation raises one of the most critical questions facing school libraries today. The question is this: "what differences do my school library and its learning initiatives make to student learning

outcomes? Or, expressing it another way: what differences do my library and its learning initiatives make to student learning? That is, what are the differences, the tangible learning benefits, defined and expressed in ways that lead a school community to say: "we need more of this!" rather than to say "we must cut school library programs".

The strong voice of the profession has to be telling the story of how effective school libraries make a difference to the learning outcomes of students. This is not just other school libraries, but YOUR school library as well. How does your school library make a difference to student learning outcomes? If your local newspaper phones you and says: "We want to do a story on your school library and how it really helps students learn", what would be your response? Could you quickly draw on a portfolio of actions and evidences to build your case? If your school board, in its efforts to distribute a meager budget amidst budget cuts, asked you to give clear summary of how your school library has impacted on the students in your school in order to help its deliberations, what would you say? And how would you know this? If your principal or superintendent asked you to provide an overview of the current research on school libraries and their impact on meeting curriculum standards, technology standards, on independent and lifelong learning, what would be your response? The answer centers on the notion of evidence-based practice. Key stakeholders, educational policy makers and funding agents sometimes do not convincingly see the links between what school librarians espouse and do on a day by day basis, and how that enables the learning outcomes of students.

Evidence-Based Practice

Evidence-based practice is where day-by-day professional work is directed towards demonstrating the tangible impact and outcomes of sound decision making and implementation of organizational goals and objectives. It is an evolving concept in many professions, and for many it represents a new paradigm for professional practice. It emerged in the early 1990s in the fields of Medicine and Health Care Services initially to teach medical students how to independently find, appraise and apply the best evidence, and to apply it to solving clinical problems (O'Rouke, 1998, 1). Sackett defined evidence based medicine as the "conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients. This practice means integrating individual clinical experience with the best available external clinical evidence from systematic research" (Sackett, 1996, 72-3). Implicit in this approach are important concepts such as "duty of care", "informed decision making" and "optimal outcomes", all seen as critical factors in making a difference to the well being and lives of people. At a fundamental level, the early evidence-based practice movement had as its goal the tangible capacity to make a difference to the lives of people, through carefully informed intervention to achieve optimal outcomes - DIFFERENCE, INTERNVENTION, and TRANSFORMATION. Interest in evidence-based practice has grown exponentially since the early 1990s, and today it is acknowledged as an important approach to professional practice in

many disciplines beyond the health care arena, to professional arenas such as education, social work and law.

Central to evidence-based practice is the combining of professional expertise, insight, experience and leadership with the ability to collect, interpret, and integrate valid, important and applicable user-observed and research-derived evidence to ensure significant outcomes (E-BEUK, 2002, 1). More recent explications of this concept establish evidence-based practice as an approach to professional work which argues that policy and practice "should be capable of being justified in terms of sound evidence about the likely effects" (E-BEUK, 2002, 1). Underpinning its role in education is the belief that student learning and student learning outcomes are "too important to allow [them] to be determined by unfounded opinion, whether of politicians, teachers, researchers or anyone else" (E-BEUK, 2002, 1). In other words, duty of care centers around being able to articulate clear learning outcomes, developing processes and strategies to enable these, and articulating the impacts.

In current usage, the concept of evidence-based practice thus has two important dimensions. First, it focuses on the conscientious, explicit and carefully chosen use of current best research evidence in making decisions about the performance of the day-by-day role. Second, evidence-based practice is where day-by-day professional work is directed towards demonstrating the tangible impact and outcomes of sound decision making and implementation of organizational goals and objectives. This latter dimension of evidence-based practice centers on local processes, local actions and local outcomes. A number of important notions are embedded in these dimensions. As a particular approach to practice, it moves beyond intelligent guesswork, clever hunches, and application of individual skills; beyond the anecdotal and tossing of coins so to speak, to establishing a sound research-based framework for decision making. However it is more than getting research into practice to guide day-to-day work. It is also about focusing on the delivery of services based on stated goals and objectives, and systematically demonstrating outcomes and endpoints in tangible ways, and critically reflecting on inputs and processes. It plays an important role in user-centered services to show that the rhetoric about those services is real, that expectations are met, and promised outcomes are actually delivered. In the context of school libraries and school goals and objectives, evidence-based practice means that the day-by-day work of school librarians is directed towards demonstrating the tangible impact and outcomes of services and initiatives in relation to student learning outcomes. It involves critically analyzing the accumulated data and on the basis of indicators, and deriving statements about student learning outcomes. What is important is that such evidence is cumulated, analyzed and synthesized so that a learning outcomes profile of students engaging in library learning initiatives can be constructed.

Build on the Existing Research Evidence

There is much research evidence already established in the school librarianship field that, when coupled with the enormous professional experience and wisdom of school

librarians, can contribute to the sound development of meaningful learning experiences for students and for charting and documenting student learning outcomes. While the research agenda in relation to school libraries has taken shape only within the last twenty or thirty years, a number of summaries and syntheses of this research have been published (Loertscher & Wools, 2002; Callison, 2001, and Haycock, 2003. Within this corpus of research, Callison (2001) identifies important themes such as instructional role, instructional methodologies, intellectual freedom, information search process, students' use of online technologies, program evaluation, and student achievement. Clyde (2002:66) identifies growth from 1991-2000 in the focus on national surveys, information literacy, information technology, principal support, and reading and reading promotion.

Some of the most prominent work comes from the USA. The state-wide studies undertaken by Keith Curry Lance and colleagues have involved hundreds of primary and secondary schools, and include: Colorado I (1993); Alaska (1999); Colorado II (2000); Pennsylvania (2000); New Mexico (2001); Oregon (2001); and Texas (2001). A similar study has been undertaken by Baughman (2000) in Massachusetts. These important studies have sought to empirically establish the relationship of school library programs to student achievement, and support several common findings. These include: professionally trained school librarians do make a difference that affects students' performance on achievement tests; in order for school librarians to make this difference, the support of the principals and teachers is essential, as well as the availability of support staff who can free the librarians from routine tasks to undertake their curriculum role; a dual instructional role of teaching students in facilitating the development of information literacy skills necessary for success in all content areas, and in-service trainers of teachers enabling them to keep abreast of the latest information resources and networked information technology services within and beyond the school library. These are very significant outcomes, and hopefully they should motivate and inspire school librarians to pursue their instructional role, or at least to question and reflect on their own practices if they do not include this strong instructional role.

The longitudinal research of Carol Kuhlthau (1991, 1993, 1994, 1999) provides some of the fundamental building blocks for the collaborative instructional role of the school librarian centering on information literacy development. This research provides evidence of the nature and dynamics of inquiry based learning centering on the information search process, and the nature of information literacy pedagogy. With a strong focus on knowledge construction through effective engagement with a variety of information sources and formats, Kuhlthau's research establishes the cognitive, behavioral and affective dimensions of the search process. Her Information Search Process (ISP) found to occur in seven stages: Initiation, Selection, Exploration, Formulation, Collection, Presentation, and Assessment, also provides a framework for gathering evidence on the learning journey of students as they progress from the time of the initiation of their research task, to the time they complete it and reflect on its outcomes.

Some very rich research on the impact of school libraries and learning is being undertaken by the Council for Museums, Archives and Libraries in Scotland. The research was conducted in secondary schools in Scotland between August 1999 and February 2001, and involved focus groups with teachers and students in selected schools across Scotland. Both groups shared a common perspective that the school library can contribute to learning. The collective perceptions of impact of the school library were: the acquisition of information and wider general knowledge; skills development in the areas of finding and using information, computer technology skills and reading skills; higher achievement in school work; developing a study and reading habit that encouraged independent learning; the ability to use these skills confidently and independently and the ability to transfer these skills across the curriculum and beyond school; and the development of interpersonal and social skills, including working collaboratively (Williams & Wavell, 2001: i). In this study, the school librarians interviewed were aware of what they were trying to achieve, but were not sure whether their objectives were being met. The study identifies some potentially useful tools for school librarians to monitor the impact on learning. These include: student observations of their activities and learning in the school library; discussion with and questioning of students about their work during and at the end of their activities; analysis of submitted work to identify learning gains; discussion with other members of the teaching staff about work, attitudes, and related incidents; and examination of reader records.

There is also considerable amount of smaller research studies that examine more closely the many different dimensions of the relationship between student learning outcomes and school library programs. Collectively these highlight:

- a process inquiry approach, focusing on the systematic and explicit development of students' abilities to connect with, interact with, and utilize information to construct personal understanding, results in improved performance in terms of personal mastery of content. This is shown in examination and assignment grades, and through the mastery of a wide range of particular information skills;

- successful information literacy programs are ones that set clear expectations and manageable objectives, establish realistic timelines, and provide opportunities for students to reflect on their successes and failures with finding and using information;

- the systematic and explicit development of students' abilities to connect with, interact with, and utilize information to construct personal understanding, results in: more positive attitudes to learning; increased active engagement in the learning environment; and more positive perceptions of students themselves as active, constructive learners;

- when students master a range of information processes – technical, critical, evaluative – they are empowered to learn for themselves; there is a strong relationship between an effective school library and personal agency;

- active reading programs encouraged by the school library can foster higher levels of reading, comprehension, vocabulary development, and language skills;

- when there is access to diverse reading materials, more reading is done, and literacy development fostered.

While the concept of school library outcomes, effectiveness and evaluation are not new, historically these has been directed to outputs in the form of statistical information related to resources, expenditure and facilities use – "the found", rather than in terms explicitly stated learning outcomes that identify and demonstrate the tangible power of the school library's contributions to the schools' learning goals and learning outcomes – "the understood". Historically, school libraries have celebrated the found. They have documented, for instance, the number of classes in the library, the number of library items borrowed, the number of students using the library at lunch times, the number of items purchased annually, the number of web searches or hits, the number of resources purchased, even the number of books lost or monies collected in fines! These are measures of pathways to learning, not of learning itself. Celebrating the understood is what evidence-based practice is all about. It is knowing and showing how the school library helps students learn, and the learning outcomes that are enabled. The research documented above clearly shows that learning outcomes can be charted in terms of: information processes and skills, mastery of networked information technology, reading, knowledge outcomes such as mastery of content, development of personal perspectives and viewpoints, independent learning strategies, changed attitudes and values, and gains in self concept and personal agency. These are knowledge and values outcomes, not merely information literacy skills outcomes. Evidence-based practice is about ensuring that daily efforts put some focus on not just gathering meaningful and systematic evidence on learning outcomes that matter to the school and its support community, and critically reflecting on this evidence to shape a dynamic school library program that clearly impacts on student learning outcomes. This evidence-centered cycle of development and reflection will clearly convey that learning outcomes are continuing to improve, and inform the process of their continued improvement.

From Research to Evidence-Based Practice

What are school librarians doing in relation to evidence-based practice? How do school librarians get underway with evidence-based practice? These questions are increasingly posed in the profession (Todd, 2001, 2002a, 2002b). One of the first ever studies of school librarians and evidence-based practice was undertaken in 2002 in Australia (Todd, 2003a, b). As a prelude to the focus of this book on the practice

of school library evidence-based practice, this study will be briefly elaborated. This study, sought to:

(a) provide more comprehensive and detailed evidence of how the teaching and learning focus of the school library improves student learning outcomes – what these outcomes actually are, and how school librarians can more effectively work towards these;

(b) provide school librarians with a range of strategies, initiatives and measurement techniques that will enable them to carefully and effectively chart and document the tangible learning outcomes of their teaching-learning activities;

(c) enable school librarians to be able to build a portfolio of local school evidence of the importance and value of the school library to their school communities; and,

(d) identify barriers of evidence-based practice.

In this particular study, a survey instrument based on a Critical Incident approach was used to collect the data. The Critical Incident Technique, based on work of J. C. Flanagan (1954) centers on the collection of detailed reports of incidents / discreet experiences in which individuals do something in achieving an articulated purpose. Based on this technique, data are derived chiefly from in-depth analytical description of an "intact cultural scene", involving the gathering of facts before, during and after the event or experience. Typically this approach uses an open-ended questionnaire, gathering retrospective data, and where questions typically help respondents recall events or steps in the events. The questionnaire collected data on school background, and to identify evidence-based practice, respondents were asked to describe one of the most recent curriculum units that she or he had planned and taught collaboratively with classroom teacher(s). The focus was to get an indication of what learning outcomes were achieved, and how respondents were able to identify these. Unit details included: Year/grade; Syllabus, Number and gender of students; their average age; brief description of students (eg. mixed ability, streamed, gifted and talented); Title of unit; Brief description of the unit (eg. time span of unit, number of sessions, lesson length); Syllabus outcomes addressed by unit (be specific); and Related information skills outcomes of unit. To document learning outcomes and their evidence, respondents were asked to identify:

1. The learning achieved in relation to the planned outcomes;

2. The techniques/measures/strategies/checklists/assessments used to identify that learning had taken place;

3. Learning outcomes in relation to information skills;

4. The techniques/measures/strategies/checklists/assessments used to identify that learning had taken place;

5. Any approaches you used to make before-and-after comparisons with the class.

6. Some other significant learning gains in addition to the planned outcomes, such as attitudes to learning, attitudes to school, self-esteem, developing independence of learning, engagement in learning, increased commitment by teachers to collaborative planning and teaching, informed future planning;

7. The techniques / measures / strategies / checklists / assessments that you used to identify these other outcomes;

8. The barriers experienced in relation to evidence-based practice, and how these barriers might be overcome; and

9. Additional approaches, other than collaborative teaching initiatives to demonstrating the impact of school librarians on learning outcomes.

The survey was distributed in the Australian journal *Scan* in May 2002, which has a circulation of over 3000. 11 responses to this survey were received. These were very rich and detailed responses. A number of reasons could be posited for the low response number. The questionnaire required considerable thought and time to complete, and the busy daily agendas of many school librarians may not have provided the time to complete it, or they may not have considered that the focus and/or outcomes of the study were important, and were unwilling accordingly to invest the time to complete it. It is also possible too that school librarians may not actually engage in evidence-based practice, and therefore have had little to contribute to the study. The responses came from 2 elementary schools and 9 high schools. What follows is a brief summary of some of the findings.

Findings: Learning Outcomes

The school librarians in this study could clearly articulate some curriculum and information literacy outcomes as a result of their instructional and service intervention. The information literacy outcomes ranged across the broad spectrum of skills in relation to defining, locating, selecting, organizing, presenting and assessing information. These were articulated quite concretely. For example, outcomes were expressed in terms students being able to:

- explore general / background information sources to increase familiarity with the topic;

- distinguish between primary and secondary sources;

- construct a search strategy using the appropriate commands for the various retrieval systems chosen;
- use various search systems to retrieve information in a variety of formats;
- record all the appropriate citation information for later use;
- read the text and identify and select the main ideas;
- compare information from different sources to evaluate accuracy, authority, recency and bias;
- show mastery of a particular presentation software;
- construct of concept map of the dimensions of a topic;
- draw conclusions or state personal position based upon information gathered.

Findings: Evidence-Based Strategies

The strategies for documenting evidence of learning outcomes fell into two broad categories: formal, structured records of evidence, and informal observational approaches. The formal structured approaches used to gather evidence were the use of checklists, rubrics, and formal feedback strategies. Each of these is briefly described.

(a) Checklists. A range of simple checklist strategies, where both students and school librarians provided checklist or ratings of perceived levels of skills and / or knowledge acquisition, mainly after the instructional period, and in four cases, both before and after so that comparisons of differences, changes in levels of knowledge and skills could be documented. These checklists were in relation to levels of mastery of information literacy competencies such as ability to identify main ideas, make notes, use different formats of information, understanding the differences in the different purposes of sources; competencies in relation to information technology, such as skills in searching, evaluating information on web sites, and using a range of presentation software such as Powerpoint and spreadsheets.

When checklists were used, some attention was given to deriving general statements about outcomes achieved on the basis of these comparisons. School librarians recognized this as an important process in evidence-based practice. This involved critically analyzing the accumulated data and, on the basis of evidence and goals of the intervention, deriving some general statements about student learning outcomes. Some outcomes statements that respondents were able to provide through use of checklists were:

"More than 80 % of the class showed improvement in their ability to effectively judge the quality of web sites after the sequence of lessons to develop this awareness";
"Virtually all of the students recorded citations accurately in their essays following the input on bibliographic citations";
"When we analyzed the essays submitted at the end, and following through some of the web sites that the students had cited, we saw a dramatic decrease in the level of plagiarism. We had explicitly built this issue into our teaching, and discussed it with the students, both in terms of being responsible and ethical users of information, and teaching them some analytical strategies to express ideas in their own words. We were thrilled, and discussed these findings and processes in our recent staff meeting"
"We ran a quick survey at the beginning of the unit to see how students were thinking about the unit. They were not terribly motivated or interested, and said so in their surveys. In our teaching of the unit, we worked really hard to build interest and motivation, and when we ran the little survey at the end, we had almost all of the students indicating how much fun the unit was, and how much they learned. It was hard work creating motivational activities, but worth it. We not only felt we had achieved something, we had some proof"

(b) Rubric strategies. Some school librarians indicated that they used rubric strategies where students' performance in final products were scaled according to a set of criteria that clearly defined what range of acceptable to unacceptable performances and/or information products look like. For example, a semester paper was based on and scaled according to Gordon's rubric (2001) for evaluating the research process. This rubric focused on a number of dimensions: Planning; Meeting deadlines; Organization; Working with the teacher-librarian; and Problem solving. The students scaled their performance in terms of: Excellent, Competent, Making some Progress, and Not yet competent, and were asked to write personal comments as well as the rating. In the feedback to the students, the school librarian also provided ratings and comments.

(c) Formal feedback strategies. One school librarian used a simple feedback survey every term on what the library does "best" and "least" to help students with their school work. This is a general survey made available to the students which asks two questions: *"During this term, how did the library best help you learn?"* And *"During this term, how could the library help you learn better"?* The school librarian reported that after one intensive collaborative with all the Year 8 teachers on more effectively using the internet for Science, the term survey clearly showed that the students believed that they had quite dramatically improved their web searching skills, not just in terms of finding more pertinent resources, but also in terms of meeting assignment deadlines on time, and feeling more comfortable about using accurate web sites for their research. Each term, the school librarian presented the results of this survey at staff meetings, and commented: *"I do not let an opportunity go by when I let staff know about what the library contributes to learning. I always quote some of the things the students have said to illustrate my points. The school*

has got the idea that what I am on about in helping kids learn. The key thing in my view is to have something to say that goes beyond gut reaction. The student survey does just that. ... I believe they listen a great deal to this". According to this school librarian, the feedback is also used to make decisions on improving services, designing information literacy classes, and planning the whole library team's work agenda.

(d) Informal Observational Approches. The use of informal observational approaches was more predominant than the use of planned strategies for recoding evidence. All school librarians indicated that their observations and in a few cases, observations of teachers were the basis for making statements about learning outcomes. These were based on discussions and observations during the teaching time, and on review of student products. The approaches were *"gut reactions"*, drawing on professional expertise and experience to identify outcomes. School librarians said:

"I rely on my long experience to work out what is happening with the students";
"I watch the students casually though fairly consistently while they work in the library";
"I get ideas from the kids of questions students ask when they are in the library";
"Often when I am chatting to a student doing a major assessment item, I will ask them about what they have learned in the library".
"I have discussions with the teachers about what is going on"
"I take note of student behaviors while they are in the library"

These more informal approaches to gathering evidence enabled the school librarians to make some statements about learning outcomes. For example:

"The class teacher noted an improvement"
"Students completed learning journals"
"Students were certainly engaged in their learning"
"Students showed quite a lot of independence"
"Students worked well in groups"
"I saw increases in student motivation"
"Students displayed all or nearly all of the information skills"
"Students initiated email interaction and to me this showed engagement with the topic"
"I saw evidence of improved or extended technical vocabulary"
"The technology was used beyond my expectation"

What is particularly noticeable with the statements of outcomes based on casual observations and discussions is their lack of specificity and precision. Concrete outcomes were not clearly articulated. This is consistent with the finding of Williams & Wavell (2001, iii) in their study of secondary schools in Scotland. They found that

techniques such as observing students at work, questioning students about their work, examining work in progress, examining reader records, and discussions with teachers were typical techniques to monitor impact of learning. However, they also concluded that while the librarians were aware of what they wanted to achieve, they were not able to clearly and precisely articulate these as learning outcomes.

(e) Other Approches. Two further approaches were provided in the study. One school librarian examined the results of Year 7 English Language and Literacy Assessment tests, and sought to identify how one class group involved in an intensive reading enrichment program and literature discussions, compared to other students in the school. The school librarian noted that there appeared to be stronger test scores for this group of students. Another school librarian compared borrowing records of students during a collaboratively implemented science unit in the lower high school, and found that those students with the highest number of items borrowed for the unit also achieved the highest scores on the test at the conclusion of the unit. While it is difficult to establish strongly stated conclusions, such patterns show promising school library-outcomes relationships worthy of richer documentation.

Findings: Value of Evidence-Based Practice

Despite concerns and fears expressed about the intentions, processes and competencies in relation to undertaking evidence-based practice, school librarians identified 6 key benefits of evidence-based practice.

(1) Visibility of the school library's contribution to learning. Evidence-based practice was seen to provide evidence at the local school level that library initiatives make a visible contribution to learning, and that administrators, teachers and parents can see the real impacts:

> *"My boss actually talks about specific outcomes I have identified. He's proud of what we have achieved, and it's not because I tell him how important our school library is, it is because I actually show him the evidence. He shares this with the parents in the school newsletter"*

(2) Funding accountability. Evidence-based practice is seen to play a role in convincing administrators and community funding agencies that the money invested in the school library is worth it, as well as ensuring continued funding:

> *"Money in my school seems to flow easiest to those happenings / teachers in the school where students achieve success, and it is clearly seen ... anything which show learning and success and which the school celebrates. I've learned over the last year or so that if I want to jump on the money bandwagon, I show the achievements of my library initiatives. This is usually outcomes related to information literacy lessons, or my literature enrichment activities".*

(3) <u>The school librarian's role is learning centered</u>. Evidence-based practice demonstrates the school librarian's commitment to learning outcomes, with library goals, library actions and library outcomes having a clear student learning focus:

> *"When I tell the staff or parents about what the library is doing, I always try to tell about what we have achieved for the students, not from the library's perspective, but from the students. ... In the parent nights where teachers meet with parents to discuss students' grades, I always set up a display for parents to show our various projects and what the students learn through it. I get lots of positive feedback that recognizes our involvement in students' learning"*
> and
> *"My colleagues around the school see and hear me involved in learning. I'm not seen as the circulation police or fines controller, or the shusher or the stamper, I'm seen and valued as a teacher".*

(4) <u>Planning for instruction</u>. Evidence-based practice is seen to help school librarians plan more effective instructional interventions and information services:

> *"the feedback from students, and results of analysis of what students have learned or not learned helps me plan my teaching to be more effective, it identifies gaps in students' information literacy skills so I can make it better for them. ... Sometimes you can put a lot of effort into something, and then find out it didn't really achieve anything."*
> *"The evidence helps me work out what is really important for me to do each day, rather than concentrating on functional or management things, which sometimes take on a magnitude of importance well beyond the time and energy given to them".*

(5) <u>Job Satisfaction</u>. Some school librarians indicated that evidence-based practice confirms that their profession work is making a difference, and this in turn provides satisfaction and encouragement.

> *"When I can put my finger on what the students have achieved because of my work, I feel terrific, and get more enthused about being a teacher-librarian. I feel as if I am making a valuable contribution to the kids' learning, because I can see some actual results".*
> *"I get a real buzz each day because I know I make a difference to these kids at school"*

(6) <u>Moving beyond advocacy.</u> A number of school librarians indicated that evidence-based practice adds certainty to their role, by moving beyond anecdotal, guess work, hunches, advocacy, and the touting of others' research findings.

> *"I don't have to get on my library soap box and try and convince people about the value of the library. I make a habit of sharing with them details about every set of classroom units I do, and try and sum up how the students have benefited, using examples from their work. I don't think that advocacy without evidence goes far"*

Clearly, the school librarians in this study saw real benefits to their students and to themselves by engaging in evidence-based practice. They saw that it provides evidence at local school level that the school library makes a tangible difference to student learning outcomes, and de-emphasizes intuition, the anecdotal, and hasty decision making. In essence, evidence-based practice is effectiveness-lead: it targets time, energies, scarce resources, and scarce staffing in improving and demonstrating effectiveness.

Findings: Evidence-Based Practice Issues

Five key issues in relation to evidence-based practice were identified by the respondents.

(1) **Accountability fears.** Some school librarians felt that having to "*prove your worth*" through pressure to demonstrate learning outcomes and evidence of impact would be detrimental to the profession:

> *"It would encourage more anxiety and paranoia at a time when teacher-librarians' workloads are already full to overflowing"*
> "*evidence-based practice might be used as a basis for getting rid of us. It's something we haven't done, or had had to do, and because we now are not able to produce anything that focuses on what learning outcomes we bring on, we may be assumed to be ineffective when accountability demands are made".*

There are some clear messages here. School librarians are not immune from any kind of accountability for processes and outcomes, particularly at a time when calls for educational accountability are increasing. Accountability is all about taking responsibility for students' performance of all types of educational outcomes. Evidence-based practice is unquestioningly accountable practice. It is a systematic method to assure all members of the school community, policymakers, funding authorities, and the public that schools and school libraries are producing desired results. However, practice that focuses on elements such as goals, indicators or progress toward meeting those goals, measures, analysis of data, reporting procedures, and outcomes is not just evidence-based practice, in most professions it is *best practice.* It is not some new form of teacher-librarianship where the familiar current practice is discarded, where professional instincts and experience are devalued. In linking actions, goals, outcomes and evidence, evidence-based practice enhances day-to-day work by taking uncertainty and guess work out of the role, its value, position, action and its public perception. This is a powerful dimension of professional credibility and authority. Evidence-based practice is about building certainty and authority, not eroding it.

(2) Competency requirements. This issue centers around the assumed competencies needed to undertake evidence-based practice. As some school librarians said:

"It seems as if I need to be a statistician to do this. I just do not have these skills, and I disliked research methods at university".
"We have to become researchers in order to undertake evidence-based practice, or at least have a mastery of statistics. Isn't that what the universities should be doing?"

Some school librarians may feel that they have to become researchers in order to undertake evidence-based practice. Evidence-based practice does demand certain precision in identifying learning outcomes, establishing indicators of these, and skills in analyzing and synthesizing the evidence to establish specific achievements in learning outcomes. However, the intellectual skills required to undertake evidence based practice are not formal quantitative and qualitative research methodologies and complex statistical analyses. Rather, they are the skills of examining student learning goals and needs, selecting appropriate learning outcomes, identifying desired indicators of these outcomes, establishing systematic approaches to locating and gathering the evidence of achieving learning outcomes, analyzing, organizing and synthesizing the outcomes, presenting and celebrating the outcomes in the school community, and reflecting on how this continues to inform the ongoing teaching and learning process. Evidence based practice is about identifying, exploring, locating, focusing, selecting, organizing, presenting information. The information process that has guided the information literacy initiatives of school libraries and which has been the espoused educational platform for almost two decades is the very process of evidence-based practice.

The information process does not claim that school librarians become formal hard-core researchers in the academic sense, but does ask that they be researchers, like students, guided by the information process. It does mean that reflective practices, guided by the available formal academic research, give some careful attention to learner assessment and instructional evaluation, to documenting, analyzing and synthesizing the outcomes of collaborative teaching-learning initiatives, and how these outcomes support and enhance the learning goals of the school. What is important is that evidence is gathered in a systematic way that highlights the learning gains, both in terms of a range of information and critical literacies, but also how developing these scaffolds enables more effective learning of curriculum content and how this contributes to the development of new knowledge. It can also highlight how the library plays a role in shaping attitudes and values, in contributing to the development of self-concept, and in contributing to a more effective learning environment. And apart from the tangible outcomes that demonstrate the central role of the school library in learning, evidence-based practice as best practice provides a wonderful opportunity for school librarians to model the information process to their teaching colleagues.

(3) <u>Time pressures</u>. Some school librarians raised the issue of the time commitment needed to undertake evidence-based practice. One said: *"I see the value of evidence-based practice, and have tried to implement measures. It takes time, and I feel the pressure when I have so many other things to do".* This tension between belief

versus action was also reflected in the comment: *"I want to do it, but when do I find the time to do it?"* and *"I do not have enough time to do my current job as it is, let alone adding more, even though I would like to do this"*. One other librarian claimed: *"In reality a lot of evidence is intuitive and the time element squeezes out the more formal measures"*. Compounding the time pressure was the situation of school librarians scheduled to provide classroom teachers with release from face-to-face teaching: *"I need to be free from providing release from teaching for classroom teachers so that I have time to undertake this. This is a barrier to making real collaboration happen and working together to identify the outcomes"*.

School librarians may feel the time pressure of evidence-based practice. It should not, however, be viewed as an add-on, another thing to do on top of busy schedules. As already stated, evidence-based practice is about best practice and reflective practice, where the process of planning, action, feedback and reflection contributes to the cyclic process of purposeful decision making and action, and renewal and development. It gives emphasis to identifying effective actions, putting value on appropriate actions rather than actions for the sake of doing something. It is sharper and clearer practice – more focused and productive.

(4) Evidence-based practice is contrary to lifelong learning. This issue was raised by one school librarian. It was posited that *"EBP is unrealistic, given the goal of lifelong learning that information literacy is all about. How can one realistically measure this outcome, especially when it may not be evident for many years?"* Lifelong learning is not some distant endpoint, rather, it is a process made up of multiple moments in time. Providing learners with a clear understanding of how they in the formative years of their lives, are actually learning in an information rich environment, particularly in terms of information literacy outcomes and indicators, providing them with feedback on their mastery, enabling them to refine their learning processes are fundamental to the work of school librarians. If indeed the notion of lifelong learning is some elusive rhetoric, and we are unable to provide substance as to how we might enable our students to become lifelong learns with explicit feedback and input along the way, then we are doing considerable disservice to our students. The rhetoric of lifelong learning must not become the scapegoat for not engaging in evidence based practice.

(5) Lack of knowledge and skills to undertake evidence-based practice. This concern was expressed by all school librarians:

"I lack the skills in devising accurate assessment tools";
"I need lots of practice with this to develop my skills";
"It would be nice to have access to some recent criterion-referenced or standardized tests to assess my students' standards and progress. This is really needed if we are to engage in evidence-based practice";
"I feel completely unqualified to accumulate sufficient or accurate evidence about what I do, or hope I am doing";
"I need to learn to write more performance descriptors";

It would be really helpful to have some school-wide information literacy tests";
"There are limited training opportunities available to develop new skills, initiatives or approaches to implementing EBP".

These comments highlight real needs if the profession is to engage in evidence-based practice, and identify a range of specific themes around which ongoing professional development can be structured. There are implications for teacher librarianship education, particularly in developing both a rationale for, and skills in carrying out evidence based practice. There is also golden opportunity for professional associations to provide the appropriate professional development to its members.

Moving Forward

Evidence-based practice is about opportunities and options. Some school librarians may say "why bother, it's futile", believing that such calls for evidence-based practice represent faddism or short-lived hype; that it may not do any good. This is a defeatist attitude. The more confrontational question is asking: "what are the potential implications and outcomes of not engaging in evidence-based practice?" One school librarian make this thoughtful comment: *"No change in the current situation for school librarians will be forthcoming until they can successfully demonstrate and document evidence of their support, success and impact on children's literacy, with all its ramifications".* If the answer to this question is a dismal perspective on the status quo, and if there is no personal motivation to engage in professional initiatives that might enable the profession to construct as preferred future, then the issue is a personal one that poses the question: *"Is my role as a school librarian a liability or a liberator of the profession"?* If we are not prepared to commit ourselves to initiatives that have the potential to create a bright future for the profession, then we seriously need to consider why we are in it, and what in fact we might be better off doing. Retreating to a position of no hope is retreating to a short future for the profession.

At this time in our profession, it is not enough to just say that the library is important, nor is it enough to say that there is plenty of evidence out there – why should I waste valuable library time getting mine? Many school administrators, school boards and parent communities are looking for tangible, documented evidence of the impact of their library on student learning, and use this as a basis for providing more library funding, technology, staffing. In a recent study published in School Library Journal (Lau, 2002:53) which explored Principal's perceptions of school librarians, it was found that only 37% of principals said that the school librarian made them familiar with current research of library programs and student achievement, and only 35% of principals were made familiar with current research on reading development. Principals and administrators want to know about student outcomes. The opportunity to identify local outcomes and local successes and to share these with school stakeholders is knocking. Evidence based practice is about having the rich, diverse and convincing evidence that demonstrates that the library is a vital part of the learning fabric of the school – that it is integral, rather than peripheral. Such evidence

can also be the basis for richer, meaningful discussion between stakeholders – students, parents, and community. Evidence based practice provides school librarians with a compelling opportunity to "seize the day". It is about empowering both the learner and empowering the profession. It is about improving learning effectiveness and demonstrating effectiveness. It is an enormous challenge, and one that will contribute to the longevity and vitality of the profession for years to come.

References

American Library Association and Association for Educational Communications and Technology. (1998). Information Power: Building Partnerships for Learning.

Baughman, J. C. 'School libraries and MCAS Scores. A paper presented at a symposium sponsored by the Graduate School of Library and Information Science, Simmons College, Boston, Massachusetts', October 26, 2000. Available online at: http://artemis.simmons.edu/~baughman/mcas-school libraries/Baughman%20Paper.pdf

Boschee, F. & Baron, M. (1994). OBE: Some answers for the uninitiated. *Clearing House*, 67 (March/April), 193-96.

Callison, D. (2001). The Twentieth-Century school library media research record. In: A. Kent 7 C. Hall (Eds). Encyclopedia of Library and Information Science Vol 71 Supplement 34. New York: Marcel Dekker, 339-369.

Clyde, L. (2002). Developing the knowledge base of the profession: Research in school librarianship. In: D. Singh et al (Eds.). School libraries for a knowledge society. Proceedings of the 31st Annual Conference of the International Association of School Librarianship and the Sixth International Forum on Research in School Librarianship (pp. 55-75). Seattle: International Association of School Librarianship, 55 – 75.

E-BEUK: Evidence-Based Education, UK. (2002) Durham University's Curriculum, Evaluation and Management Centre. Available at: http://cem.dur.ac.uk/ebeuk/manifesto.htm

Flanagan, J. (1954). The Critical Incident Technique. Psychological Bulletin (July), 51(4), 327-358.

Gordon, C. (2000). Information Literacy in Action. Saxmundham, UK: John Catt Educational

Haycock, K. (2003). The crisis in Canada's school libraries: The case for reform and reinvestment. Toronto: Association of Canadian Publishers. Available at: http://www.peopleforeducation.com/librarycoalition/Report03.pdf

Hein, G. (1991). Constructivist learning theory. Paper presented at the CECA (International Committee of Museum Educators) Conference in Jerusalem, Israel, 15-22 October 1991. Institute for Inquiry. Available at: http://www.exploratorium.edu/IFI/resources/constructivistlearning.html

Kuhlthau, C. Inside the search process: information seeking from the user's perspective, Journal of the American Society of Information Science 42(5), 1991, pp 361-371.

Kuhlthau, C. (1993). Seeking meaning: a process approach to library and information services. Ablex.

Kuhlthau, C. (1994). Teaching the library research process. Scarecrow Press.

Kuhlthau, C. (1999). Student learning in the library: what Library Power librarians say, School Libraries WorldWide 5(2), 80-96.

Lance, K. C. (1994). The impact of school library media centers on academic achievement, School Library Media Quarterly 22(3). Available at: SLMR © 1999 ALA [website]:http://www.ala.org/aasl/SLMR/slmr_resources/select_lance.html

Lance K. C., Hamilton-Pennell, C. & Rodney M. J. (2000). How school librarians help kids achieve standards. Hi Willow Research and Publishing.

Lance K. C., Hamilton-Pennell, C. & Rodney M. J. (1999). Information empowered: the school librarian as an agent of academic achievement in Alaska schools. Alaska State Library. A summary of the Alaska study is available online at: http://www.educ.state.ak.us/lam/library/dev/infoemp.html

Lance K. C., Welborn L. & Hamilton-Pennell, C. (1992). The impact of library media centers on academic achievement. Colorado Department of Education.

Lance, K. C. (2001). Proof of the power: Recent research on the impact of school library media programs on the academic achievement of U.S. public school students. ERIC Digest. EDO-IR-2001-05 October 2001. Syracuse, N.Y.: ERIC Clearinghouse on Information & Technology.

Lau, D. (2002). What does you boss think about you? School Library Journal, September, 52-55

Lorenzen, M. (1999). "Using Outcome-Based Education in the Planning and Teaching of New Information Technologies." In *Information Technology Planning.* Edited by Lori A. Goetsch. Binghamton, NY: Haworth Press, Inc, 141-152

Loertscher, D., & Woolls, B. (2002). Information literacy research: a review of the research: a guide for practitioners and researchers. 2nd ed. Hi Willow Research and Publishing, 2002.

O'Rouke, A. (1998). An introduction to evidence-based practice. Available at: http://www.shef.ac.uk/uni/projects/wrp/sem3.html

Spady, W. and Marshall, K. (1994). Light, not heat, on OBE. The American School Board Journal, 181 (November), 29-33.

Todd, R. (2001). Transitions for preferred futures of school libraries: knowledge space, not information place; connections, not collections; actions, not positions; evidence, not advocacy. Keynote address: International Association of School Libraries (IASL) Conference, Auckland, New Zealand, 2001. Keynote paper, IASL conference 2001 virtual session: paper from Ross Todd, available online at IASL: school libraries online [website]: http://www.iasl-slo.org/virtualpaper2001.html

Todd, R. (2002). Evidence-based practice I: The sustainable future for teacher-librarians. Scan, 21(1), 30-37.

Todd, R. (2002). Evidence based practice II: Getting into the action. Scan, 21(2), 2002, 34-41.
odd, R. (2003a). Evidence-based practice III: Difference, Intervention and Transformation Scan. 22(4) In press

Todd, R. (2003b). LMC Library Media Connection. 22(1), August/September.

Todd, R. (2003c). Learning in the Information Age School: Opportunities, Outcomes and Options. Keynote address: International Association of School Libraries (IASL) Conference, Durban, South Africa, 2003. Keynote paper, IASL conference 2003 virtual session: paper from Ross Todd, available online at IASL: school libraries online [website]: http://www.iasl-slo.org/conference2003-virtualpap.html

Towers, J.M. (1996). An elementary school principal's experience with implementing an outcome- based curriculum. Catalyst for Change, 25 (Winter), 19-23.

Williams, D & Wavell, C. (2001). The impact of the school library resource centre on learning. Library and Information Commission Research Report 112. Aberdeen: The Robert Gordon University.

Wilson, B. (1997). The postmodern paradigm. In C. R. Dills and A. Romiszowski (Eds.), Instructional development paradigms. Englewood Cliffs NJ: Educational Technology Publications. Also available at: http://www.cudenver.edu/~bwilson/postmodern.html

Evidence-Based Practice: Findings of Australian Study 2002-2003

A PowerPoint Presentation

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School Libraries: 3 Core Beliefs

- Information makes a difference to people.
- Making a difference does not happen by chance: Teaching-learning role is the central dimension of the professional role of school librarians, in collaboration with classroom teachers and students PEDAGOGICAL INTERVENTION
- Learning outcomes matter: belief that all students can learn, and develop new understandings through the school **library, and demonstrate outcomes** TRANSFORMATION

Evidence-based Practice

- Evolving concept in many professions and new paradigm for professional practice
- 1990s: Medicine and Health Care - to teach medical students how to independently find, appraise and apply the best evidence, and to apply it to solving clinical problems

Evidence-Based Practice

- "Conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients. This practice means integrating individual clinical experience with the best available clinical evidence from systematic research" (Sackett, 1996, 72-3)
- Practice is justified in terms of sound evidence about the likely effects
- Implicit are key concepts: "duty of care", informed decision making", "optimal outcomes"

Two key dimensions of EBP in current usage

- Conscientious, explicit and judicious use of current best research findings in making decisions about the performance of the day-to-day role
- Where day-to-day professional work is directed towards demonstrating the tangible impacts and outcomes of sound decision making and implementation of organizational goals and objectives.
- Local actions, local processes, and local, immediate outcomes

Quote:

I am a school librarian at x. We are confronting a serious situation. Because of the financial crisis in our community, our school board is addressing a proposed substantial budget cut. One of the proposed strategies is to drastically reduce the number of school librarians in the area claiming that school libraries can be effectively run by aides to ensure services are provided and the library remains open. This is despite the fact that I have hundreds of students in the library each day, and teach in the classroom regularly. I have voiced my objection, but I am told that such reductions will not impact on student learning in any way.

EBP & School Library Context

- Identifying indicators and outcomes
- Systematically demonstrating outcomes and endpoints in tangible ways, and critically reflecting on inputs and processes
- Establishing a sound research-based framework for decision making
- Focusing on delivery of services based on stated goals and objectives

Research Problem
School Libraries And Student Learning Outcomes:
What Is Your Evidence, And How Do You Get It?

"No change in the current situation for school librarians will be forthcoming until they can successfully demonstrate and document evidence of their support, success and impact on children's literacy, with all its ramifications".

Research Objectives

1) Provide more comprehensive and detailed evidence of how the teaching and learning focus of the school library improves student learning outcomes – what these outcomes actually are, and how school librarians can more effectively work towards these.
2) Provide school librarians with a range of strategies that will enable them to chart and document learning outcomes of their teaching-learning activities.
3) Enable school librarians to be able to build a portfolio of local school evidence of the importance and value of the school library to their school communities.
4) To identify barriers and enablers to EBP

Methodology

- Critical Incident Technique (J. C. Flanagan)
- Collection of detailed reports of incidents / discreet experiences in which individuals do something in achieving an articulated purpose

- Data derived chiefly from in-depth analytical description of an "intact cultural scene"
- Gathering of facts before, during and after the event
- Typically uses an open-ended questionnaire, gathering retrospective data
- Questions typically help respondents recall events or steps in the events without interfering with the quality of the recall

Features / Issues of Critical Incident Techniques

- Data are centered around real events
- Tasks performed by real people
- Participants are located in normal working environments
- Data are captured in normal task situations, not contrived lab settings
- Storytelling process to deconstruct movement / steps through the incident
- Prompted questions to ensure uniform data
- Provides opportunities for follow-up
- Reliance on memory → focus on recent events
- Focus on part of a whole → richer experiences may be overlooked

Questionnaire

- School Background
- Evidence of learning outcomes: unit description, student description; syllabus outcomes and information literacy outcomes addressed by unit; learning achieved in relation to planned outcomes and indicators of learning; techniques, measures, strategies, checklists uses; any approaches to before and after comparisons; additional learning outcomes – attitudes, self-esteem teacher outcomes; barriers and enablers

To document learning outcomes and their evidence:

- The learning achieved in relation to the planned outcomes
- Techniques/measures/strategies/checklists/assessments used to identify that learning had taken place
- Learning outcomes in relation to information skills
- Techniques/measures/strategies/checklists/ assessments used to identify that learning had taken place
- Any approaches you used to make before-and-after comparisons with the class.

To document learning outcomes and their evidence:

- Some other significant learning gains in addition to the planned outcomes, such as attitudes to learning, attitudes to school, self-esteem, developing independence of learning, engagement in learning, increased commitment by teachers to collaborative planning and teaching, informed future planning

- The techniques / measures / strategies / checklists / assessments that you used to identify these other outcomes
- The barriers experienced in relation to evidence-based practice, and how these barriers might be overcome
- Additional approaches, other than collaborative teaching initiatives to demonstrating the impact of school librarians on learning outcomes.

Sample & Data Collection

- The survey was distributed in the Australian journal Scan in May 2002, which has a circulation of over 3000, targeting school librarians. Best Practitioners? High Achieving Schools? Random selection? Voluntary selection?
- 11 responses to survey. 2 elementary schools and 9 high schools

Low response rate:
questionnaire required considerable thought and time to complete, and the busy daily agendas of many school librarians may not have provided the time to complete it
may not have considered that the focus and/or outcomes of the study were important
may not actually engage in evidence-based practice, and therefore have had little to contribute to study

FINDINGS: Learning Outcomes

For example, outcomes were expressed in terms students being able to:

- explore general / background information sources to increase familiarity with the topic;
- distinguish between primary and secondary sources;
- construct a search strategy using the appropriate commands for the various retrieval systems chosen;
- use various search systems to retrieve information in a variety of formats;
- record all the appropriate citation information for later use;
- read the text and identify and select the main ideas;
- compare information from different sources to evaluate accuracy, authority, recency and bias;
- show mastery of a particular presentation software;
- construct of concept map of the dimensions of a topic;
- draw conclusions or state personal position based upon information gathered.

FINDINGS: Evidence-Based Strategies

(a) Formal, structured records of evidence

Checklists. Students & school librarians provided checklist or ratings of perceived levels of skills and / or knowledge acquisition, both before and after instructional intervention so that comparisons of differences, changes in levels of knowledge and skills could be documented
Statements about learning outcomes

"More than 80 % of the class showed improvement in their ability to effectively judge the quality of web sites after the sequence of lessons to develop this awareness"
"Virtually all of the students recorded citations accurately in their essays following the input on bibliographic citations" "When we analyzed the essays submitted at the end, and following through some of the web sites that the students had cited, we saw a dramatic decrease in the level of plagiarism

FINDINGS: Evidence-Based Strategies

Rubric strategies. Students' performance in final products were scaled according to a set of criteria that clearly defined what range of acceptable to unacceptable performances and/or information products look like. EG c. Gordon's rubric on evaluating the research process

Formal feedback strategies. eg simple feedback survey every term on what the library does "best" and "least" to help students with their school work

FINDINGS: Evidence-Based Strategies

Each term, the school librarian presented the results of this survey at staff meetings, and commented:

"I do not let an opportunity go by when I let staff know about what the library contributes to learning. I always quote some of the things the students have said to illustrate my points. The school has got the idea that what I am on about in helping kids learn. The key thing in my view is to have something to say that goes beyond gut reaction. The student survey does just that. … I believe they listen a great deal to this".

FINDINGS: Evidence-Based Strategies

(b) Use of informal observational approaches was more predominant than the use of planned strategies for recoding evidence.

Gut reactions & unsystematic observations based on experience

"I rely on my long experience to work out what is happening with the students";

"I watch the students casually though fairly consistently while they work in the library";

"I get ideas from the kids of questions students ask when they are in the library";

"Often when I am chatting to a student doing a major assessment item, I will ask them about what they have learned in the library".

"I have discussions with the teachers about what is going on"

"I take note of student behaviors while they are in the library"

FINDINGS: Evidence-Based Strategies

These more informal approaches to gathering evidence enabled the school librarians to make some statements about learning outcomes. For example:

"The class teacher noted an improvement"
"Students completed learning journals"
"Students were certainly engaged in their learning"
"Students showed quite a lot of independence"
"Students worked well in groups"
"I saw increases in student motivation"
"Students displayed all or nearly all of the information skills"
"Students initiated email interaction and to me this showed engagement with the topic"

"I saw evidence of improved or extended technical vocabulary"
"The technology was used beyond my expectation"

FINDINGS: Value of evidence-based practice

(1) Visibility of school library's contribution to learning
"My boss actually talks about specific outcomes I have identified. He's proud of what we have achieved, and it's not because I tell him how important our school library is, it is because I actually show him the evidence. He shares this with the parents in the school newsletter"

(2) Funding accountability
"Money in my school seems to flow easiest to those happenings ... where students achieve success, and it is clearly seen ... anything which show learning and success and which the school celebrates. I've learned over the last year or so that if I want to jump on the money bandwagon, I show the achievements of my library initiatives. This is usually outcomes related to information literacy lessons, or literature enrichment activities".

FINDINGS: Value of evidence-based practice

(3) The school librarian's role is learning centered
"My colleagues around the school see and hear me involved in learning. I'm not seen as the circulation police or fines controller, or the shusher or the stamper, I'm seen and valued as a teacher".

(4) Planning for instruction. Evidence-based practice is seen to help school librarians plan more effective instructional interventions and information services:
"the feedback from students, and results of analysis of what students have learned or not learned helps me plan my teaching to be more effective, it identifies gaps in students' information literacy skills so I can make it better for them. Sometimes you can put a lot of effort into something, and then find out it didn't really achieve anything."

FINDINGS: Value of evidence-based practice

(5) Job Satisfaction. Some school librarians indicated that evidence-based practice confirms that their profession work is making a difference, and this in turn provides satisfaction and encouragement.

"When I can put my finger on what the students have achieved because of my work, I feel terrific, and get more enthused about being a teacher-librarian. I feel as if I am making a valuable contribution to the kids' learning, because I can see some actual results".

"I get a real buzz each day because I know I make a difference to these kids at school"

FINDINGS: Value of evidence-based practice

(6) Moving beyond advocacy. A number of school librarians indicated that evidence-based practice adds certainty to their role, by moving beyond anecdotal, guess work, hunches, advocacy, and the touting of others' research findings.

"I don't have to get on my library soap box and try and convince people about the value of the library. I make a habit of sharing with them details about every set of classroom units I do, and try and sum up how the students have benefited, using examples from their work. I don't think that advocacy without evidence goes far"

FINDINGS: Evidence-based practice issues

Accountability fears. Some school librarians felt that having to "prove your worth" through pressure to demonstrate learning outcomes and evidence of impact would be detrimental to the profession:

"It would encourage more anxiety and paranoia at a time when teacher-librarians' workloads are already full to overflowing"

"evidence-based practice might be used as a basis for getting rid of us. It's something we haven't done, or had had to do, and because we now are not able to produce anything that focuses on what learning outcomes we bring on, we may be assumed to be ineffective when accountability demands are made".

FINDINGS: Evidence-based practice issues

Competency requirements. This issue centers around the assumed competencies needed to undertake evidence-based practice. As some school librarians said:

"It seems as if I need to be a statistician to do this. I just do not have these skills, and I disliked research methods at university".

"We have to become researchers in order to undertake evidence-based practice, or at least have a mastery of statistics. Isn't that what the universities should be doing?"

Evidence-based practice is contrary to lifelong learning. One school librarian posited that "EBP is unrealistic, given the goal of lifelong learning that information literacy is all about. How can one realistically measure this outcome, especially when it may not be evident for many years?"

FINDINGS: Evidence-based practice issues

Time pressures. Some school librarians raised the issue of the time commitment needed to undertake evidence-based practice.

"I see the value of evidence-based practice, and have tried to implement measures. It takes time, and I feel the pressure when I have so many other things to do".

"I want to do it, but when do I find the time to do it?" and "I do not have enough time to do my current job as it is, let alone adding more, even though I would like to do this". "In reality a lot of evidence is intuitive and the time element squeezes out the more formal measures".
"I need to be free from providing release from teaching for classroom teachers so that I have time to undertake this. This is a barrier to making real collaboration happen and working together to identify the outcomes".

FINDINGS: Evidence-based practice issues

(5) Lack of knowledge and skills to undertake evidence-based practice. This concern was expressed by all school librarians:

"I lack the skills in devising accurate assessment tools";
"I need lots of practice with this to develop my skills";

"It would be nice to have access to some recent criterion-referenced or standardized tests to assess my students' standards and progress"

"I feel completely unqualified to accumulate sufficient or accurate evidence about what I do, or hope I am doing";

"I need to learn to write more performance descriptors";

It would be really helpful to have some school-wide information literacy tests";
"There are limited training opportunities available to develop new approaches to implementing EBP".

2 A Framework for Evidence Upon Which to Base Sound Practice (And Tell Our Story)

Educators at all levels are being asked to collect various forms of evidence about the impact of their actions upon achievement. This evidence, added to guidance from educational research, personal experience, and judgmental skills guide what we do each day. This entire process constitutes what we mean by evidence-based practice. It would be the same for a physician: guided by medical research, personal judgmental skills, and experience during practice, the patient's health is affected each day.

Traditionally, library media specialists collected a variety of organizational data that described their programs and allowed comparison to state or national standards. The purpose was to give an indication of support upon which a quality library media program could develop. Such data as size of staff, budget, size of collection, numbers of computers and flexibility of facilities were important and still are. Yet, they have lost their punch in an academic-achievement-oriented frenzy. It would be the same for doctors who would claim that hospital facilities and equipment are the major factor in restoring health.

Called "input measures," counting people, things, and environments provide a potential impact but not a guaranteed one. For a period of time, the library profession was interested in output measures interpreted as results or outcomes. For school library media specialists, these never did provide a gauge on learning or a link to standardized test scores. They looked at circulation as an output, or the number of visitations of children to the LMC during a typical week. We needed measures of impact on learning.

The troubling part of extending measurement closer and closer to learning is our inability to invent a thermometer-in-the-mouth that will measure degrees of learning. And our current frustration is centered in the fact that too much faith is being put in the almighty achievement test.

Chapter two presents in almost handout form, a two-pronged look at the type of measures that have the potential to get closer to learning. Since we cannot precisely measure our target, we offer measures that "if it quacks like a duck, waddles like a duck, and looks like a duck" it must be a duck. Substituting the term "achievement,"

we would say, "If it looks like achievement, acts like achievement, and it performs like achievement, it must be achievement." We would then challenge the doubters to prove that it **wasn't** achievement.

In this chapter, we prescribe multiple views: first, a triangular view followed by a second dimension of both direct and indirect evidence. We will then present a simple matrix to help the library media specialist see the possibilities of measuring a little every day to create a big picture. Finally, we present ripple-effect measures of programmatic elements that could be measured. It may seem a little daunting at first, but it all forms a matrix that affects practice and planning. Here is an overview of these elements:

Views from which to triangulate evidence:

1. **Triangulation of Evidence-Based Practice** – explains various views our evidence should create.

2. **Learner Level Evidence-Based Practice** – explains appropriate measures at the student level we might collect.

3. **Teaching Unit Level Evidence-Based Practice** – explains appropriate measures as classes use the LMC for research.

4. **Organizational Level Evidence-Based Practice** – reviews the tried and true measures we have collected for years and suggests a few new ones.

A second dimension of measures:

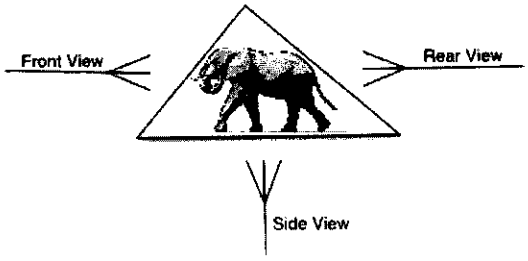
1. **Direct Evidence** – measures so close to actual learning that confidence in an impact could be inferred.

2. **Indirect Evidence** – measures of actions that set the sage for, provide an environment for, give support to, enable, help, give encouragement to, mark progress toward, and indicate change over time.

And finally, the program elements that need to be measured:

1. **Collaboration** – our efforts to create exciting learning experiences in the LMC with the teacher.
2. **Reading** – our efforts to increase literacy and increase the love of reading.
3. **Information literacy** – our efforts to teach the research process.
4. **Technology** – our efforts to enhance learning and efficiency through technology.

Triangulation of Evidence-Based Practice



Triangulation of data means to collect data from various points of view or vantage points before making a decision and taking action. To understand what an elephant is, better to get a view from the front, the rear and from the side rather than any single picture. Like the points of a triangle, there ARE different vantage points from which the impact on learning (the center of the triangle) can be viewed or validated. The trend in state and federal governments is to ask educators to collect more quantitative (or scientific) data by using more rigorous research designs. Those designs often require experimental conditions difficult to create in local schools. To compensate, since learning and teaching are not exact sciences, the more types of data we collect, the closer our views of the elephant will move toward validity. At the same time, local communities will need to learn to accept a wide variety of indicators of success rather than exclusively seeking test score evidence.

Library media specialists need to collect various evidences as a part of their effort to document what they contribute, what they do, and what they need to do next. Three major types of evidence suggested here, could be collected in any school to provide a more holistic view of the library media programs:

Data from the learner level. Data at the learner level such as achievement test scores are currently at center stage in the United States. Standardized test scores in almost every state have taken on great significance. There are, however, many other measures of how well an individual might be doing: portfolios, attitude, measures of performance, and other techniques used by both adults and learners to judge individual attainment.

Data from the teaching unit level. Data can be collected about the various learning experiences that are designed by adults to interact with LMC materials and technology. That is, we begin examining the impact of our resources on teaching and learning. "Because we have this, we did that." Data collected from the collaborative activities of teachers and LMC staff are quite powerful in describing impact. For example, the Lance studies did note that achievement was affected as the amount of collaboration between teacher and LMS staff increased.[1]

Data from the organization level. Common measures at the organizational perspective are size of facilities, the equipment available, the amount of funding provided, and the size of collections or staff. All these factors might be termed "inputs" or the resources we have to make a difference. They are often reported to accrediting agencies and in local reports to administrators and boards. The Lance studies of LMC impact looked at many inputs as they affect the "output" – reading scores.[2]

The Challenge: To use measures from all levels to triangulate the view of impact.

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[1] See Lance, Keith Curry and David V. Loertscher. *Powering Achievement.* 2nd edition. Hi Willow Research & Publishing, 2003.
[2] *Ibid.*

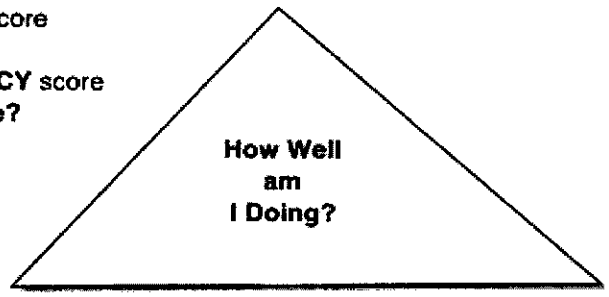
Learner Level

Evidence-Based Practice

Triangulation of Data

During collaboration activities where teachers, library media specialists and teachers and other specialists combine expertise to enhance a learning experience, all members of the collaborative team should be interested in and help create measures whereby a learner will know how successfully they are growing and developing as learners. The measures here are designed from the learner's point of view.

Evidence:
- What I **KNOW** score
- What I can **DO/PERFORM** score
- My **AVID READER** score
- My **INFORMATION LITERACY** score
- **Am I doing better over time?**



Sources of evidence:

FROM THE LEARNER PERSPECTIVE	TESTING AND ASSESSMENT	TEACHER, LMS, TS PERSPECTIVE
Grade point averages	State tests	Checklists/questionnaires
Self-scored rubrics	Local tests	Conferencing
Journals	Performance tests	Demonstrations / showcase / re-enactment
Checklists/questionnaires		Journals
My own avid reader score		Portfolios
My information literacy score		Project assessments
Self-assessment of progress		Rubrics

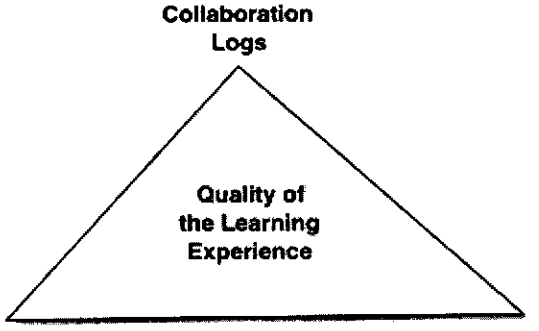
Teaching Unit Level

Evidence-Based Practice

Triangulation of Data

Probing the impact of the instructional program, when the LMC and technology are integral, allows three major measurements to take place. These are measurements from collaboration logs, rubrics, and assessments of learning. What learning experiences have been created to help students achieve? Has collaboration between the teacher and the LMC staff affected the teacher's methods? How well have all the systems worked in support of the teacher? Did the impact of the LMC program show up as a factor across learners in a classroom? In learner rubrics? In other assessment measures?

Evidence:
- Spread of collaboration across the faculty
- LMC and technology systems work well.
- Performance on assessment measures
- Performance on rubrics.
- Improvement of learning experiences over time.



Sources of evidence:

COLLABORATION MEASURES	RUBRICS (Group perspective)	ASSESSMENT OF LEARNING (Group Perspective)
Collaboration Logs	Quality of learning experience	Content learning
Impact!*	Contribution of technology	Product assessment
Collaborative units linked to LMC web page	Contribution of information literacy	Process assessment
Performance of LMC and technology systems		

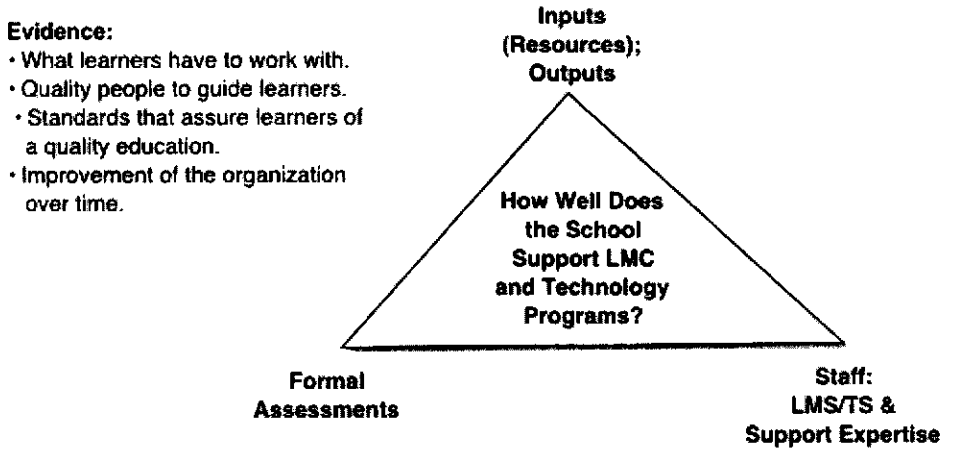
*Miller, Nancy. *Impact Documenting the LMC Program for Accountability!*. Salt Lake City, UT: Hi Willow, 2003.

Organization Level

Evidence-Based Practice

Triangulation of Data

Professionals need to keep the school community apprized of the LMC program performance at any given time and across the years. Organizational data including inputs, formal assessments, and staffing have been commonly collected over the years as professionals try to gauge whether there is a powerful learning environment for all learners.



Sources of data:

INPUTS / OUTPUTS		FORMAL ASSESSMENTS	STAFF: LMS/TS & SUPPORT
Facilities	Use	Performance-based accreditation documents	Size and roles (professional & support)
Staffing	What they do	School improvement efforts	Certification; Endorsements
Collections	Use	District-level initiatives	LMS/TS National Board Certification (NBPTS)
Budgets	Collections; Databases	School library and technology audits	Personal growth plans
Administrative support	Program implementation		School-based performance evaluations
Technology infrastructure	Network use; Reliability		Growth in expertise over time (CE, professional organizations)

Add A Second Dimension: Direct and Indirect Evidence

To the levels of learner, teaching unit, and organization where evidence is being collected, the second dimension is the type of evidence to be collected. The matrix below introduces the idea that both direct and indirect evidence should be collected.

Direct measures of evidence would be those so close to actual learning that confidence in an impact could be inferred. We have no thermometers to stick in a learner's mouth to gauge actual learning, but direct measures might challenge doubters to prove no impact.

Indirect measures provide evidence that actions set the stage for, provide an environment for, give support to, enable, help, give encouragement to, mark progress toward, make change in direct measures over time the probable stimulus.

	Learner Level	Teaching Unit Level	Organization Level
Direct Measures	Assessments of various types given to learners showing impact on learning	Measurements of impact on teaching quality and classes engaged in LMC learning units	**Behaviors of administrators and data that show an impact of the LMC program on the school as a whole**
Indirect Measures	**Environmental factors that support the individual learner**	**Support of teachers enabling successful use of the LMC program**	**Policies and support at the school and district level that enable a quality LMC program**

Building an Evidence-Based Practice Plan

Use this form to plan data collection in one of the four program areas of the LMC: Collaboration, Reading, Information Literacy, and Technology. One might try to collect something in each area or zero in on a single area for a period of time. Every box in the template need not have something in it. Neither should all data collected be in a single box. Data from several levels and both dimensions would be ideal.

Goal:

	Learner Level	Teaching Unit Level	Organization Level
Direct Measures*			
Indirect Measures**			

*Direct measures would be those so close to actual learning that confidence in an impact could be inferred. We have no thermometers to stick in a learner's mouth to gauge actual learning, but direct measures might challenge doubters to prove no impact.

** Indirect measures provide evidence that actions set the stage for, provide an environment for, give support to, enable, help, give encouragement to, mark progress toward, make change in direct measures over time the probable stimulus.

Ripple-Effect Measures; or, Pebbles in a Pool

For the past five years, many studies done by Keith Lance and Marcia Rodney have contributed mightily to the evidence that school library media programs make a difference. As a careful reader of research, I have been wondering why school libraries keep showing up as important – the milk on the cereal – not the butter on the bread. I am tempted by the following general explanation: Administrators both district and school who care enough about education to have a strong library media program, also care about a lot of other enriching elements that make the difference between high performance and low performance on achievement tests. As a profession, we have not been able to establish cause and effect relationships, yet every time careful correlational studies are done in different states with differing conditions, we are there.

Likewise, in daily practice, it seems that the best of library media specialists sense what to do each day that contributes to achievement. These professionals sense that busy work like shelving books, straightening books, cleaning computer screens – while necessary – are not features of their program that dominate their time each day. Rather, they have learned certain strategies that trigger higher-level contributions.

I like to think of these as ripple-effect strategies, which if measured and are successful, act like throwing a pebble in a pool. It is something simple, yet it causes a reaction far beyond its size and seeming significance. I sometimes call this the Joyce Valenza technique. Let me explain.

Joyce, a successful library media specialist in Pennsylvania who has been on the cover of *School Library Journal* told an audience a story that went something like this. She was in the teacher's lounge one day when teachers were complaining about the amount of plagiarism that was going on in student reports. Joyce knows the answer to that problem but wants to plan her "pebble" carefully. Here is how she does it. She goes to her favorite history teacher and states the problem and wonders if he would like to experiment on a solution. He would and they do. During a research assignment in the LMC, she teaches his students about plagiarism, helps them avoid it, and the products are excellent. She has her pebble. Now she is ready to toss it. She makes an appointment with the principal and she and the history teacher present their solution – that information literacy teaching "just in time" is a marvelous technique. Thoroughly convinced, the principal declares that the school will hereafter be known as the information literacy school. And that teachers will be evaluated on whether they incorporate information literacy into their classrooms. Joyce now not only has the ripple effect, but a tidal wave! Yesterday, she had one client. Today she has 100! So much for selecting the right pebble at the right time to throw into the right pool.

In the chapters to follow (collaboration, reading, information literacy, and technology) each begins with the author's best recommendations for pebbles – measures most likely to produce not only data, but also a transformation in the library media program. Look at these first and see if they can be adapted to your local situation. If one of the ripple-effect measures won't work well, each chapter contains a variety of other measures that might work better. Ultimately, the library media specialist must choose those measures that will return the type and level of impact representative of the local program.

Listed below are these pebbles to consider. They are covered in depth in their respective chapters.

Summary of Ripple-Effect Measures for LMC Programs

Collaboration:

1. The time professional library media specialists spend collaborating.
2. The move from "bird units" (low-level learning experiences) to quality learning experiences in the LMC.
3. The dispersion of collaborative experiences across the faculty and across the content areas.
4. Assessment of learning includes both classroom and LMC agendas including measurement of content learning, information literacy, amount read, and impact of technology.

Reading:

1. Access to a plentiful supply of materials learners want to read:
    a. In the Library Media Center
    b. In the Classroom
    c. At home
    d. Over digital networks
    e. As implemented in organizational policy

2. The Amount Read (Individuals, classes, the entire school).
    a. Free voluntary reading
    b. During topical unit studies

3. Whether a learner likes to read.

Information Literacy:

1. Use of a joint rubric (teacher and LMS) for a LMC-based unit. Learners realize that information literacy is an integral part of LMC learning experiences.
2. Learners complete research logs for critical points or extra credit.
3. Learners begin the process of internalizing their own information literacy model.
4. Assessment of information literacy happens as it is taught.

Technology:

1. Information systems emanating from the LMC are available 24/7 and are reliable.
2. LMC information systems are available at the elbow (in the LMC, the classroom, in the home, and on any technological device owned by the learner).
3. Learners prefer LMC information systems over full Internet access.
4. LMC information systems and tools add to learner efficiency.
5. Enhancement of learning through technology is a part of teacher assessment of student learning.

DRAFT FOR DISCUSSION

A final version of this paper will be published in the
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School Principals' Perceptions of Library Media Specialists' Roles and Responsibilities

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Treasure Mountain 11 Research Retreat: Evidence-Based Practice
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The Kentucky Education Reform Act (KERA) of 1990 was among the first major attempts at educational reform in the United States.[1] KERA allowed schools and districts the option of employing library media specialists. The perception of principals was such that sixty-four schools in the 176 school districts in 1998-1999 chose not to employ library media specialists. In 2000, House Bill 324 amended the Kentucky Education Reform Act. It requires all districts to establish and maintain a library media center in every school and to employ a certified library media specialist. However, the law also states that a library media specialist may be employed to serve two or more schools.[2]

School library media specialists consider themselves vital to the success of schools and the achievement of students. No matter how highly library media specialists perceive themselves, their place in schools is marginalized if those who have decision making power have the opposite view. An inescapable fact is that school principals do have a great deal of influence over the professional staffing of schools, even under educational reform.

One of the most important lessons learned from the 1993-98 Library Power Project was the value of collaboration between media specialists, teachers, and administrators, working together to improve teaching and learning for all students.[3] The library media specialist-principal relationship is a vital ingredient in children's learning, but it is one that has not been addressed systematically. There are large bodies of literature devoted to the roles of library media specialists and principals, but comparatively little describing the partnership or strategies for establishing effective partnerships. Because the library media specialist is not automatically perceived as a leader in the school community, the support and collaboration of the principal is needed to promote the great intrinsic value of the library.[4]

Unfortunately, principals often perceive library media specialists exclusively as resources for students and teachers who need help with print materials and technology, and not as leaders within the school community. This limited knowledge is in part due to their training. Many principals have received little, if any, course work during their professional preparation about library media centers.[5] Training of administrators also neglects a discussion of the library media center as a positive force.[6] Since the major source of a principal's knowledge about the library media center comes from the school library media specialist,[7] the responsibility for informing principals about the role of the library media specialist rests with the library media specialist.[8] Like principals, however, library media specialists receive only limited training on how to be advocates for library media centers, and thus the issue persists of library media specialists' failure to promote themselves to their administrators and colleagues.[9]

Purpose and Method

The purpose of this study was to investigate school principals' perceptions of library media specialists (LMSs) and services 10 years after the implementation of the Kentucky Educational Reform Act, and to ascertain the degree of importance that principals ascribe to library media centers. To carry out the investigation a survey instrument was developed consisting of 35 objective items. Demographic questions about the schools in which the principals worked were included at the beginning of the survey. The demographic section included questions about school location (urban, suburban, rural) and size of enrollment. An interesting preliminary note is that these factors had no influence on principals' perceptions, so they will not be discussed further in this article. The bulk of the survey consisted of items rating the importance of roles and responsibilities performed by the library media specialist. The items were grouped into five categories that reflect roles, responsibilities, and underlying themes found in *Information Power: Building Partnerships for Learning*.[10] The categories included:

- Information literacy

- Collaboration/leadership/technology
- Learning/teaching
- Information access/delivery
- Program administration

The questionnaires were sent to 180 randomly selected school principals in all types of schools across the Commonwealth of Kentucky. Fifty-six percent (102) completed surveys were returned from 55 elementary schools, 23 middle/junior high schools, and 24 high schools. The data from the survey were aggregated and statistical comparisons and/or correlations were made to answer questions of interest regarding school principals' perceptions. When the term "significant" is used in the results and discussion that follow, the authors are reporting results that were statistically significant at a probability level of less than .05.

Results and Discussion

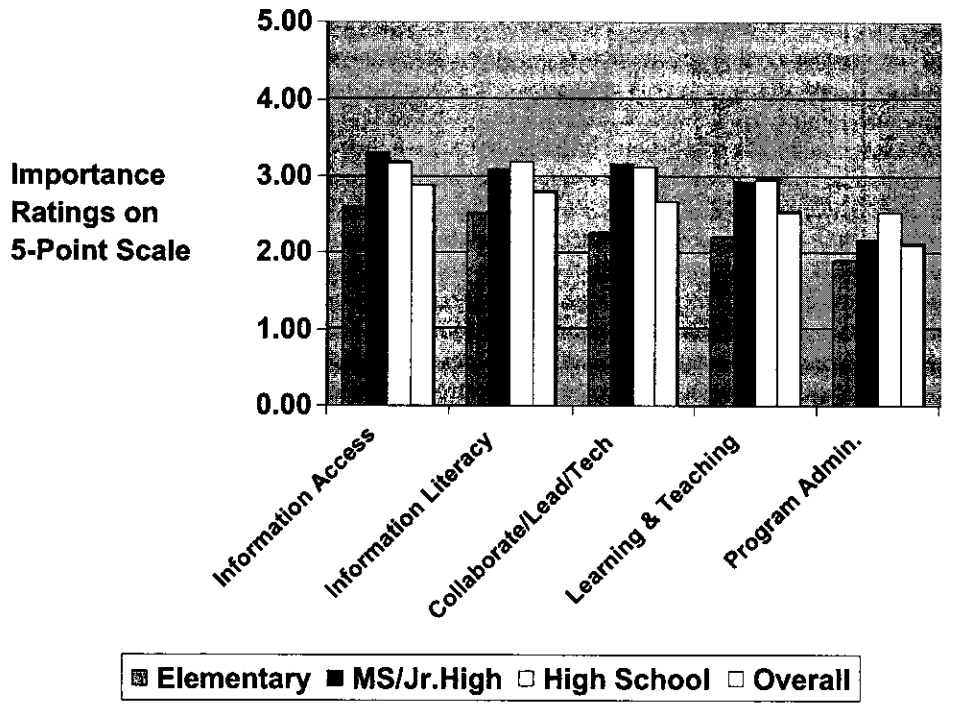
The first question of interest was whether formal education about the school library media function would influence principals' perceptions of the media center's value. Fewer than 10% of principals responding to the survey reported that they had ever taken a college course that included content on collaborating with LMSs. That finding in itself confirms the observations made by Wilson and Lyders,[11] but of greater interest is the difference in perceptions of value of the library media center between the group of principals who had taken such a college course and those who had not. Principals who had taken a course rated the value of the library media center significantly higher at 7.00 on a 10-point scale, than the principals who had not taken a course who rated the value of the library media center at 4.97. How perceptions develop and whether they are actually borne out by fact is always a matter of speculation, but the value of a principal's good will in a school setting is indisputable. A clear implication exists here for school library media educators whether their academic home is within or outside a college of education. A valuable agenda item for educators would be to work within their academic institutions for incorporating the school library media message into the principal preparation program. There is also an implication here for district-level library media supervisors, because many larger districts now manage their own programs for preparation and selection of principals. Contributing to that preparation program could be an investment in the long-term health of district-wide school library media services. One could also generalize and conclude that building-level specialists should take advantage of every opportunity to collaborate with principals and educate them about professional roles, responsibilities, and services.

A second question of interest in the study was whether there is a relationship between principals' perceptions of the adequacy of funding for the media center and their rating of the overall importance of the media specialist. High positive correlations were found between adequacy of funding and importance; that is, the higher a principal rated the adequacy of funding, the higher a principal rated the overall importance of the library media specialist. This correlation was significant overall and for each of the media specialist's five roles individually. This apparent relationship between funding and importance of the media specialist is no doubt more complex than it may appear, because the perception of adequate funding could well be an indicator of the principal's general satisfaction with the school's overall media services program. The question of cause and effect should also be raised. Does adequate funding provide the resources for a satisfactory program and the perception of a strong media specialist, or does a strong media specialist build a program that causes the principal to conclude that funding is adequate? This is an area of study where some good qualitative followup research might clarify the quantitative findings in this study. Regardless of how the relationship works, however, the strength of the relationship cannot

be denied and must be a factor that enters into media specialists' thinking about how they are perceived by their principals.

The third question of interest was whether principals' perceptions of media specialists varied by the level of school in which they work. Principals were asked to rank the importance of the five roles of the LMS with 1 = least important and 5 = most important. Figure 1 presents the means for these rankings of the five roles for each type of school. Principals of high schools ranked the role of information literacy first in importance while elementary principals put it second and middle/junior high principals ranked it third. Information access and delivery were ranked first by elementary and middle/junior high principals while high school principals ranked this role second. Principals at all levels ranked learning and teaching fourth. Program administration was ranked last by principals at all three school levels. It is interesting to note that the highest mean on any of the rankings was 3.30 as indicated in Figure 1. This mean ranking was by middle/junior high principals on information access and delivery. On a scale of 1-5, none of the mean rankings were extremely high. Findings indicate somewhat low principal perceptions of the LMS in all five roles. Again, it should be noted that the highest mean rating of 3.30 on a 5-point scale is not a rating with which LMSs might be particularly pleased.

Figure 1
Principals' Ratings by Type of School of the Importance of LMSs Roles



It is clear from Figure 1 that the type of school influences how principals rate the overall importance of their library media specialists by their roles. Middle/junior high and high school principals significantly rank the LMS more important in all five roles than do the principals of elementary schools. These ratings were born out in another question on the survey in which principals were asked to rate the overall importance of the library media specialist as to the learning success of students on a scale of 1 = least important to 10 = most important. Of the three school types elementary principals rated the library media specialist least important with a mean of 4.46, while middle school/junior high principals' mean rating was 5.74 and high school principals rated the library media specialist most important with a mean of 6.29. As was concluded for the results on the 5-point scale, these ratings on a 10-point scale are only a moderate endorsement at best of the media specialist's role in the school. The finding that elementary school principals assign lower ratings to LMSs than their secondary school counterparts is difficult to explain. One generally thinks of elementary LMSs as being more proactive in their collaboration with teachers and many of them teach class groups daily on a fixed schedule. Even elementary LMSs on flexible scheduling frequently arrange instructional programming for class groups in the media center. Is there a perceptual disconnect in the minds of principles between the learning that occurs in the library media center and the learning that occurs in the classroom? In other words, is the library media function still viewed as a "special" instead of being accepted as a core part of the school's learning and teaching mission? This question of the centrality of the LMS's roles is addressed further in the final question of interest in the study.

Figure 1 provides additional information for examining the library media center's status as a core part of the school's mission. On their ranking of the importance of LMS's five roles, elementary principals and secondary principals alike placed learning and teaching fourth. The ratings of learning and teaching were not significantly different from roles ranked first, second, and third, but the trend held across all three school levels. This is disturbing because of the emphasis in *Information Power* on the collaborative learning and teaching role. Could one imagine a principal rating the second grade teachers or the English department in the middle of a 5-point or 10-point scale on their importance to the learning success of students? Certainly not, nor can library media specialists be satisfied with such a perception. The data reported in Figure 1 provide another viewpoint on the multiple roles performed by the library media specialist. Principals' response patterns on each role are correlated significantly with response patterns for each of the other four roles. When this inter-correlation exists among the items on a survey, it can mean that all of the items are measuring the same perception; thus, the concept of *library media center* in the mind of a principal could be amorphous instead of being composed of distinct understandings of the five roles identified in this study. One conclusion from this could be that principals really are not actively marginalizing the media specialist's learning and teaching contributions; rather, they simply do not make the distinction in their minds between learning and teaching and all of the other things that go on in a library media center. Considering the fact that learning and teaching are the core of any school's mission, this interpretation of the data could logically place the library media center outside that core. An alternative explanation could be found in Carey's hypothesis[12] that a gap exists between theory in the school library media profession and day-to-day practices. This explanation would conclude that the mediocre ratings on the survey resulted from asking principals to rate theoretical LMS roles that are, in fact, not being practiced. Either way—whether LMSs are a core part of the school's mission and the problem is perceptual, or current theoretical positions in *Information Power* are not being widely practiced—the results of this study indicate a problematic situation that could have implications for the future status of the profession in Kentucky. Additional research that is

both more focused and more broadly based geographically is needed to provide better understanding of the relationships between principals' perceptions of roles and library media specialists' practice of roles.

Summary and Conclusions

School principals in Kentucky after ten years of school reform generally regard library media specialists as only somewhat important. Principals of high schools and middle/junior high schools rate the library media specialist as more important than do principals of elementary schools, but mean ratings from all principals are uniformly mediocre. Further research is needed to determine reasons for such ratings and to shed light on the finding that principals who rate funding levels as more adequate also tend to rate library media specialists as more important.

A course that focuses on the role of the library media specialist in the professional preparation program of school principals is a predictor for higher ratings of the importance of the library media specialist. Because school principals network, share ideas and beliefs, and become the central office supervisors and the district superintendents, their impressions and perceptions of library media specialists are mainly based on their on-the-job experiences, and even on their experiences as far back as when they themselves were elementary school students. Few have had a course on how the library media center fits into a school curriculum and the roles of the library media specialist. Principals need to be educated about what we do. The change agent should be the library media educators in colleges and universities who should initiate collaboration with the programs that prepare school administrators. Leaders in the library media profession should also work toward cooperation by offering to speak to classes on school administration about *Information Power* and the implications of research such as the "Colorado Study"[13] and the host of statewide studies that have followed.

The literature describes a variety of techniques for program promotion and gaining support from principals including: being positive and meeting regularly with principals, attending departmental meetings and joining committees,[14] becoming involved with the curriculum to help select appropriate resources for classes,[15] and preparing a professional portfolio to record work and accomplishments for submittal to a principal during job evaluation and for public view in the library media center.[16] The results of this study suggest that research is needed on such promotional efforts with a focus on validating strategies that can be initiated and managed by the library media specialist for effectively educating principals on the centrality of the library media center in the mission of the school. One fruitful avenue may be qualitative research with winners of the AASL Outstanding Administrator Award to discern factors that contributed to the development of their positive perceptions and actions. The most productive emphasis will most certainly be on validating strategies that are under the control of the building-level professional. Legislators can pass laws and library media educators can work to spread the message, but the building-level professional is the only one with the opportunity for day-to-day influence on the perceptions of the principal.

Notes

1. Legislative Research Commission, *Kentucky Education Reform Act: A Citizen's Handbook* (Frankfort, KY: Legislative Research Commission, 1999).

2. Kentucky Department of Education, *Achieving a Distinguished Library Media Program* (Frankfort, KY: Kentucky Department of Education, 2001).

3. Lincoln Public Schools, *The National Library Power Project, 2001*, <http://www.lps.org/instruction/lms/prog/libpow.htm> (10 May 2002).

4 Wilson, Patricia P. & Josette A. Lyders, *Leadership for Today's School Library: A Handbook for the Library Media Specialist and the School Principal* (Westport, CT: Greenwood Press, 2001).

5. Ibid.

6. Gary N. Hartzell, "The Invisible School Librarian: Why Other Educators Are Blind to your Value." *School Library Journal* (Nov. 1997)

7. Jerry M. Campbell, *Principal-School Library Media Relations as Perceived by Selected Northern Elementary Principals and School Library Media Specialists*. University of North Carolina at Chapel Hill, 1991- Dissertation.

8. Roger A. Damerow, "A School Administrator's Perception of the Contemporary Media Specialist." *Indiana Media Journal* 12 (Winter '90): 3-5.

9. Donna M. Shannon, "Education Reform and School Library Media Programs: Perceptions of Kentucky's School Library Media Leaders." *School Library Media Quarterly* (Fall 1996).

10. American Association of School Librarians and Association for Educational Communications and Technology, *Information Power: Building Partnerships for Learning* (Chicago, IL: American Library Association, 1998).

11. Wilson & Lyders, op. cit.

12. James O. Carey, "Library skills, information skills, and information literacy: implications for teaching and learning." *School Library Media Quarterly Online.* http://www.ala.org/aasl/SLMQ/skills.html. (Vol. 1, 1998)

13. Keith Curry Lance, "The Impact of School Library Media Centers on Academic Achievement," *ERIC Digest*, <http://panther.chs.chico.k12.ca.us/~pmilbury/colo.html> (15 August 02).

14. Diane Gallagher-Hayashi, "Engaging your Principal in your School Library Program." *Teacher Librarian* 28:5 June 2001.

15. Ann C. Weeks, "Stop the Whining." *School Library Journal.* Sept. 2001

16. Sheila Bennett-Newton, "Portfolios for Professional Evaluation." *CSLA Journal* v.21 no. 2 (Spring 1998)

Statewide Efforts to Support Digital Libraries in K-12 Schools

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This research study surveyed the public websites identified as having a statewide audience and state-support for K12 schools in the United States. This census of the sites, done in 2002-03 school year, identified the characteristics of the sites and the content included in the following areas: funding, content, organization, access, measurement outputs, and demographics. Dan Fuller, assistant professor, assisted by graduate assistant Dale David conducted the research at the School of Library and Information Science at San Jose State University.

The premise for the research resulted from the observation of the allocation of state funds for the purchase of online databases with access available to K12 students statewide. These projects had a variety of names relating to digital, virtual, and electronic libraries or information centers. The creation of these libraries resulted from the refocusing of earlier statewide library related projects or they were new projects. Two basic research questions emerged. First, what is the state of the art of statewide support of K12 schools? Second, what evidentiary basis, if any, was used or provided.

The findings were thought provoking. The demographics of access is almost complete in the United States with 92% of all states providing some level of support to digital libraries for K12 schools. Funding sources varied, but the largest single source of funding was state or federal grants. While the cost varied from state to state, the cost of creation exceeds $500,000. The content of the support is eclectic. Organization is equally eclectic and provides a challenge to users. Access varied from open to password protected to IP authentication. At home access after school hours, varied directly with the level of security access. Measurement outputs existed in the sites utilizing fee-based online services. However, analysis of the data was the exception not the rule.

Four conclusions emerged from the study. One, the sites reflect the overall lack of a definition of libraries of information resources identified with the adjectives digital, virtual, or electronic. Two, site content is eclectic and not directly related to student outcomes, curriculum or published guides of K12 recommended sites. Three, the sites are a cost effective manner to provide shared electronic resources. Four, little or no evidence exists to demonstrate the relationship of the projects to learning theory or to information literacy needs.

The next steps are a follow-up survey for the 2003-2004 school year. The research goals are to identify changes and new trends plus create a set of baseline requirements for statewide efforts to support K12 schools in virtual, digital or electronic environments.

EVIDENCE-BASED PREPARATION FOR SCHOOL LIBRARY MEDIA

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Abstract:

Evidence-based practice is a well-developed concept in some helping professions, but relatively new to education. Evidence-based practitioners use action research processes to investigate, implement, and evaluate strategies for improvement of the teaching and learning processes. Higher education programs leading to licensure as school library media specialists will need to include skill development in evidence-based practices as part of the licensure program. This has ramifications for school library media educators.

Evidence-based practice is a relatively new term to school library media, but not to other helping professions. Practicing professionals in nursing, social work and other fields regularly use evidence-based practice as a way to improve the quality of service to their clients. The definitions and examples from these professions indicate that evidence-based practice is a generally recognized way to construct new meaning. It provides knowledge of what professionals can do to affect their practice as pertains to one client, using a combination of research into past practices and empirical evidence (Gibbs, 2003, p. xvii).

Evidence-based practice makes use of action research processes, defined in education as "the process of studying a real school or classroom situation to understand and improve the quality of actions or instruction" and "a systematic or orderly way for teachers to observe their practice or to explore a problem and a possible course of action" (Johnson, 2002, 13). For medical and social services professions, the improvement of practice is directed toward one case, client or patient. Sackett et al (1997) defined evidence-based medicine as "conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients" (p. 2). For education, that one case must be, "how does this one child learn" (Norlander-Case, Reagan, & Case, 1999, p. 23). Our evidence relating to how that one child learns has impact on the field of school library media when we share our results with our two professions of library/information science and education.

Our definition of evidence-based practice in school library media is the use of action research processes directed towards the improvement of school library media practice, focusing on one student or a small group of students with similar characteristics. By implementing evidence-based practice, school library media

specialists can improve how one child learns to love to read, to use technology efficiently and effectively to meet information needs, and to increase proficiency in information skills.

For the purposes of this paper, the operational definition of evidence-based practice is action research that is focused directly on the results of the teaching-learning processes in schools. The purpose of evidence-based practice, thus defined above, is to improve school library media teaching practice. In this paper, I will begin the discussion of evidence-based school library media practices, in the context of which school library media specialists act intentionally, situate their actions in the context of the library media program and its users, and therefore construct new meaning and knowledge that can be shared with the profession (Lyons & LaBoskey, 2002, p. 21). I will also apply the principles of evidence-based practice to school library media education, referred to as evidence-based preparation.

Evidence-based Practice in Education

Reflective practice, or "confessional jargon" (Lyons & LaBoskey, 2002, p. 23) is one way for professionals to act, think, reflect, and change their practice. This changes the way that practitioners apply their training to their job. In professional preparation, pre-service professionals are told what is generally known about their chosen profession. They may learn about past practices that have been discarded, current practices that have been proven effective, and usually have some internship or field experience in which they can see these practices at work and practice their own implementation. The concept behind evidence-based practice, of conducting inquiry and making decisions to change current practice, has not in the past been an expectation of the field. Seidl notes in the introduction to Gibbs (2003) that social workers "neither read, write, or utilize research (p. xvii). Yes, these skills are crucial to coming to an understanding of evidence-based practice. Johnson's (2002) guide is an excellent resource to use when planning action research.

Defining Evidence-Based Practice

The skills described above; reading, writing, and utilization of research, are congruent with action research skills, defined in Norlander-Case, Reagan, and Case (1999) as "concerned with the development, implementation, and evaluation of solutions to real, immediate problems and concerns that classroom teachers face every day in their professional life"(p. 43). Patterson et al (1993) defines action research as "work that does not separate investigation from the action needed to solve problems" (p. 14).

Action research is setting up a question, researching possible solutions, implementing one option and observing the results. It requires patience and long-term commitment to improving practice, acknowledging that connecting results to that change takes time. It is not a quick fix, or a set-aside of a few hours to investigate one aspect of practice. True action research in education is focused on the improvement of how

one teaches and whether or not the children are learning. It is said that the beginning teacher often asks, "how am I doing?", while the experienced teacher asks, "How are the children doing" (Patterson et al, 1999, p. 8). This shift in attitude is the beginning question of evidence-based practice.

Very little is found in the literature regarding evidence-based practice in education. Most citations from a literature search focus on the helping professions such as nursing and social work. There, texts on evidence-based practice focus on how these professionals can express concern about a characteristic of a group of patients, can formulate a question focusing on one patient, search for information in the research literature, experiment with possible solutions, analyze the results, and then share their findings with the field (Gibbs, 2003, p. 8). The conceptual definition expressed in Gibbs (2003) presents the concept of evidence-based practice as a professional attribute. "Placing the client's benefits first, evidence-based practitioners adopt a process of lifelong learning that involves continually posing specific questions of direct practical importance to clients, searching objectively and efficiently for the current best evidence relative to each question, and taking appropriate action guided by evidence" (Gibbs, 2003, p. 6).

The skills required to be an evidence-based practitioner include learning how to formulate answerable questions, to search efficiently in the literature to find and appraise evidence, to implement solutions and to analyze results. This is a long-term process, and rarely results in an accurate conclusion on the first attempt. Scientific discovery takes years of repetitive experiments, wrong turns, and false conclusions before real strides are made.

Of course, fallacies exist in the development of evidence-based practice. There are a number of factors affecting how children learn, especially when measuring academic achievement through standardized testing. Inexperienced practitioners may have flaws in logic as they formulate their conclusions. The use of anecdotal evidence can be overstated. While anecdotal evidence is important and can provide needed illustration for conclusions, careful analysis is needed to extract evidence from anecdotes. Blind acceptance of tradition or untested precepts of the field can also be problematic. Myths and rituals of institutional development (Meyer and Rowan, 1991), sometimes produce iron-clad educational structures that are not in the best interests of teaching or learning. Action researchers need to "think outside the box" as they formulate questions, review the evidence found in the library literature and analyze evidence by applying their critical judgment to solve learning problems.

Formulating the Question

Statement of the problem is the first step in evidence-based practice. Beginning evidence-based practitioners may make the question too global, "Does Accelerated Reader work", instead of specific, "What will increase Johnny's motivation to read". The focus must be on the child, not the context. Contextual information that is important are the characteristics (symptoms, in medical terms), of the learner that

relate specifically to the learning environment. By the same token, the question also becomes not "what is the impact of school library media programs on academic achievement", but rather, "What kind of inquiry learning projects works best with Susie (a low-motivation, high-energy, under-performing student in Mrs. Smith's 11th grade government class). The answers to those questions form the building blocks of the answers to the larger questions; the impact of the school library media program on the achievement of all learners in the school.

Statements of facts are usually if/then questions. If I create a book display, then the research participants (children under study) will check out those books. If I collaborate with the classroom teacher and jointly develop, teach, and assess an instructional unit, then there will be a higher level of information skill achievement for a particular child or group of children. Statements of belief, on the other hand, are characterized by the use of the word, "should". Collaboration should occur with every teaching unit. Children should love to read. Notice that the statements of belief do not create an answerable question through evidence-based research practices. Although statements of belief feed into statements of fact, and may reflect them, statements of fact are better questions.

Knowing how children learn information skills, gain technology expertise, and become motivated readers feed into the analysis of the larger-scale assessments that abound in schools. Lissitz and Schafer (2002) caution against what they refer to as "reductionism", defined as the inevitable forgetting that the standard is always larger than what is tested (p. 77). Mean scores for grade levels mask the true impact of school library media on achievement. Is analysis of large-scale assessments important? Of course, but first we have to compile evidence from practice that is based on student learning. Girod (2002) notes "we believe that the professional touchstone for both teachers and teacher educators is pupil learning, and that the progress of either as a profession will advance only when teachers are demonstrably able to help children accomplish the learning outcomes desired from schools" (p. 26).

Search of the Literature

The basic premise for searching in the research literature comes from John Dewey, "It is not necessary that many should have the knowledge and skill to carry on the needed investigations; what is required is that they have the ability to judge of the bearing of the knowledge supplied by others upon common concerns" (Norlander-Case, Reagan, & Case, 1999, p. 23). In some ways, the literature search is a meta-analysis, focusing on one question of practice and searching to see what other researchers and practitioners have written or investigated. Gibbs (2003) recommends searching using an explicit search strategy that focuses on the question. Good studies have a specific focus that is uniformly applied, and has rigorous criteria and analyses. Although some would say that the findings must be in quantitative terms, most educational researchers would now disagree, and allow qualitative studies that have a degree of rigor.

Empirical Investigation

After the formulation of a question and the search for evidence-based alternatives, the evidence-based practitioner experiments with the implementation of an alternative, taking careful notes and observations about the effectiveness of the intervention. After implementation, the results must be analyzed, and then repeated to ensure the same results with similar situations. This requires a high level of understanding of assessment, of the learning process, and of the learners under study.

Both Patterson et al (1999) and Smyth (1989) use this definition to further define the empirical investigation phase of evidence-based practice. Below are listed Patterson's questions (p. 8).

- What am I doing
- What does it mean that I choose to do it this way
- How are the students responding
- What does it mean that they respond in this way
- How did I come to do and see things this way
- What do I intend to change

This thinking rubric, as it might be called, is an outline of the types of reflective thinking that leads to a question. Figure 1 below illustrates the thinking rubric again, with the school library media aspect included.

Figure 1 Thinking Rubric – Evidence-Based Practice

Questions (adapted from Patterson et al, 1999)	First Reaction	Revision	Followup Notes
What am I doing	I am doing a book talk for a class of 8th grade reluctant readers .	I am encouraging the love of reading by motivating 8th grade reluctant readers.	Curriculum #
What does it mean that I choose to do it this way	I am doing it in the library so that they can check out books afterward	Book talks have been shown to motivate reluctant readers.	Find research
How are the students responding	The students are alert and attentive, for the most part	Students show more interest in some books than others. Some students do not appear to be interested. Some students appear to be hiding their interest	Tag books that have a high interest. Ask students why they liked or didn't like (writing assignment?)
What does it mean that they respond in this way	They like the book talk	Is it because it is visual, or because I am talking to them, rather than at them. Would they pay this much attention to this done over the television system, or as a web page?	Try different media and measure the response
How did I come to do and see things this way	I learned this in library school	Over time, I have found booktalks successful, and my research indicates the same	Keep a record of book talks, and the impact of those books.
What do I intend to change.	I will do more booktalks	I will evaluate student interest in each booktalk to see if together we can see which books appeal to which students.	What would happen if the students evaluated my presentation? Would I learn more about what to change?

This thinking rubric could lead to the development of several questions. First, is it true that every child could love to read if they found the right book? There may be one or two students in the above group who are more intriguing than others. The library media specialist may want to booktalk to this class on a regular basis, or try a variety of strategies, and note which ones are particularly successful. Other possible strategies could involve the use of different media, different print formats, and different strategies in booktalking, or even different props used in storytelling to make the story more visual.

Through this type of careful analysis of how one child learns the impact of the school library media program on the large-scale assessment measures can be more fully understood. Lissitz and Schafer (2002, p. 9), however, caution about the faulty uses of such data. They note that teachers should be aware of 4 points: First, be wary of thoughtless uses of norm-referenced analyses. Second, Lissitz and Schafer point out that the mean score for a school or classroom means very little for the learning of

each child. More accurate, progress-oriented analyses give far more data. Third, Lissitz and Schafer advocate more criterion-referenced uses of data, and fourth, score reports that meet teachers' information needs.

This last is extremely important in the improvement of practice. Classroom mean score is irrelevant. 50 % of the students in any class will always be below average. What is important, however, is if the individual students are learning more, if their progress on the criterion referenced tests improves, and if their learning continues to improve over time. Traditional score reports do not always give that kind of information.

To do this type of in depth intervention and analysis takes time. It is not a quick fix, and there is always some element of doubt, which John Dewey notes is the first requirement of reflective thinking. Norlander-Case, Reagan, and Case (1999, p. 25) notes: "To maintain the state of doubt and carry on systematic and protracted inquiry -- these are the essentials of thinking".

Benefits of Evidence-based Practice

Norlander-Case, Reagan, and Case (1999) point out that teaching is a moral occupation, and there are 5 direct recipients of the act of teaching. These are: children, parents, society, the institution, and the profession (p. 17). They also report 4 dimensions of teaching that especially resonate with the school library media profession.

- Access to knowledge
- Growing citizens
- Teaching in a nurturing way
- Moral stewardship of schools

The school library media specialist's role in each of the above is part of the schema of library/information science. Schemata, according to Glaser, is "interrelationships between objects, situations, events, and sequences of events" (1984, p. 100). It is tacit knowledge of the context of the library and information science professions. School library media professionals may not have as complete of a schemata of the context of each of the above recipients and dimensions of teaching as others in the education profession. However, the reverse is also true. Norlander-Case, Reagan, and Case (1999) note that teaching as a profession needs to care in a reflective search for improvement for each of these constituencies. Action research is one of those ways that this occurs, and it provides a learning environment in which school library media professionals can gain a richer schema of the school library media profession in the context of the school.

School library media specialists have a unique opportunity to add to their schema, and also to enrich the schema of others in the educational environment. While teachers give knowledge through content, school library media specialist teach strategies for

continuous and lifelong access to knowledge. School library media specialists are especially concerned with the legal and ethical tenets of information, while championing the freedom to read and the elimination of artificial barriers to information. Growing citizens in a real information world is a bedrock principle of library and information science. School library media specialists teach all students in the school and can develop relationships with students that other teachers cannot do. School libraries operate at the hub of the school, and have a unique opportunity to influence culture, development of a true learning environment, and other factors that imply moral stewardship.

School library media education is designed for first-time school library media specialists, regardless if it is at the undergraduate or graduate level. It is assumed that the purpose for seeking higher education in school library media is to gain initial licensure as a school library media specialist. School library media educators have only a few courses to move from teaching the beginning principles of the field to new students, to graduating professionals who are prepared to function at a high level of excellence. The level of expertise required for truly reflective practice will be difficult to achieve in the short time allotted for school library media education. However, even beginning school library media specialists need specialized professional growth. As Patterson (1993, p. 159) notes, "Teachers and students both need learning environments that encourage active inquiry on questions that are significant to their lives." Evidence-based practice can give that sense of active learning and inquiry.

Preparing School Library Media Specialists for Evidence-based Practice

Lyons and Laboskey (2002, p. 2) point out that teacher education works on the principle of scaffolding knowledge. Prospective teachers learn about the profession of education, then learn about children. Slowly, new more practical elements are built on this foundation, similar to a construction scaffold. Prospective teachers construct their own meaning of teaching over time, based on their increasing knowledge applied to their hands-on experience. The last year of teacher preparation is spent for the most part in the schools, where knowledge of theory becomes entwined in knowledge of practice.

School library media, whether embedded in a school of library and information science or in a school of education, rarely has the luxury of time. To add on the skills of inquiry and action research and a truly constructivist approach to what Shulman refers to as the prototypes, precedents, and parables (1986, p. 88) of school library media education would result in either that school library media specialists would not be prepared for the practical tasks associated with the position, or that another year of study would be added to the preparation for the field.

This is especially unfortunate when considering the practice-based development of the school library media profession. The two major shifts in school library media program development, the Knapp Model Schools Project and the Dewitt-Wallace

Reader's Digest Library Power program were forms of intervention scholarship, where practitioners made changes based on current theories of best practice. The knowledge of the school library media field, what is usually called "technical rationality", has been created in some part by practitioners.

Both the Knapp School Library Project and Library Power are "exemplars", which Lyons and Laboskey (2002, p. 6) refer to as a model of practice. The validation of those exemplars is measured by the degree to which others adopt and adapt the model. The school library media profession has been, for a large part, developed by the Exemplar/Validator concept. The latest edition of Information Power (1998) still reflects and validates elements of the 1960 standards, the Knapp project, and the Library Power years.

The missing link connecting our practice-based historical development to true evidence-based preparation is the community of school library media scholars. The technical rationality of the school library media academy will need to move from acting as outside evaluators or consultants to being first-line interventionists to the exemplar/validation process.

Lyons and Laboskey (2002, p. 17), begin their argument by noting that teachers and teacher educators are not usually seen as members of the same profession. In medical school, medical educators usually practice medicine, and therefore use their professional skills as part of their teaching. When asked directly "do you teach what you do", professors may rightly answer "yes", because what they do is research, and the knowledge of what they teach comes from their research. The opposing argument of course is that professors are creating the body of specialized knowledge on which the definition of a profession is based (Norlander-Case, Reagan, & Case, 1999, p. xii). A reinforcement of the argument that professors and practitioners are two separate professions is Schon's assertion that all professions, not just education, are likely to state that they really learned how to be a doctor, lawyer, teacher, etc, when they got into practice (Schon, 1982, p.29)

Teacher education has moved in some respect to a more practice-based professoriate, however there are still unresolved issues. First is the issue of how higher education faculty is hired, rewarded, and promoted. Second is the issue of faculty time/workload (Girod, 2002, p. 355). Higher education faculty members produce new knowledge for their profession. Excellence in teaching may be expected, but excellence in scholarship is required.

Several scholars, Argyris and Boyer among them, raise questions about the separation of practice and theory. Argyris points out that technical rationality is built on rigid and controlled conditions, the basics of traditional institutional research (Arygris & Schon, 1974). Such research takes years to study. Real-time decision making operates in a time crunch of hours, not years. The context in which decisions are made evaporates under the rigor of institutional research. Boyer, in his Scholarship Reconsidered (1990), posits that a new scholarship should be considered. He

suggests that a scholarship of integration, scholarship of application, and a scholarship of teaching be added to the traditional scholarship of discovery, what Schon (1995) calls the institutional epistemology of scholarly research. Boyer's description of these new forms of scholarship speak to the type of preparation evidence-based practitioners will need. The scholarship of integration, for school library media faculty, means integrating the school library media preparation program with other disciplines in the university, and integrating school library media research with appropriate disciplines in the academy. The scholarship of teaching, especially important for school library media educators, is an opportunity to model evidence-based research practices.

The scholarship of application applies scholarly knowledge to specific practice situations, and analyzes and reports the results of that analysis. Argyris and Schon make the call as well for "researcher-interventionists" (1974, p. xvii). He describes the conceptual framework that erases the barrier between the technical rationality of the researcher and the application in a real-world setting. Argyris and Schon encourage planned and thoughtful interventions from the university to the organizational setting. In this context, school library media researchers will be active participants in the teaching and learning processes of K-12 schools, modeling the evidence-based practices expected of school library media students.

Teacher Work Sample Methodology

One of the ways to implement evidence-based preparation for school library media specialists may be in the implementation of Teacher Work Sample Methodology (TWSM). Developed at Western Oregon State, TWSM is "a means of systematically and meaningfully connecting teaching and learning" (Girod, 2002, p. 1). Simply stated, TWSM and other such programs evaluate pre-service teachers on the degree to which they reflect K-12 student learning. If implemented in school library media, school library media candidates for licensure would prepare instructional plans, describe the learning outcomes that children are expected to achieve, the strategies to achieve them, and the methods by which they will be assessed. They would implement those plans, and then participate in a thoughtful reflective discussion of whether the teaching has been successful. This means that a school library media education class may be discussing in the higher education learning environment the work that they do with students in schools. Clinical review of student learning is almost unheard of at this level.

The tools needed to develop a TWSM model for school library media are extensive, given the limited time available for scaffolding of skills. The knowledge base, adapting the variables found in Shulman, (1986, p. 9) are content knowledge of library and information science; pedagogical knowledge about the science of teaching; curriculum knowledge (information skills); pedagogical content knowledge (how to teach information skills); knowledge of learners; knowledge of educational contexts; and knowledge of educational ends, purposes, and values.

The impact of developing a TWSM-based model for school library media is tremendous, but the impact of the faculty workload on school library media scholars is even more daunting. There simply aren't enough school library media scholars in preparation programs. One-person school library media programs exist in even the largest library schools. Recruitment, course development, teaching, advising, practicum supervision, and now the addition of evidence-based intervention will limit the ability of school library media scholars to do the necessary research to support such programs.

Conclusion

Are we as the school library media professoriate teaching the skills that school library media specialists need in order to become evidence-based practitioners? In some respects, our colleagues in the schools of education have accomplished progress toward that ideal. The move to professional development schools have helped draw the university professors and K-12 teachers together. Education faculty members at the university level are expected to demonstrate service at the K-12 school level, and the type and level of service is an important part of the promotion and tenure process. The same is not usually true for school library media faculty.

The typical M. Ed experience for classroom teachers draws on the skills scaffolded in the undergraduate experience and molds teacher leaders as reflection practitioners, with skills aligned with NBPTS processes. The school library media Master's experience does not exist in that same manner.

The classic definition for a profession is specialized knowledge requiring specialized training, a definable client base, and a degree of autonomy or self-regulation. To continue the development of the school library media profession, there has to be a group of school library media specialists who have a high degree of knowledge and skills, who understand the values and beliefs underlying the profession, and be willing to take risks to implement those values and beliefs.

School library media students, moving from a non-awareness of their professional roles to experienced evidence-based practitioners, will feel a certain amount of "disequilibrium" as they try to make sense of their teaching. The need exists to incorporate skills within the master's degree learning experience, but we also have to offer professional growth experiences for school library media practitioners in the field that will enable them to become truly evidence-based practitioners.

REFERENCES

Argyris, C. & Schon, D.A. (1974). Theory in practice: Increasing professional effectiveness. San Francisco: Jossey Bass.

Boyer, E. L. (1990). Scholarship reconsidered; Priorities of the professoriate. Princeton, N.J.: Carnegie Foundation for the Advancement of Teaching.

Gibbs, L. E. (2003) Evidence-based practice for the helping professions; A practical guide with multimedia. Pacific Grove, CA: Brooks/Cole.

Girod, G. R, (2002) Connecting teaching and learning; A handbook for teacher educators on Teacher Work Sample Methodology. Washington, D.C.: AACTE.

Glaser, R. (1984). Education and thinking; The role of knowledge. American Psychologist, 39, (2), 93-103.

Johnson, A. P. (2002). A short guide to action research. Boston: Allyn and Bacon.

Lissitz, R. W. & Schafer, W. D. (2002). Assessment in educational reform; both means and ends. Boston: Allyn and Bacon.

Lyons, N. & LaBoskey, V.K. (2002). Narrative inquiry in practice; Advancing the knowledge of teaching. New York: Teachers College Press.

Meyer, J.W. & Rowan, B. (1991). Institutionalized organizations: Formal structure as myth and ceremony. In Powell, W. W. & Dimaggio, P. J. (Eds.) The new institutionalism in organizational analysis. Chicago: University of Chicago Press (pp. 41-62.

Norlander-Case, K., Reagan. T.G., & Case, C. W. (1999). The professional teacher; The preparation and nurturance of the reflective practitioner. Agenda for education in a democracy, no. 4. San Francisco: Jossey-Bass.

Patterson, L., Santa, C. M., Short, K., & Smith, K. (1993). Teachers are researchers: Reflection and action. Newark, DE: International Reading Association.

Sackett, D. L., Richardson, W. S., Rosenberg, W, & Haynes, R. B. (1998). Evidence-based medicine: How to practice and teach EBM. Edinburgh; Churchill Livingstone.

Schon, D. A. (1995). The new scholarship requires a new epistemology. Change, 27, 26-34.

Schon, D. A. (1982). The reflective practitioner; How professionals think in action. New York: Basic Books.

Sergiovanni, T. J, & Starratt, R. J. (1979). Supervision: Human perspectives. 2nd ed. New York: McGraw-Hill.

Shulman, L. S. (1986). Those who understand; Knowledge growth in teaching. Educational Researcher, 15, (2), 4-14.

Smyth, J. (1989). Developing and sustaining critical reflection in teacher education. Journal of Teacher Education, 40, (2), 2-9.

Building Evidence-Based Practice Through Action Research

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Curriculum reform efforts in schools around the world have focused on the importance of more rigorous assessment measures for student learning and the use of this data to improve teaching and learning conditions. The essential question for school library media specialists is how are we measuring student learning through the library?

The current *Information Power* guidelines (AASL & AECT, 1998) emphasize the building of partnerships to design and implement quality instruction. If this is the case, where is the evidence that library media specialists are indeed making a difference in our schools?

The most common statistics collected by library media specialists are quantifiable data such as the number of books circulated and the number of instructional sessions conducted. Such data are important; however, they do not begin to describe the "tangible outcomes...that are directly linked to local student success" (Todd, 2003, online). In today's schools where accountability for student learning extends to the entire educational community, library media specialists must be able to provide qualitative evidence of student performance in library-led instruction. This paper

- Describes action research as a means to collecting more rigorous and thoughtful qualitative evidence of actual student performance.
- Provides a case study of a school level effort to collect this type of data.
- Discusses the benefits of action research and the implications for moving beyond single teams to total schools embracing this approach to improvement.

Defining action research

Action research is deliberate, solution-oriented investigation that is group or personally owned and conducted. While the concept of action research can be traced back to the early works of Dewey in the 1920s and Kurt Lewin in the 1940s, it was Stephen Corey and others at Columbia's Teachers College, who introduced the term action research to the educational community in 1949. Corey (1953) defined action research as the process through which educators study their own practice to solve their personal practical problems. The prevailing focus of action research is to expand the practitioner's role as inquirer about teaching and learning through systematic school-based research (Calhoun, 1994; Copper, 1990). It is generally collaborative and includes characteristics of case study methodology (Dick, 2000; Belanger, 1992).

Action research is a combination of both action and research. It is based on the premise that practitioners can act as catalysts for each other's learning and

professional growth. By using the tools of inquiry to learn the craft of teaching, school professionals effectively model the practices that they wish their own students to demonstrate. The art of this research involves framing key questions, reviewing the literature, collecting and analyzing data, and communicating and using the findings.

University faculty can be critical partners in school-level action research initiatives. They contribute information on new practices, along with concepts and language from research that can help propel conversation. Teachers and library media specialists bring experience with students, knowledge of the limits imposed by curriculum frameworks, and craft knowledge of the daily rhythm and flow of life in schools. Through their joint study, university researchers and school practitioners develop deeper definitions of best practices.

How action research contributes to evidence-based practice

Action research is a means to more systematically and rigorously examine one's teaching and its impact on student learning. The current school restructuring movement has site-based, shared decision-making at its core. School teams are now accountable for their programs and practices. It is not enough for teams merely to make decisions. They must make decisions that are data driven. Therefore, it is necessary for them to be much more deliberate in documenting and evaluating their efforts. Action research is one means towards that end.

What action research looks like in practice

At Waikele Elementary School in Hawaii, the entire school community has been engaged in a study of student-centered, inquiry-focused learning for the past five years. Working in teams, the faculty has implemented a project-based approach to learning. They have also established various study groups to examine specific issues related to a student-centered approach in their curriculum. The library media specialist, Debora Lum, has been a critical team member and leader in this school-wide effort. One of her most successful partnerships has been with Kathy Souza, a kindergarten teacher. Two years ago, Lum and Souza developed an action research initiative to document how kindergarten students conducted an inquiry-focused project. They invited me to join them as a university partner (Harada, Lum, & Souza, 2003).

Research questions

Lum and Souza devised the following focus for their action research project:

- How can we nurture inquiry in kindergartners?
- How do we measure students' progress and performance in an inquiry-focused project?
- What roles do we assume as teaching partners in inquiry learning?

What happened

The opportunity to initiate this project presented itself when several students in Souza's class discovered a strange bug on the school playground during recess. Souza captured the bug in a container and brought it back to the classroom. This generated tremendous excitement among the youngsters, who were curious and eager to learn more about the bug. They generated questions they wanted to answer about the insect and three of the students volunteered to be the "bug investigators" for the class. The trio decided that the place to start was the library media center so they made an appointment with Lum. They combed the library shelves together but were not successful in their efforts. At that point, Lum suggested that the team might contact a "bug expert." They loved the idea. Souza helped them photograph the bug and they sent the digital image along with the following e-mail message to an entomologist at the local university:

Der Mr. Kumashiro:

We fownd a bug on the sidwok at or school. It is red and black. It has 2 antennae and small squares on its back. Kan you hlp us? We want to no if this bug is dangris and if it pichas and what it can do. Can you tell us its name too?

From kaya and mark and westin

The youngsters were delighted when Kumashiro responded with vital facts regarding the insect. He informed them that it was an assassin bug. He explained that it ate small cockroaches and used its mouth like a sharp needle to pierce small insects and suck out their juices. He mentioned that it could also bite people. In addition, Lum borrowed a CD-ROM from another library that described the bug as a bloodsucking, cone-nosed insect. The students also eventually found a photo of the insect on the Internet.

The young bug investigators shared all of this information with their peers. In addition, they wanted to get the word out to everyone else in their school. How might they do this? At first, they wanted to draw posters. When Souza suggested the creation of a video that could be aired over the school's closed circuit system, the students leaped at this possibility. The technology coordinator and video specialist joined the instructional team and helped the students conceptualize and produce a two-minute video that was shown to the entire school and at a parent night at Waikele.

Evidence collected

As part of their action research, Lum and Souza realized the importance of collecting evidence of students' progress. Rather than quizzes and worksheets, they focused on assessing student artifacts and on documenting audience feedback. They also maintained anecdotal records as teacher and library media specialist. These logs provided critical data on their roles and their insights throughout the month-long project.

Examples of the evidence they collected included the following:

- Memory chart of information retrieved by the students
- Class-created web of the inquiry process
- Criteria to assess the video
- Data chart to log audience feedback
- Anecdotal records maintained by the library media specialist and teacher

I elaborate on each of these data collection methods below.

Memory chart of information retrieved by the students

As the investigative team collected their information from the entomologist and through the CD-ROM and the Internet, Lum and Souza helped the students create a memory chart. By recording this information, students were able to see their own progress in gathering facts. The teacher and library media specialist helped them organize the chart by using key headings (see Figure 1).

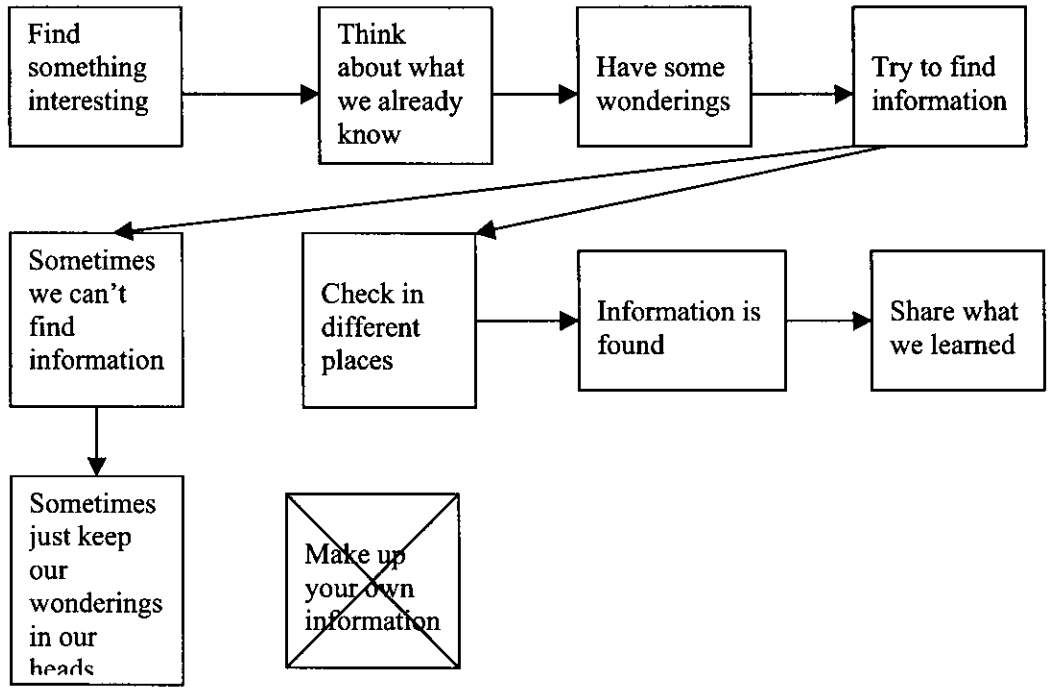
Figure 1. Memory Chart of Information Collected

Key headings	What we found out
1. How we found the bug and what we did with it.	Found on sidewalk near playground. Mrs. Souza put bug in container.
2. How we got information about the bug.	Made up questions about the bug. Looked at bug books in the library (nothing). Sent email to Mr. Kumashiro, bug expert.
3. What we found out.	Name is assassin bug. Sucks juice out of other insects with beak. Can fly. Can bite. Can be anywhere at our school.
4. Advice to people.	If you see the bug, don't pick it up. It can bite.

Class-created web of the inquiry process

Lum and Souza also wanted to find out how much of the inquiry process these kindergartners actually comprehended. Since the entire class had been closely following the investigation, Souza decided to have all of her students collaborate on a web or mind map that detailed this experience (see Figure 2). By using this visual presentation of the process, both instructors and students were able to clearly see the scope of the work involved. The instructors decided to retain this web and have the students continue to expand on it through the rest of the school year.

Figure 2. Web Representation of Inquiry Process



Criteria to assess the video performance

The content of the video had been captured on the memory chart (Figure 1). In addition, however, the students were encouraged to watch television news at home and Souza asked family members to suggest tips for "how a good news caster performs on camera." Based on the suggestions, Souza, Lum, and the students devised the following criteria to assess the students' performances:

- Get your information correct.
- Stand straight.
- Do not fool around.
- Speak loud and clear.
- Look at the camera.

The students used these criteria to critique their own and each other's works at rehearsals.

Data chart to log audience feedback

The students were eager to find out what other people thought about their video. They were not really interested in a critique of their performance as much as they wanted to know whether others felt their message was an important one. To help gather this type of information, Souza devised a classroom data chart to log any feedback received during the ensuing semester. Along with the instructors, all the students in Souza's class were encouraged to report any evidence of audience response to the video. Figure 3 is a partial example of the chart.

Figure 3. Sample of Data Chart of Audience Feedback

Who reported this?	Who said what?	When was this reported?
Erin	Mark, gr. 6, said he found assassin bug near the cafeteria.	Feb. 7
Roland	His sister in gr. 2 said she wants to do a video like this.	Feb. 8
Mrs. Souza	Custodian told her he is keeping is eye out for assassin bugs.	Feb. 8
Leilani	Romulo, gr. 5, said the video was "awesome." He found the bug near his classroom.	Feb. 10
Mrs. Lum	Two teachers have asked to do similar projects with their students.	Feb. 11

Anecdotal logs written by library media specialist and teacher

Being partners in a community of learners meant that Lum and Souza had to seek answers to the *why* and *how* of the learning experience. Through their reflection logs and conversations, they revealed the following insights:

- Children are natural learners, who are imbued with a sense of curiosity about the world around them. This curiosity led the kindergartners to hunt for

explanations and to actively seek relationships with others that extended their understanding.

- Student-generated questions are central to the inquiry process. These questions framed what the children wanted or needed to know.
- Teaching paradigms change in this type of learning. Lum and Souza found themselves experimenting with more facilitative styles of interaction that focused on coaching rather than telling. They gave students time to investigate and to pose questions that helped them think about the steps being proposed. Where appropriate, they made suggestions, offered options, and raised further questions that stretched the students' thinking and encouraged connections. Importantly, they invited students to make thoughtful choices.

Finally, Lum and Souza gained deeper insights into the synergy of collaborative curriculum planning. Their meetings ranged from short, informal debriefings to longer discussions in the mornings and after school. Souza brought to these sessions her experiences with the kindergarten curriculum and with appropriate instructional strategies, and her knowledge about the developing strengths and needs of her students. In turn, Lum shared her expertise in developing integrated curriculum, in teaching information literacy skills, and in accessing global resources. Together they explored standards in the curriculum and ways to differentiate learning.

Conclusion

In a truly dynamic learning environment, the process of inquiry is lived by both children and adults. Not only are all partners invited to make connections with their previous experiences but they are also challenged to go beyond them.

As the Waikele team discovered, participation in such a community of learners provokes conversations that stretch one's thinking and that promote self-initiated learning. Roles for the adults change. "Evaluation and reflection become an ongoing and natural part of the learning cycle. Genuine engagement challenges all participants to explore their own practices so that inquiry truly emerges as the center of the learning quest" (Harada, Lum, & Souza, 2003, pg. 71).

Without a doubt, teachers and library media specialists participating in action research become more reflective about their own practices. They attend more carefully to their methods, their perceptions and understandings, and their whole approach to the teaching process. Importantly, they think critically about how to develop the targets for rigorous teaching and learning and how to assess and evaluate the achievement of these outcomes.

While I have focused on how an individual team might engage in action research to strengthen evidence-based practice, an even more ambitious but vital challenge

would be to have entire schools embrace a culture of professional inquiry (Groundwater-Smith, 2000). Hargreaves (1999) refers to this notion as schools becoming knowledge-creating organizations. Building such communities helps all members grow as they focus on student learning, peer collaboration, and reflective dialogue (Schlager & Fusco, 2003). Library media specialists are potentially powerful partners in developing practices that effectively demonstrate not only *what* students learn but also *how* they learn. By contributing to solid school evidence of student learning, library media specialists also build an undeniable case for the value of their services and programs.

References

American Association of School Librarians, & Association for Educational Communications and Technology. (1998). *Information power: Building partnerships for learning*. Chicago: American Library Association.

Belanger, J. (1992). *Teacher as researcher: Roles and expectations.* East Lansing, MI: National Center for Research on Teacher Learning. (ERIC Document Reproduction Service No. ED 342 751)

Calhoun, E. F. (1994). *How to use action research in the self-renewing school.* Alexandria, VA: Association for Supervision and Curriculum Development.

Copper, L. R. (1990). *Teachers as researchers: Attitudes, opinions and perceptions.* Paper presented at the Annual Meeting of the American Educational Research Association. Boston, MA. (ERIC Document Reproduction Service No. ED 322 130)

Corey, S. (1953). *Action research to improve school practice.* New York: Teachers College, Columbia University.

Groundwater-Smith, S. (2000). *Evidence-based practice: Towards whole school improvement.* Paper presented to the Annual Conference of the Australian Association for Research in Education. Sydney, Australia. Retrieved September 27, 2003, at http://www.aare.edu/au/00pap/gro00303.htm

Harada, V. H., Lum, D., & Souza, K. (2003). Building a learning community: Students and adults as inquirers. *Childhood Education, 79*(2), 66-71.

Hargreaves, D. (1999). Revitalising educational research: Lessons from the past and proposals for the future. *The Cambridge Journal of Education, 29*(2), 242-260.

Schlager, M. S., & Fusco, J. (2003). Teacher professional development, technology, and communities of practice: Are we putting the cart before the horse? *The Information Society, 19*(3), 203-220.

Todd, R. (2003). Irrefutable evidence. *School Library Journal.* Retrieved September 27, 2003, at http://slj.reviewsnews.com/index.asp?layout=article&articleid=CA287119&publication=slj

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Documenting Student Achievement:

The Reflections of an Action Researcher

A Work in Progress

I teach an online course for the University of North Texas called Trends and Practices for School Librarians. When asked for input on course content, I immediately replied, "Add a module on action research!" Technically, action research is a process for bringing about sustainable change. It consists of five steps: formulating a question or identifying a problem, collecting data, analyzing data, reporting results, and developing a plan of action. For me, action research is the ideal method for exploring student learning, improving teaching, and documenting student achievement.

Learning from English Language Arts

My first experiences with action research occurred in the mid-80s when I was teaching high school English. (At that time, we called it "teacher research," but the investigative process was the same.) It was a time of change as K-12 teachers and academics explored the best practices for teaching writing. We used a variety of strategies to gather data. We reflected on our personal approach to writing in journals and learning logs. We observed our students as they wrote, and gathered samples of their work. We conducted case studies and kept records of our student-teacher conferences. Then we shared our work with colleagues by publishing our teacher research and conducting workshops. Most importantly, we struggled to create a common vocabulary for discussing the writing process, and we reached a consensus on a model of the writing process. Teacher research contributed to the evolution of a methodology for teaching writing. Teacher research gave me the tools for implementing evidence-based practice.

Discovering the Research Process

I moved from the English classroom into the library in 1989. My action research study was inspired by material in *The Information Skills Guide for Maine Educators* (Maine Educational Media Association, 1990). The guide included a model of the research process. Viewing the model, I realized why my students'

research papers were weak in content. I taught research paper format, not research process. I also left out critical stages of the process. Two action research questions emerged: What tools and strategies can I use to guide my students through the research process? How effective are these tools and strategies?

While taking courses toward my MLS during the summer of 1990, I devoured the library literature on teaching information skills. Colleagues in the fields of library science and English language arts provided encouragement and feedback. Anne Wescott Dodd, a friend and Student Teaching Supervisor at Colby College, suggested I consider the I-Search paper as a vehicle for teaching research. I returned to my high school in the fall with a new mission: to implement and evaluate a unit on the research process using the I-Search paper.

Using Action Research to Explore the I-Search Process

Upon returning to my school, I immediately sought the support of Bettie Martin who taught freshman English. Would she be willing to collaborate on an I-Search unit? I explained the I-Search format. Students selected a personally meaning topic to guide their research. The I-Search paper told the journey of their research experience as they recognized their information need, created research questions, selected resources, evaluated and interpreted information, answered research questions, and assessed their progress at each stage of the research process. Bettie agreed and I immediately revised my action research questions: What tools and strategies can I use to guide my students through the I-Search process? How effective are these tools and strategies? I also had one follow-up question: Will students transfer the research methodology from the I-Search to more traditional research units such as the sophomore term paper?

Throughout our collaboration, Bettie and I explored new ways of gathering data. Metacognition became an important component of data collection. Students reflected on what they learned and how they learned it by keeping learning logs. I kept a daily journal of my observations of students as they experimented with research tools and strategies. Bettie and I also employed more traditional evaluation tools. We tracked student process using rubrics. Students maintained portfolios of their work. But the most useful information came from the daily debriefing sessions. At the end of the day, Bettie and I reflected on our teaching and observations of students. What worked? What needed to be tweaked or changed? We frequently asked students for their feedback. Did they find our strategies useful? What could we do better?

A short time into the unit, Bob Tinkham, the Chairman of the English Department, became interested in our work. He had heard about the I-Search from his daughter who was in one of Bettie's freshman classes. We asked him to become our independent observer. Bob soon became a regular visitor offering his observations and suggestions. I also shared our findings with Julie Tallman, one of my former college professors. She was using the I-Search process with students in her graduate courses at the University of Iowa. Bettie's classroom and the library became the residence of a community of learners with the librarian, partner teacher, independent observers, and students working together to explore the process.

After several years of teaching I-Search units, I had gathered enough material to answer my action research questions and replicate my findings. Students who successfully completed the I-Search unit were able to transfer their knowledge of the research process to other assignments, especially the traditional research paper. Bettie and Bob agreed with the results, and we took our findings to the administrators and school board members. The English Department approved a plan to train all freshmen in the I-Search process. Action research became a means of documenting our success and the catalyst for positive change.

In spite of my findings, I felt I needed confirmation of our success from a university researcher. My next step was to invite Julie Tallman to conduct a study of our work. Julie's quantitative research study helped us tweak the process even further. Most importantly, it validated the effectiveness of I-Search and its teaching methodologies. We knew we had to share our findings with other educators. My action research and Julie's study resulted in several journal articles and our book, *Making the Writing and Reading Connection with the I-Search Process* (Neal-Schuman, 1997).

I recall the excitement produced by our publications. Students and their parents were thrilled when I asked them for their permission to tell their stories and publish their I-Search papers. Julie and I were the co-authors, but the book belonged to the community.

Fostering Reading Through Intrinsic Motivation

My current action research study is not as exciting as the I-Search experience, but it is equally as important. The study emerged from the debate over Accelerated Reader. The problem focuses on the use rewards to motivate students to read. While programs that use rewards produce temporary gains in reading achievement, research shows that it is intrinsic motivation that turns adolescents into life-long readers. How could I show my colleagues and administrators the value of fostering life-long reading through intrinsic motivation? The result is a two-year action research study conducted at Brewer High School in Brewer, Maine. The findings of this study will be presented at the 2003 AASL conference in Kansas City, Missouri. Some materials from my presentation are available to AASL members through KQ on the Web <http://www.ala.org/aasl/kqweb>.

Looking Forward

Now I share my experiences and expertise in conducting action research with graduate students in the School of Library and Information Science at the University of North Texas. My students design and implement action research studies for their school libraries. I provide the methodology and help to facilitate the process, but the most meaningful part of their work comes from the online support of colleagues. Students serve as peer coaches helping each other create action research questions, review the library literature, design their data collection and analysis, and determine ways of presenting their findings. I look forward to their stories as action researchers and encourage them to share the their findings. Imagine what would happen if more school librarians documented the achievements of their students through action research and published the results.

Building a Resource for Enhancing Information Literacy Skills Instruction: Research and Development

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Abstract

This paper describes the pre-development research and ongoing development and evaluation of *S.O.S. for Information Literacy,* a comprehensive, Web-based, multimedia resource for helping educators become better prepared to teach students to be information literate citizens of the 21st century. *S.O.S.* will be launched nationwide in 2005. Educators identify relevant Situation-specific variables ***(S)*** and desired instructional Outcomes ***(O)*** and a variety of instructional Strategies ***(S)*** are subsequently generated as part of a multimedia database of lesson plans and real-world examples, including photographic and video demonstrations. *S.O.S.* continues to be responsive to advancing technology and includes system feedback mechanisms as well as direct user input for ongoing evaluation and improvement. A selected group of more than 100 educators ("Pioneers") nationwide are presently contributing resources and participating in the development of *S.O.S.* to insure that the resource meets the needs of its target audience before going public in 2005. This paper discusses the front-end research effort, the development of its unique evaluation component to assess the quality of lesson plans and support material submissions, and the adoption of an outcome-based project evaluation model. *S.O.S. for Information Literacy* is funded by a National Leadership Grant from the Institute of Museum and Library Services.

INTRODUCTION

At no time in history has the ability to locate, organize, evaluate, manage and use information, skills collectively referred to as *information literacy*, been more important to today's learners. Classroom and technology teachers and library media specialists are challenged to find effective, innovative techniques for teaching research and information skills, especially to young children.

On both the national and state levels, education goals stress the importance of students' learning to use information to solve problems, make decisions, and develop skills for lifelong learning. The Association for Educational Communications and Technology (AECT) and the American Association of School Librarians (AASL) jointly established nine national standards and indicators for information literacy in their publication *Information Power: Building Partnerships for Learning* (1998). Principles for implementing information literacy standards specify the importance of 1) integrating information literacy with the content and objectives of the school's curriculum and 2) teacher-library media specialist collaborative instructional planning and curriculum development to guarantee the effective teaching of information skills (AECT and AASL, 1998). Yet, there are no support tools for improving instruction in this area, that encourage collaborative efforts, or that offer the power of capturing first-hand model teaching strategies and digitally storing specific visual and auditory examples in a quickly accessible manner.

The purpose of this paper is to: 1) provide evidence to support the need for a tool to enhance information literacy instruction, 2) describe the *S.O.S.* development process emphasizing specific decisions that have impacted its development and anticipated acceptance by the target audience, and 3) describe the role of evaluation in the development of *S.O.S.* It is hoped that sharing this experience may prove useful to other designers and developers who are planning similar projects.

BACKGROUND

Need for Effective Information Literacy Skills Instruction.

Education goals on both the national and state levels and across content areas specify the importance of students' ability to use information to solve problems, make decisions and develop skills for lifelong learning. Much of the responsibility for helping students develop their information literacy skills often falls to library media specialists at both the elementary and secondary levels. "Media programs are no longer measured by the number of books in the media center, but by the information literacy level of the students" (Anderson, 1999, p. 22). Stripling (1996) states that the quality of school library media programs can best be measured by the quality of teaching and learning in a learner-centered culture. Quality information literacy instruction motivates young children to not only become "effective users of ideas and

information" (AECT/AASL, 1998) but also to develop a lifelong intellectual curiosity, quest for knowledge, and love of learning.

The nine national standards for information literacy, established by the American Association of School Librarians and the Association for Educational Communications and Technology in their publication *Information Power: Building Partnerships for Learning* (AASL/AECT, 1998), identify essential skills required of information literate citizens. For these skills to be truly learned, they must be taught in the context of an authentic information need, such as a classroom activity, a research project, a homework assignment, or even in relation to a personal problem or decision in everyday life. Massell et al. (1997) assert that these new information literacy standards require new pedagogy, instructional organization, and attitudes. To prepare information literate citizens, teachers must shift their teaching philosophies from a product-orientation to a process-orientation, emphasizing critical thinking and problem-solving skills, integrating information exploration into learner-based curricula, and helping students understand the importance of information and information access, particularly in the context of information technology (Lenox & Walker, 1993; Demo, 1986; Hubbard, 1987).

While the standards and the numerous existing information literacy models do a good job of describing in detail *what* information literacy skills to teach, there are far fewer resources that address *how* to teach information skills, *how* to integrate them with the curriculum, and *how* to collaborate to plan and deliver creative and effective information skills lessons. In addition, there have been, to date, no support tools for improving teaching in this area that offer the power of capturing first-hand model teaching techniques and digitally storing specific video examples in a quickly accessible manner. Furthermore, there are no resources that combine such access to video demonstrations with sophisticated search technologies, making it possible to prescribe potentially successful strategies for attaining desired teaching outcomes under specific situational variables.

Although there are many books and articles for educators describing how to develop successful information literacy skills instruction programs, none provides real-life demonstrations that exemplify specific techniques used by practitioners for creating and delivering effective lessons and demonstrate those techniques "in action." A tool that offers (1) examples of best practice for pre-service and in-service library media specialists to emulate and (2) readily available resources to adopt or adapt to their information literacy skills lessons would help to ensure the quality and effectiveness of their teaching.

S.O.S. for Information Literacy, takes a systemic approach to the development and/or improvement of teaching skills and materials in the area of information literacy. Educators identify relevant Situation-specific variables *(S)* and desired instructional Outcomes *(O)* and a variety of

instructional Strategies *(S)* are subsequently generated as part of a multimedia database of lesson plans and real-world examples, including photographic and video demonstrations. *S.O.S.* is also a useful tool as a Web-based, multimedia tool for college faculty helping pre-service educators learn to develop high quality information literacy skills lessons.

Need for Librarian-Teacher Collaboration.

Research indicates that information literacy skills are learned best when teachers and library media specialists partner on the planning and implementation of lessons that are integrated with the curriculum. Principles for implementing information literacy standards specify the importance of (1) integrating information literacy with the content and objectives of the school's overall curriculum and (2) teacher-library media specialist collaborative instructional planning and curriculum development to guarantee the effective teaching of information skills (AASL/AECT, 1998).

Research also reveals that students have a greater opportunity for successful learning if the teacher and library media specialist collaborate and plan together when integrating information literacy skills and subject matter (Pitts, 1995; Todd, 1995). "Collaborating with teachers is the only way to ensure that information literacy skills will be learned within a meaningful context" (Gross & Kientz, 1999, p. 24). In a 2001 speech to the National Forum on Information Literacy, Ken Haycock stated, "The role of the teacher-librarian has been clarified to focus on collaboration and the integration of information literacy with classroom instruction...course integrated instruction is the more effective means of affecting student achievement...If we are serious about implementing information literacy programs, we need to start with the construction of assignments and the instruction provided for their effective completion." Often, however, educators have no experience with this type of collaboration for curriculum integration and lack clear models and examples of ways to accomplish this. Furthermore, *S.O.S.* provides such models and examples through videos of actual teaching episodes and other resources that incorporate collaborative planning/teaching and curriculum integration techniques.

There are currently no "just in time" methods that provide interactive tools for matching teaching needs to teaching strategies *at the exact time they are needed.* An interactive tool like *S.O.S.* that provides examples of authentic, relevant curriculum integration projects and librarian-teacher collaborative planning and team teaching activities at the precise time they are needed would benefit a range of educators, including classroom teachers, reading specialists, technology coordinators, and library media specialists. Library media specialists, possessing strong teaching skills while working with classroom teachers and others collaboratively using new technologies, can provide meaningful learning experiences for all children, especially those at risk of educational failure.

While this paper describes a unique tool to enhance information literacy instruction, its primary purpose is to describe the research and development process and the impact of decisions made on the development and implementation of *S.O.S.* Ultimately, it is hoped that such decisions will be reflected by an end product that will be enthusiastically adopted by educators worldwide.

The remainder of this paper is divided into two main topics (Design and Analysis, Development and Evaluation) with several decisions related to those topics. Each of the decisions, their rationale, and results to date are described in the sections that follow.

Design and Analysis

An analysis of S.O.S. user specifications and decisions regarding design of the S.O.S. database system included:

- involving the target audience early in the decision-making process.
- developing a research management site (RMS) for conducting a front-end analysis
- using a variety of data collection methods for front-end analysis
- adopting an iterative design approach for proof-of-concept prototype and ongoing development

Involving the Target Audience Early in the Decision-making Process

The decision to include members of the target audience early on was an easy one. The project team believes strongly in participative development and involvement of those who will ultimately adopt (or resist) the innovation. A decision to elicit information from a variety of audiences using a variety of data collection methods was made. The target audience was defined as educators (including library media specialists, reading teachers, classroom teachers and technology coordinators) and leaders in the library media field. Data collection methods for the target audience included online surveys, focus groups, and a progressive feedback panel.

This analysis provided information on the critical features that K-8 educators most wanted the proposed resource to include, the type and scope of content that should be included (information skills and sub--skills, lesson plans, features on educators, videos of in-action strategies, reflective interviews with practitioners, etc), desired search parameters (e.g., information literacy standards, content standards, topic and keyword, etc.) features that would add value to the database (e.g., help mechanisms, visual layout.), technical specifications, evaluation criteria, and so on.

Developing a Research Management Site

The Research Management Site (RMS) was a controlled online environment within which the focus group and progressive feedback panel activities could take place. The focus group tested the first iteration prototype while the progressive feedback panel tested a later version. The RMS was first developed in HTML and then brought into the WebCT Courseware environment so that threaded discussions could take place. Additionally, it served as a jumping off spot to link to the *S.O.S.* beta test site and as a return point to continue in the focus group or progressive feedback panel mode. This environment was well-suited to conducting front-end research because there were no geographic barriers to participation, it afforded a means of directing discussion themes by establishing various threads, support materials could be uploaded to the site, and all discussions could be saved and used for accurate reporting of results to the funding agency.

Using a Variety of Data Collection Methods

A variety of electronic data collection methods were used to gather information from a range of relevant sources. These methods included surveys, questionnaires focus groups.

Survey and Questionnaire. An online survey and questionnaire were developed and pilot tested. The first was intended for practitioners to provide feedback on potential curriculum content, perceived usefulness of the product, and plans for current and future technology implementation in respondents' schools and homes. The second targeted selected leaders in the field of school librarianship in order to gather consensus on the appropriate scope of content to include in the *S.O.S.* tool and to gather feedback on the proposed features of the tool. Each is described in more detail below.

Practitioners' Survey. A 40-item survey was designed as a comprehensive set of items including multiple choice, short answer, and open-ended questions. The first draft of the survey was piloted with 32 graduate students enrolled in a class called "Instructional Strategies and Techniques for Information Professionals" at Syracuse University, School of Information Studies. The pilot test served three purposes: 1) test the appropriateness of the survey's dissemination medium, 2) test the robustness of the dissemination medium, and 3) garner item feedback. After some modifications the survey was announced on several listservs (e.g. LM_NET, ED-TECH, RTEACHER) and 192 library media specialists, teachers, and technology coordinators completed it.

Ninety-four percent (94%) of respondents indicated that the *S.O.S.* system as described would be either "useful" or "very useful" to library media specialists and 85% felt it would be "useful" or "very useful" to classroom teachers. Participants were given a number of potential uses for *S.O.S.* and, while the majority indicated the importance of all the options, using S.O.S to help with lesson planning (85%; 163) was the highest rated response. Stimulating ideas (80%; 152), providing background information (67%; 127), and allowing practitioners to compare strategies provided

with current practice (65%; 124) were also highly rated uses. Fifteen (8%) indicated "other" (e.g. professional development, use in education courses). Information was also gathered on information skills and sub-skills to include in the system. Respondents overwhelmingly agreed that the inclusion of lesson plans would be a highly motivating component of *S.O.S.* and that standards tie-ins would also be important.

Questionnaire to Selected Leaders in the Field. A questionnaire was administered to a group of 11 selected leaders in the field of information literacy including university faculty, officers of professional educator organizations, and national consultants. Eight of the 11 responded. Responses resulted in clarification of several information literacy skills and the addition of several sub-skills as *S.O.S.* search options. This group provided useful suggestions for publicizing and motivating educators to use *S.O.S.* Respondents also provided a number of suggestions for *S.O.S.* features that were added to the design of S.O.S. They include:

- A listserv to allow educators to exchange comments and make suggestions as well as contribute lessons
- A way to add comments/reflections to the site which would then be available to others to peruse
- Printable lesson plans
- Links to state content standards in addition to national content standards
- Lessons that reflect collaboration with classroom teachers in specific subject areas
- Printed transcripts of video/audio clips

Focus Group for Pre-Service/In-Service Educators. A streamlined prototype was developed that addressed what we extrapolated from the survey data. However, at this point, no attempt to develop a graphical look was made. We concentrated on content delivery and search functionality. We knew that users wanted to be able to search by grade level and content area. We also added a motivation variable. That is, users could search by perceived level of incoming motivation of their students. Those were what we considered our "situation" variables. They could then select their desired "outcome" variables; these would be in the form of information skills and sub-skills to be taught, or any of the national information literacy standards. The system would then generate a hit list of strategies, if they had requested same, or lesson plans. Each of these categories were linked to related resources such as image files, handouts, or videos, if available. Users could also simply search on a topic, if they chose. While this design was very rough, it was a place to start. At this point, we decided to test it with a group of real users.

An online focus group consisting of 11 pre-service and in-service educators (potential future users of *S.O.S.*) was recruited from a distributed geographic location. This allowed us to continue to gather information from a broad constituency.

All focus group sessions were conducted online using WebCT, a Web-based learning environment. Using WebCT's asynchronous discussion, the focus group provided valuable feedback on important issues that related to the *S.O.S.* prototype,

including scope of content, inclusion of standards, value of lesson plans, variety of videos, amount of information presented in videos, links, etc.

While focus group participants were enthusiastic about being able to search by information skills/sub-skills, they were less enthusiastic about having to input students' incoming motivation levels. Their feeling was that all lessons included in the database should be motivational to most students, that searching on that additional variable would make the interface too cumbersome, and could limit the hits on a search in a database just beginning to be filled with content.

This group also provided input that resulted in the adoption of the national information literacy standards put forth in *Information Power: Building Partnerships for Learning* (AECT & AASL, 1998) as the basis of the information literacy standards search. They also felt that lessons should at least include identifiers for related curriculum standards on the national level.

Quality control of content was also considered an important attribute of the future tool. The focus group provided a number of possible ways to insure quality control of content including a quality assurance committee, expansion of the online feedback mechanism, and the development of an evaluation tool that could be used by trained review teams. The consensus seemed to be that anything uploaded to the *S.O.S.* site should be considered a quality product. After collecting the first set of data, curriculum decisions were made that included what content, structure, and types of searches that would be offered.

Adopting an Iterative Design Approach

Following data collection, it was back to the drawing board, knowing that we had made some good decisions but that lots of issues still needed to be addressed. The easiest first step was eliminating the motivation variable; easy, technically speaking, but more difficult to simply let it go. We had become somewhat attached to the idea of including the motivation piece and were convinced of its importance; however, it proves that the analysis phase is critical. The target users didn't want it and so it most likely would have been a detriment to the system being adopted if not dealt with at this juncture.

We also decided to at least tag the existing lessons in the database with national content standards using the Mid-Continent Research Education Lab (McREL) standards. We did not make it possible to actually search on that variable, however, at that time. The interface was addressed, colors were selected, a preliminary logo designed, and a spotlight page (feature highlighting one or more educators and a topic) was designed. One of the features was on collaboration. Additional videos were planned for inclusion in the sample database.

For the second iteration prototype, the technical development activities revolved around improving the collection of information from a variety of sources, streamlining the mechanism to enter or query data, and deliver a wide variety of media as efficiently as possible. This solution was then integrated into a

comprehensive Web site using the interface and graphical elements provided by the designers.

A relational database was custom developed and a number of changes and additions were added to the database. Strategies could be related to lesson plans, lesson plans could be related to strategies and an unlimited number of resources could be attached to either. Supported resources included, but were not necessarily limited to, QuickTime video, Power point, text, QuickTime audio, pictures, and Web links. Special care was taken to allow content to be cross-referenced. Videos included "in action" videos of the lesson in progress, "reflection" videos of the practitioner reflecting on a completed lesson, and "child perspective" videos in which a student describes the lesson from his or her perspective. A number of other decisions were made related to data entry, user interface design, query functions, video production and acquisition, and data delivery issues to allow *S.O.S.* to be utilized to its full potential.

Progressive Feedback Panel. The second iteration prototype was tested with another group of educators who we called the "progressive feedback panel" because we anticipated that they would follow us throughout development providing input along the way. The panel consisted of several members from the original focus group plus new members. This configuration was chosen to provide a balance between continuity of feedback and fresh input from persons not previously connected with the project. Eight library media specialists, two classroom teachers, and one district-wide technology coordinator comprised the group. They were given instructions for reviewing the site individually, and subsequently filled out a comprehensive questionnaire.

The questionnaire was developed by the principal investigator and senior project consultant to elicit feedback in two main areas 1) searching functionality across strategies and videos, lesson plans, topics, and standards, and 2) interface and design. This site was then presented to the panel who helped us evaluate the 2nd iteration of the proof-of-concept prototype in the above areas and on specific issues that included: ease of use, features that might attract educators, quality of content, technical quality, menu buttons, color appeal, etc. (Whereas the focus group was concerned with content issues and functionality, this group was also concerned with interface issues.)

In addition to rating various aspects of the tool on a scale, participants provided many useful suggestions via open-ended comments. The Panel gave *S.O.S.* high scores (4.1; n = 11) on the intuitiveness of searching with the Strategy and Lesson Generators (1 = not intuitive; 5 = very intuitive). They gave an even higher score (4.4; n = 11) on the usefulness of the "related resources" which included videos, lesson plans, graphics, etc. Such resources are intended to help clarify, enrich, or reinforce the teaching strategies suggested by the strategy generator.

In terms of quality of video, most comments reflected high enthusiasm for the videos. "This is some of the highest quality [video] I have seen on the web!!!" wrote one respondent. Another stated:

> "It is always valuable to hear from colleagues. When I see the enthusiasm of the person in the video, it makes me more likely to try their strategy. The videos are a valuable part of *S.O.S.*"

There were a number of comments, however, that indicated concern about the speed of access of the videos. Some of the longer videos took an extremely long time to load if the user did not have a direct connection to the Internet. In addition, some participants required technical support from staff due to browser or other technical issues.

Anyone contemplating the use of video in projects may find the following results relevant:

- Participants commented that the voiceovers that were added to some of the videos were of professional quality, helped to clarify points made by the speaker (educator), and were effective in providing transitions.
- After seeing two examples demonstrating an alternative video production technique in which educators submitted photos edited into a video with added voiceover, almost all panel members agreed that this was an effective and useful alternative to all-motion video. This indicated to us that many educators still feel more comfortable producing media using a still camera than a video camera.
- Opinions were mixed on the value of including video transcripts but one important comment was made that transcripts may be useful for the hearing impaired.
- Some panel members felt the current size of the video frame used in the prototype was adequate (240 X 180); others felt it should be twice as large.
- As technology advances allow, we anticipate increasing the size of the video at least two-fold. We selected the current size in order to conduct research with users who would not have been able to accommodate the larger video size at this time due to unreasonable loading times.

Comments were solicited on the usefulness of the search function for information literacy standards. Responses were generally positive and included:

> "This is a good search. Often we are looking for a specific idea to teach a standard required in our curriculum and this will be a good resource for it."

Another wrote:

> "This will be handy when my co-librarian and I are in the midst of our curriculum and benchmarks we are writing based on the ILS [information literacy standards] from *Information Power*. Great examples."

Although not implemented in the prototype, participants were asked to assess how useful it would be to search *S.O.S.* by nationally recognized content area standards such as those compiled by the Mid-Continent Research for Education and Learning (McREL) in addition to searching by information literacy standards. On a scale of 1 (not useful) to 5 (very useful), this item received a 3.7. One Panel member wrote: "I

believe the national standards are adequate. Users can interpolate where the standard they are looking for is within the national standards."

Panel members offered suggestions for improving the Topic Search function including providing drop-down menus of topics, clarifying directions, providing the ability to browse available topics, and adding a help menu. Positive comments included those who liked the "quickness" and "ease" of the search in addition to its potential helpfulness in searching for ideas to integrate into classroom instruction.

From a design and navigational perspective, *S.O.S.* was generally well received. It had received a complete overhaul from the simple design and layout of the initial prototype beta tested by the focus group. Panel members commented positively on the colors, banner, the appealing look, and layout. Still, the screens required more scrolling than users were willing to accept which meant a more sophisticated method of providing search options would need to be designed during the development phase.

Finally, comments from both the focus group and the faculty/leaders questionnaire had previously mentioned the desirability of including a section where visitors could find news, features, special videos, or other information. This was included in the second prototype iteration reviewed by the progressive feedback panel. One person commented on its potential value for encouraging collaboration.

In the prototype, one of the *"In the Spotlight"* feature stories focused on a teacher from New Hampshire who cleverly wove eight information skills into a 6-week social studies unit on communities, describing how her students actually built a play community in the woods behind their school as a way of learning the concepts. Also *"In the Spotlight"* was a library media specialist talking about ways to foster collaboration between classroom teachers and library media specialists. This was presented as a video interview. Because this component of *S.O.S.* helps the site maintain a feeling of currency, a decision was made to include it a part of the full *S.O.S.* development.

Development and Evaluation

More than a year passed before we received funding to go into full-scale development of *S.O.S.* During that time, we decided to:

- adopt an incremental scaling-up approach before "going public" prematurely.
- use the Web-based Research Management Site as an environment to collect evaluative data from potential users on the progress of the system in order to inform the technical development.
- ensure quality submissions to the database.
- provide a virtual training site which educators can use when preparing their lesson plans for submission to ensure success.
- adopt an outcome-based evaluation model to assess our progress and outcomes

A Scaling-Up Approach.

A decision was made to invite a selection of individuals from the target audience to participate in building the database throughout the development process, before launching *S.O.S.* nationwide. The risks of full-scale implementation before there is substantial content include (1) subjecting your audience to a neonate database with so few offerings that successful searches are not the norm and (2) having a large group of people live through the technical glitches you thought were solved but they found new ones.

An initial group of "S.O.S. Pioneers" (approximately 100 educators selected from a pool of a potential 200 participants throughout the U.S., Canada, and England) came on board during the sixth month of development. Like the name implies, the *S.O.S.* Pioneers are helping the project forge ahead, breaking new ground along the way. And, like all Pioneers, they expect that the journey may be bumpy at times. Being an extension of the development team, they are experiencing both the core team's elation at each new development that works and meets a need, *and* the team's disappointment when a technical gliche has reared its ugly head. Yet, going back to the drawing board inevitably results in something much better than the original.

The second aspect of this scaling up approach involves functionality. Rather than wait for multiple aspects of the system to be ready for use before bringing in the target audience for testing, *S.O.S* is only releasing one piece at a time. This has been a tremendous help with tracking problems and making fixes. At the beginning of this phase, the decision was made to develop the submissions software first. This is the software that allows the user to contribute a lesson plan, media, or other resource. It made the most sense to work on this first because it meant we could start early collecting content for *S.O.S.*

The Pioneers accepted this incremental process; it also meant that by the time we were finished with the display side, they could actually start looking at some of the contributions of their colleagues. Other functions that Pioneers will soon experience include printable lesson plan templates for their own use, a "Spotlight" section with special featured topics and educators, and added functionality that allows users to track what they have submitted and what topics they have recently searched.

This approach means development and pre-implementation are constantly dovetailing. When the tool is complete and ready to "go public," it is expected that there will be some content in the database, the content will be of high quality, most of the technical glitches will have been solved, and we will have a group of individuals who will transition from Pioneers to S.O.S. advocates.

Using the Research Management Site (RMS)

The RMS continues to be an excellent environment for conducting focus groups with geographically-distributed participants to collect ongoing data about the

functionality and new features of *S.O.S.* It is also becoming helpful as a place for disseminating information to Pioneers.

The RMS has evolved into an Evaluation Management Site (EMS) for the current development phase and continues to use a WebCT interactive environment which allows asynchronous or synchronous discussions, surveys, and one-on-one interviews with focus groups and the progressive feedback panel. Progressive feedback makes sense when using an iterative design approach where each feature is tested before full-scale implementation. Creating an online environment for research and evaluation provides a number of benefits such as continuity for participants, a place to house supportive information and instructions, and a convenient method of collecting feedback useful for later reporting.

The results of the front-end analysis and continuing evaluative data collection are informing technical decisions throughout the development phase of the project. A few of these decisions are:

- being able to view one's completed lesson plan.
- a lesson plan template to facilitate lesson creation.
- a media submission template to assist in incorporating media components.

Ensuring Quality Submissions

One of the findings of our initial research during S.O.S. prototype development was that users wanted only high quality content in the database. Therefore, we are employing several methods to insure this quality. They are 1) training and 2) peer review.

Potential *S.O.S.* contributors are asked to participate in the virtual training (see below) which not only addresses how to make the best use of the resource but also presents important concepts related to motivation and learning. Providing motivating instruction is one of the underlying goals of *S.O.S.* Most pioneers have either attended workshops in which *S.O.S.* was a major component or participated in the *S.O.S.* virtual training.

The second method for ensuring quality was the development of criteria for online submissions and the creation of teams of reviewers who would access, review, and rate each submission as it was submitted to the database. The criteria for online submissions was adapted from that used by the Gateway to Educational Materials (GEM) for which one of the authors had been a principal investigator.

For the *S.O.S.* project, a consensus approach to reviewing each submission was developed. When a new submission is received, a copy of the submission/record is stored in an archival database, to which a team of two reviewers has access. Using the established criteria, the two reviewers review the submitted lesson plan individually. If there are no discrepancies that would change the acceptance of the record, there is consensus. If the lesson plan is approved, the appropriate message is sent to the submitter. If there is not consensus as in severe discrepancies, the reviewers discuss the lesson plan in order to reach consensus. The evaluation form used by the

reviewers allows them to send feedback to the submitter. There is always some motivational feedback but, in cases where revision is required, informational feedback is provided. Each submission is subsequently either accepted, accepted with revisions, or rejected.

Providing Virtual Training

All Pioneers agree to (1) participate in *S.O.S.* training if they have not attended one of the S.O.S. workshops, (2) contribute at least one resource to the database for each year they participate during the development process, and (3) provide feedback to the project team during the ongoing development.

The virtual training is intended to help Pioneers create successful *S.O.S.* lesson plans. The virtual training site includes (1) background information about the project and the importance of creating motivating information literacy skills lesson plans, (2) tips for designing *S.O.S.* lesson plans, supporting media, and successful collaboration with other educators, and (3) step-by-step instructions to guide Pioneers through the submissions process.

ADOPTING AN OUTCOME-BASED EVALUATION (OBE)

When developing software, it is often easy to fall into the trap of writing objectives that refer to what you will be accomplishing in the course of development. For example, it is common to see a goal or objective for product development written something like this: "Fully develop and evaluate a unique, state-of-the art, Web-based information system for K-8 educators." Yet, that goal is really only an activity (with many subtasks, of course). OBE forces you to step back and think about why you are building that software and who shall benefit from it. It is only then that it is possible to identify the best possible ways to measure success.

OBE involves thoughtfully constructing your desired outcomes in terms of benefits to the users and then developing indicators to measure the extent to which success has been achieved. An outcomes-based evaluation approach is particularly useful for measuring impact on the people served by a program (IMLS, 2000). The evaluation plan should (1) clearly articulate the program's benefits and intended impact (goals), (2) identify indicators for measuring the benefits and impact with a particular focus on promotion of diversity among students, (3) designate information collection methods, activities and sources, (4) identify the target audience(s) to benefit from the program, and (5) pinpoint when data will be collected (IMLS, 2002).

S.O.S. project outcomes include:

1. Participants (e.g., library media specialists and classroom teachers) will improve their information literacy instruction.

2. Participants will become partners in the continuing growth of the *S.O.S. for Information Literacy* project by contributing to and using the resource.

3. Participants will increase their confidence in teaching IL skills.

4. Participants will increase and improve their collaborative efforts with other educators.

5. Participants will report increased student motivation for learning and using information literacy skills.

6. The profession will recognize *S.O.S. for Information Literacy* as a valuable resource for their constituency.

The evaluation plan was created to specify which observable measures or behaviors (indicators) would be used to assess each outcome listed above, select methods and instruments for data collection, determine at which intervals data would be collected and establish the degree to which each outcome must be achieved in order to consider it a successful outcome.

Developing a Project Management Tool

One of the challenges of this project was (and continues to be) that core team members are spread out geographically. Additionally, as in most projects, individuals are selected because of their areas of expertise as opposed to their general skills in project management. Thus, the criteria for the *S.O.S.* project management tool (PMT) include (1) a seamless interface of project members regardless of physical location (2) a low learning curve (3) easy access to and archiving of all project management information (4) OBE compatibility, and (5) low cost.

The project's technical director was able to repurpose online calendar components from other projects for *S.O.S.* to establish useful categories (in OBE terms) for inputting information and make it possible for all members to access and contribute to the calendar. For example, the calendar display allows team members to select from the major activities set forth in the OBE plan. Some of these activities include software development, virtual training, recruitment, evaluation/OBE, administration, and media production. It is easy to see at a glance which activities are happening or planned in any given time period (day, week, month) and the lead person for each activity. Team members can also choose to display project outputs (equivalent to milestones), including number of participants served, number of teaching resources accepted to the database, amount of virtual training delivered, etc.

Having activities and outputs in such a quickly accessible form also facilitates ease of project reporting to stakeholders. The project management tool continues to be an effective method of keeping abreast of each team member's activities and of providing the overall picture of the project's progress at any given time.

CONCLUSIONS

In this paper, we have provided background on the importance of information literacy skills and of sharing methods for teaching them and some insights into the research and development process used in the *S.O.S. for Information Literacy* project. Conducting a front-end analysis that clearly demonstrated the target audience's needs and expectations paved the way for acquiring the necessary funding for full-scale development.

Adopting an iterative design approach for the proof-of-concept prototype helped to identify problems in the early stages of the development process. The research management site (RMS) used so successfully to collect focus group and progressive feedback information about the design of the *S.O.S.* prototype was reactivated as an ongoing evaluation management site (EMS) for the current development phase.

Proving to be a prudent decision was the scaling-up approach involving a select group of end users invited to participate in the development process (Pioneers) and delaying full-scale implementation until a sufficient number of invited participants have provided input, tested the resource's robustness, and populated the database with an adequate number of materials to enable successful searches when the tool is made available to all educators.

Providing virtual training to potential participants and the implementation of an online review mechanism with specific acceptance criteria has helped to answer an important early concern of potential users, that is, to ensure the content contained in this resource would be of high quality.

Using outcome-based evaluation to establish desired outcomes in terms of measurable benefits to users has helped to put all technical development goals in perspective. Using an OBE approach has also resulted in a smooth flow of all activities related to the evaluation. Designing a project management tool in the form of an easy-to-implement calendar using OBE activities and outputs has helped to overcome the challenges posed by working with a virtual team and proven to be an effective way for accessing date-related information for reporting.

While current development efforts are concerned primarily with addressing all the needs as specified in the front-end analysis, it would be unwise to consider that fulfilling those needs is all that will be required of this resource. Technology is constantly changing and the audience, impacted by both new technology and information, is continuously evolving.

Project teams for this resource as well as other Web-based educational resources must be observant of this evolution. Simply evaluating what you proposed may not be sufficient; the real future and success of a project may lie in going beyond what was promised by constantly conducting research on new or potential uses of the resource, adding new dimensions, expanding existing offerings, and constantly collecting and interpreting data on how each of these innovations affects the target audience. That's the real challenge.

REFERENCES

American Association of School Librarians (AASL) and Association for Educational Communications & Technology (AECT). (1998). *Information Power: Building Partnerships for Learning*. Chicago: American Library Association/AECT.

Anderson, M. A. (1999, Mar/Apr).Information Power: Because Student Achievement Is the Bottom Line. *MultiMedia Schools, 6*(2), 22-23.

Demo, W. (1986). *The Idea of "Information Literacy" in the Age of High Tech.* Unpublished paper, Tompkins Cortland Community College, Dryden, NY. Syracuse, NY: ERIC Clearinghouse on Information Resources. (ED282537).

Gross, J. and Kientz, S. (1999, Oct.). Collaborating for Authentic Learning. *Teacher Librarian, 27*(1), 21-25.

Hubbard. S. (1987). *Information Skills for an Information Society: A Review of Research. ERIC Digest.* Syracuse, NY: ERIC Clearinghouse on Resources. (ED327216).

Lenox, M.F. and Walker, M.L. (1993). Information literacy in the educational process. *Educational Forum, 57*(3), 312-324.

Massell, D., Kirst, M., and Hoppe, M. (1997, March). *Information Literacy and Education for the 21st Century. Toward an Agenda for Action.* CPRE "Policy Briefs," (Leesburg, Virginia, April 14-16, 1989). Syracuse, NY: ERIC Clearinghouse on Information & Technology.(ED330343)

Pitts, J. et al. (1995). Mental models of information: "The 1993-1994 AASL/Highsmith research award study. School Library Media Quarterly, 23(3), 177-184.

Stripling, Barbara K. (1996, Winter). Quality in School Library Media Programs: Focus on Learning. *Library Trends, 44*(3), 631-656.

Todd, R. (1995). Integrated information skills instruction: Does it make a difference? School Library Media Quarterly, 23(2), 133-139.

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Portals: Peril, Promise, Potential

"...if the network idea should prove to do for education what a few have envisioned in hope, if not in concrete detailed plan, and if all minds should prove to be responsive, surely the boon to humankind would be beyond measure" Licklider & Taylor, 1968, p. 40).

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Intellectual Connections

The current wave of educational reform has focused almost exclusively on the implementation of standards, relying heavily upon quantitative test scores to measure student academic achievement. Lost from this dialogue is research that demonstrates the importance of students' connections to teachers, curriculum, and peers as significant predictors of academic success (Sadowski, 2003). Studies indicate that people who are more successful have better access to capable experts and "...they access this expertise in one-on-one interactions". So *whom* you know is still as important as *what* you know (Huhns & Stephens, p. 89).

Technology has extended our concept and vision of ***connectiveness*** to include access to an increasingly wide variety of "experts" in every discipline and field imaginable, including libraries, museums, and cultural agencies; community resources; local, regional, national, and international contacts; and online data bases. The selections and possibilities continue to expand exponentially redefining the meaning and notion of what it means to be "literate." Although information technology cannot create knowledge, information technology should be viewed as a "...catalytic tool, which gives global reach to community members across large distances and time zones" (Ash, 2003, p. 3). Technology and telecommunications make knowledge more accessible and knowledge sharing drives the 21st century economy (Ash, 2003, p. 1).

How we communicate is rapidly transforming. Voicemail, electronic mail, instant messaging, text messaging and cell phones are ubiquitous, and a natural and sometimes expected part of our present day accouterments. We now face the pressing task of learning how to actively exploit technologies or we will be hopelessly exploited by them. The evolution of the Internet dates back to the 1960's, the World Wide Web emerged in 1991, and the graphical interface, or Web browser, was created in 1993. The actual study of Internet diffusion is still in its infancy and yet the use of the Internet between 1994 and 1999 has more than quadrupled in the United States (Hargittai, 2000).

A portal can be simply defined as a Web site or Web pages that link to Web-based services and resources such as email, forums, search engines, and online shopping. Web

portals have become the standard interface to aggregate resources and services through a single access and management point for users (Ketchell, 2000). Many researchers and analysts believe that we are in the very early stages of portal development and adaptation (Bolds, 2001; Firestone, 2000(a)(b), 2001, 2003). As such, portal evolution is pubescent at best, and the portal concept itself is nebulous because portal technology and their functional capacities are continuously changing (Jackson, 2002; Bolds, 2001).

This paper is a condensed version of a full length chapter in *Knowledge Communities: Bringing the Village to the Classroom* (soon to be published by Scarecrow Press). This paper will examine business portal trends and

- highlight the perils of data proliferation
- describe the importance of structuring information
- define portals and their iterations
- describe Enterprise Information Portals (EIPs) and subsequent variations
- discuss the promise of portal customization and next generation portals
- outline the importance of breaking down informational silos
- explain how lessons learned in business portal development can transfer to the K-12 sector via Learning Portals, and
- introduce the concept of Enterprise Education Information Portals (E^2IPs) and their potential to create teaching, learning, and ultimately Knowledge Sharing Communities.

Business Portal Trends

Businesses have discovered that, as Licklider & Taylor predicted over 35 years ago, computers are the key to revolutionizing the way we communicate, for "When minds interact, new ideas emerge" (1968, p. 21). A careful examination of the evolution of portals in the business sector provides important learning experiences to help schools and educators move forward in their development of Web-based services and resources.

In the beginning portals were nothing more than "...expensive wrappers around existing content" (Greengard, 2003, p. 31). Today, portals are viewed as a means to enable "...collaboration, supply chain management, customer relationship management, business intelligence and analytics, knowledge management, and e-learning..." (Greengard, 2003, p.27).

> ...as applications become increasingly Web-enabled, the portal becomes the place where information exchange and knowledge transfer take place...Just as the Internet evolved from brochureware to e-commerce, portals are growing in sophistication—allowing single password sign-on, and, in some cases, the ability to learn user preferences and adapt over time (Greengard, 2003, p. 29).

The future potential of portals undoubtedly stretches beyond our imaginations but advances in technology are providing businesses with new opportunities to manage and share resources, foster collaborative conversations, and create "knowledge organizations" (Ash, 2003).

Perils of Data Proliferation

It is reported that the world produces between one and two exabytes of unique information per year, which is roughly 250 megabytes for every man, woman, and child on earth. An exabyte is a billion gigabytes, or 10^{18} bytes, therefore it soon may be

technologically feasible for an average person to access virtually all recorded information (Lyman and Varian, 2000). The ability to navigate through this mammoth assemblage of data and integrate selective chunks of information into meaningful bits of knowledge may come to define, perhaps, humankind's exploratory quest for the 21st century. Unlike previous explorers who created maps related to physical or visible tangibles, maps of the digital world (the World Wide Web) tend to be multi-dimensional, elastic, and ever-changing. Standing atop gigabytes, terabytes, and even exabytes of information may not necessarily help us see further. It may only extend our heads further into the clouds or deeper into the sand. Brown and Duguid (2000) observe sagely that "...storage does not correlate with significance, nor volume with value" (p. xiii).

Although technology now allows us to capture and record **everything** 24 hours a day, seven days a week, we will never have the time to attend to all that is recorded. Lewis (2003) describes a famous allegory of a map of the world that grows in detail until "every point in reality has its counterpoint on paper" (p.78), the irony of course being that the map is simultaneously realistic and useless, since it becomes the very thing it intends to represent. Therefore the creation of such recordings is self-defeating and, in many instances, worthless. "If life gets recorded in real time, it hardly counts as a record at all" (Lewis, p.78). This represents a central problem for "knowledge management" where progress is often measured in terms of the amount of digital information produced or captured.

> ...'knowledge bases' can reach maximum capacity very quickly –and at exactly the same time maximum inutility. As digital production and storage grow ever cheaper, a reading of the information study suggests that a critical task ahead will be to stop volume from simply overwhelming value (Brown and Duguid, 2000, p. xiii).

The move toward total digitalization is fast and furious, and "...at the root of the problem lie issues of meaning, judgment, sense making, context, and interpretation—issues far beyond a simple search and deeply embedded in social life" (Brown and Duguid, 2000, p.xiv).

Traditional information sources, in retrospect, were simple and easy to define and confine: oral conversations, books, magazines, newspapers, tapes, microfilm, microfiche, radio, television, among others. Information today is packaged in disparate media formats, with a prolific array of derivatives. Examples of data proliferation permeate every facet of our lives. As an example, the American Museum of Natural History now has two million to three million fossils, 30 million items—bird and animal skins, pickled frogs, pre-Columbian pots, diaries, field journals, and sketches of explorers and scientists, that they hope to place in a searchable online catalog accompanied by images and test. On the surface this seems to be an exciting evolution toward a digital global museum—in effect a catalogue of the world (Gorman, 2003). Reed (2001) states that the power of selection and choice increases value, for "...the more options a network creates, the more value it creates for its users" (Reed, as cited in an interview by Weinberger, 2001, p. 3) but there can be little doubt that the ability to carefully select, evaluate, and synthesize meaningful information involves new information literacy skills of vital importance. "Unless everyone recognizes the influence of the media, and learns how to engage with it, their ability to participate in society is curtailed" (Jempson, p.8).

Structuring Information

The effective harnessing of information and data is absolutely essential to the success and continued existence of organizations and communities (Drucker, 1993; Senge, 1990; Rowley, 2000). Compared with 20 years ago "individuals, organizations, and society now face:

- more information, communicated from-
- a greater range of sources, through-
- a wider range of channels, many of which have-
- faster response and turnaround times" (Rowley, 2000, p. 218).

Determining how to structure the information on the ever-expanding World Wide Web is a problem. Web-based services, and, in particular, portals provide promising solutions.

Defining Portals

Terms used to define emergent technologies are often based upon pre-existing technologies. As our minds wrap around "the new" we sometimes use old terms that are most familiar to us -- for example the automobile was first described using such terms as the horseless carriage; gasoline buggy, or locomobile (Newsday.com). Portals today struggle with an identity crisis and they have been described as windows, gatekeepers, service providers, communication tools, community builders, link collections, application assortments, information locators, Web sites, personalized desktops, and even digital dashboards. They span a wide range of technology solutions offering everything from simple link lists and resource catalogues to sophisticated brokerage facilities for open electronic services (Zirpins, et.al, 2001).

Rowley (2000) defines a portal as a "...Web site that provides an entry point to the Internet with value added services such as directories, searching, information news, and links to related Web sites" (p. 217). Jackson (2002) cites Looney and Lyman's definition of portals as gathering of "... a variety of useful information resources into a single, 'one-stop' web page...[that] allow users to customize their information sources by selecting and viewing information they find personally useful" (p.1). Uimonen (1999) defines portals as Websites that aggregate a variety of online services and links to related sites. The difficulty in defining portals lies in their plasticity and fluidity. However, there does seem to be a growing consensus of essential portal features and functions (Jackson, 2002). A portal is not a product but rather an evolving concept, a gateway to information, a strategically organized collection of application services (such as software productivity tools) that work together to facilitate the user's access to information (Zirpins, et.al., 2001; Newman, 2002).

Zirpins et.al. (2001) describes two basic types of portals:

1. *Horizontal Portals or Consumer Portals* – Web sites that serve as entry points into the Internet. Such sites usually offer a broad array of resources and services to keep users returning and thinking of the site as their "home" page. The typical features of consumer portals include: searching capabilities, Web catalogues, messaging services, news, online shopping, and free home pages. The first consumer portals were hosted by online services, such as AOL. Most of the traditional search engines have transformed into consumer portals in order to survive and attract repeat visitors.

2. *Vertical Portals or Vortals* – Web sites that offer content and services directed to a specific domain or community. "Vortals can be focused on consumers with particular tasks, people at certain locations or communities with individual interests" (Zirpins, et. al., 2001, p. 1).

Little (2001) refers to vortals as the subject-based "intellectual building blocks" of portal networks, for they are designed to provide the identifying niche content that gives the "enterprise portal" its distinctive value (52). Niche portals have been developed through governmental and state education initiatives, an example is: FirstGov - http://www.firstgov.com - the official U.S. gateway to all government information. FirstGov describes itself as "...the catalyst for a growing electronic government."

Web portals have now become the standard interface to aggregate resources and services through a single access and management point for users (Ketchell, 2000). The projected portal market - infrastructure software and services to simplify integration of business processes - is expected to approach fifty billion dollars by 2005 (Duffer, 2001).

Megaportals

Websites began offering search services and categorization of online content to assist users in sorting through the exponentially expanding World Wide Web. Yahoo! and Excite homepages in 1994 were first generation Internet portals and served as gateway directories to information available on the Web (Raghaven, 2002, Hargittai, 2000). Lycos followed in 1995 (Hargittai, 2000). Most portal systems run either on high-performance application servers, or on robust servers combined with high-speed output and delivery system (Zirpins, et. al., 2001). Portals support interfaces to various back-end information stores and application servers (Zirpins, et. al. 2001). Megaportals were built to serve the needs of large groups of users, and offer the user personalization features. Google, Yahoo, and America Online, are considered megaportals (Little, 2001). More powerful than personalized customization features is the ability of megaportals to create what Little (2001) refers to as "thoughtful and logical group views" or channels (p.52).

Channels

Channels, on a superficial level, can be compared to a highly sophisticated filing or categorization system that allows different groups access to a "group-defined" set of folders and files. Access as such may be determined by the nature of one's job and/or position within an organization. Thus teachers might have access to one set of folders, administrators another, and students and parents yet another. This is accomplished by creating a database of content utilizing a middleware integrator to merge disparate resources, services, and applications with sufficient granularity targeted for specific user groups. The database can then be "...indexed and searched in ways that allow more or less granularity depending on the target audience" (Ketchell, 2000, p. 175).

Portal channels offer people access to an expanding range of content and extensive functionality in dealing with "information". Channels provide information, through customization, personalization, vertical integration, and sophisticated searching to avoid information glut (Ketchell, 2000).

Intranet Portals

Zirpins et.al., (2001) defines another subset of Vortals as *Intranet Portals.* Intranet Portals are business applications focused on the informational needs of personnel within a company. They can be customized according to the employee's information needs. "Intranet Portals give access to enterprise data, provide frequent business

applications like attendance recording or settlement of traveling expenses and support cooperation as well as workflows" (Zirpins et. al, 2001, p. 2).

In 1999 Oracle introduced its "portlet" concept to simplify the design of corporate Web portals (Uimonen, 1999). Portlets are applications within the portal used to offer different services on one page (Zirpins, et.al, 2001). Presented as a specialized content area that occupies a small window on the portal page, the user can modify (minimize or maximize) and move them around on the portal screen independently from the portal page (Zirpins, et.al, 2001). Portlets may be called different names by different vendors including: gadgets, blocks, Web Modules, and Web Parts.

Enterprise Information Portals

Historically each major computing paradigm has been accompanied by a user interface: mainframe computing with scripting language, client/server computing with windows, and Internet computing with the Web browser (Duffner, 2001). Web services, the new paradigm promises a new interface to facilitate the exchange of data and facilitate dynamic communication between disparate hardware systems and software programs. A portal interface enables businesses to "...improve agility and even to transform themselves into new kinds of enterprises" (Duffner, p. 2).

Shilakes and Tylman were the first to define Enterprise Information Portals (EIPs) comprehensively in 1998 as:

> ...applications that enable companies to unlock internally and externally stored information, and provide users a single gateway to personalized information needed to make informed business decisions...an amalgamation of software applications that consolidate, manage, analyze and distribute information across and outside of an enterprise (including Business Intelligence, Content Management, Data Warehouse & Mart and Data Management applications) (p. 1).

Enterprise Information Portals have now become the Web interface, or "dashboard" for control and management of Web services (Duffy, 2001, p.2). Raghavan (2002) explains that prior to the Web an EIP consisted of a search interface that was linked to a database. Two revolutions transformed the nature of access to enterprise data:

1. The network revolution of the early 1990's connected enterprise departments via wide area networks (WANs).
2. The Web revolution transformed people's mindset about search. People in enterprises became familiar with searching, browsing, and taxonomy navigation through their experiences on the Web.

In sum, Enterprise Information Portals are software platforms that provide users with a single personalized point of entry for individuals inside and outside organizations, to disparate structured and unstructured data; role based relevant content; decision support services; and dynamic collaborative application tools and services.

Enterprise Information Portal Iterations

B2B or Industry Portals

An emerging portal concept in Enterprise Information Portal development is *B2B* (business to business) or *Industry Portals* (Zirpins, et. al. 2001). B2B describes external interactions and transactions that occur between businesses as compared to communication exchanges that occur internally within business organizations.

Enterprise Knowledge Portal

In March, 1999, Firestone introduced the term *Enterprise Knowledge Portal (EKP),* an enhanced Enterprise Information Portal that Firestone defines as:

- Goal directed toward knowledge production, knowledge integration and knowledge management; and also
- Focused upon providing, producing and managing information about the validity of the information it supplies;
- Provides information about the business and meta-information about the degree to which one can rely on that information;
- Distinguishes knowledge from mere information
- Provides a facility for producing knowledge from information
- Oriented toward producing and integrating knowledge rather than information (Firestone, 2003, p. 8-9).

Firestone's strong emphasis on knowledge rather than just information is significant, for the focus of Enterprise Knowledge Portals is twofold:

1. To provide support for transforming information into knowledge through testing and evaluation and
2. To provide support for the processes that manage knowledge production and integration (Firestone, 2003, p. 9).

Thus, Firestone acknowledges that it is not just access to data, content information, collaborative tools, expert user interaction, business intelligence, or integration and combinations of these that distinguishes Enterprise Knowledge Portals from other versions of Enterprise Information Portals, but the emphasis on transforming information into knowledge and then, most important, *validating* "knowledge".

The Promise of Portal Customization

As organizations have automated their business processes over the past twenty years, a complex set of interrelationships has developed across applications and information (Metagroup, 2003). The interactive and dynamic capabilities that portals provide continues to grow and an increasing number of organizations recognize that in order to cut costs and survive they need to optimize performance through an enterprise portal connecting chain partners, employees, and consumers. Increasingly, the corporate sector is turning to "customer-facing" portals to provide consumers the information and tools they need to manage important aspects of their lives such as health and financial security issues. The Internet now offers consumers more choices than ever before and businesses are focusing on ways to develop "learning relationships" to remember what the customer wants and deliver mass-customized products and services (Zellner, 2000; Peppers & Rogers, 2001; Newman, 2002).

The My Craze

> The explosion of the Internet and other forms of personal communication (coupled with the highest level of human intellectual activity ever) has created a New Order. People who were once content to be led are now less likely to blindly follow. It is a phenomenon that transcends all ages, not just the young and the impetuous (Ash, 2003, p.xiv).

According to Zellner (2000), the era of mass production and mass media has ended. The My Generation is the first to be fashioned by the influence of customizable technology (Ketchell, 2000). In their homes, offices, or the local Internet Café consumers

can now create their own sneakers (Nike Inc., http://nike.com/main.html); customize their jeans (Levi Strauss & Co.) (http://www.levi.com/); assemble their own computers (http://www.dell.com); and build their own motorcycles (American Quantum Cycles Inc., http://www.quantumcycle.com/). Following the My Craze featured on many Web services, users can customize and configure personalized Web portals using features such as My Content, My Accounts, My Bookmarks, and My Wireless.

"Unlike the Web, where communication is essentially one way, portals provide two-way, interactive communication" (Lightfoot, as cited by Page, 2001, Sept. 2, p. 2). Portal technologies allow portal development which involves carefully balancing technology, change, and business concerns (Greengard, 2003). Authentication provides a gateway to personalization to allow users the ability to customize their portal views according to changing information needs. Successful portals are designed to offer value to their respective communities.

Multiple sophisticated channels, the ability to customize, and a well designed, user-friendly, site that connects to diverse, dynamic, and subject specific, high quality content and services increases the likelihood that users view the site as valuable and will want to return to it. Savvy Website developers collaborate with users and organizations to encourage the development of rich dynamic vortal content to serve the information needs of the community. "A well executed enterprise portal built upon a robust and developing portal network yields a more rewarding experience for users, allowing them to navigate from portal to vortal and back" (Little, 2001, p. 53).

Next Generation Portals

Portal technology has given rise to new and creative thinking in the blending and delivery of information and services. These developments offer many new and exciting opportunities for learning communities (Page, 2001, Sept 2 & 3; Sistek-Chandler, 2000). Trends in portal development point toward increased personalization and customization; wireless and voice-activated systems; direct interaction; and the rise of vertical portals that will provide narrower channels of interest and communities (Ketchell, 2000). The success of organizations, business or educational entities, will be tied to the ability to "...exploit the cumulative knowledge of a widely distributed and diverse workforce" (Huns & Stephens, 1999, p. 89). An important shift has occurred as sites have moved beyond accessing information to sites that provide a platform with communities that add value. Value is added by facilitating core capabilities, such as tools that enable communication, collaboration, and productivity.

Smashing Information Silos

In the business sector, organizations traditionally have different functional silos that gather and provide information about commercial relationships from different vantage points. Integrating the information generated by these silos has not been accomplished widely, if at all (Cathro, 2001). Portals, according to Greengard (2003) permit businesses to breakdown highly resistant silos with profound results. Portals offer a tremendous opportunity by allowing different stakeholders to share information across silo sectors. Corporate organizations have found that the breakdown of silos and connection of systems through a portal have produced profound results especially by employees who use collaboration and knowledge management tools to share ideas and solutions. This has encouraged the sharing of "...valuable knowledge that resides within

unstructured content and loosely organized communities" – knowledge that is often times untapped and overlooked (Greengard, 2003, p. 30).

Functional silos are found in educational organizations as well, and they contain valuable sources of information, that if freely shared, could transform education, both in the way teachers teach and the way in which children learn. Teachers have traditionally worked with information related to their highly specialized view of the educational process, principals another, and superintendents yet another. Even within these groups, there are subgroups who work with information directly related to their specific roles and responsibilities within the organization. Educational entities, including federal, state, and district units need to rethink the information sharing process. In the words of Cathro (2001) it is time to "smash" information silos to allow information and resources to be collectively shared and communally enhanced, permitting tacit knowledge to be shared. The day to day teaching experiences and learning activities of teachers increase their individual productivity, professionalism, and "expertise." This "expertise" if it remains solely in the individual's mind, forces others to needlessly duplicate what already has been done.

Corporations have quickly deployed various iterations of portals not only to streamline workflow and empower managers to make better decisions, but to share and transfer knowledge across an enterprise (Greengard, 2003). There is concerted push for what is commonly termed "Knowledge Management," "Information Harvesting," or "Knowledge Gathering" and this becomes part of a corporation's Knowledge Management strategy (Eisenhart, 2001). Portals have metamorphosed from Intranets and mere information management solutions to an increasingly important sophisticated technology whose nascent potential continues to expand, extend, and evolve.

K-12 Sector and Learning Portals

Portals are valuable and attractive tools for the K-12 arena because they can facilitate easy and seamless access to information resources and teaching and learning tools. Sistek-Chandler (2000) defines a learning portal as a bridge providing links to learning by containing Web-based applications for email, chat, newsroom, scheduling, and e-commerce capabilities. Not too long ago teachers who used the Web for curriculum enhancement relied heavily upon free teacher portals "...those resource filled repositories of lesson plans, assignments, and screened links" rather than accessing commercial learning portals such as bigchalk, AOL@SCHOOL, and MarcoPolo (MacKay, 2003, p.34). Educators now, however, are drawn to search engines such as Google and Yahoo! which offer a wider range of free efficient features (MacKay, 2003). According to an informal survey, conducted by MacKay, teachers prefer search engines because they include information from a wider variety of sources, offer built-in features, and are easy to use. Educational portal databases "...just cannot keep up with the breadth and scope of a search engine like Google" (MacKay, 2003, p. 34).

To date, education portals have typically focused on one or more of the following areas:

1. Community Education
2. Teacher Resources
3. Professional Development
4. Search Engine/Aggregator

New learning portals must be more than a method to select from a set of links; they must also include databases and application windows. A successful K-12 portal must integrate applications and provide personalized and customizable information to users.

An Emerging Concept: Education Enterprise Information Portals (E^2IPs)

Increased advances in technology and the ability to merge data from different and sometimes disparate sources provide the impetus for learning portals to model their business counterparts, hence the name Education Enterprise Information Portals (E^2IPs).

Many schools are still experiencing what Raghaven (2002) described as the network revolution. They are in the process of, or have recently completed connecting their enterprise (school district) to wide area networks (WANs). Schools need to be able to understand and utilize portal technologies to exploit the ecological interplay between people and resources in what they define as their "learning community". To accomplish this, educators and especially school and community representatives need to study and explore the potential of E^2IPs and become actively involved in their development, assessment, and deployment whether at local, state, or national levels.

The ubiquitous nature of the Internet has made the World Wide Web a revolutionary communication medium that delivers a wealth of information to people's desktops via a Web connection anywhere, anyplace, anytime. Although the Web is touted as having the potential to transform education and teaching techniques it also raises the critical need for new 21st century information literacy skills to enable individuals to effectively ask questions, select, evaluate, de-select, understand, and finally synthesize information. This is by no means a simple process. The wealth of the Internet as an information cornucopia in itself does not translate into a knowledge fest, for as data proliferates it is far too easy to find oneself information rich, but knowledge poor (Keen, 1997).

As has been noted, information and knowledge are not synonymous. "Information is machines. Knowledge is people" (Fullan, 2001, p. 78). Information only becomes knowledge when it takes on a "social life" (Brown & Duguid, 2000). Schools need to provide the "social life" by carefully structuring information for learners. The need to structure information is of greater consequence today than ever before because "...information is only valuable to the extent that it is structured" (Koniger & Janowitz, 1995, p. 6).

Education Enterprise Information Portals - Learning Beyond the School

Education Enterprise Information Portals (E^2IPs) can provide much needed structure by linking information services and navigational aids to subject-specific sites. However it is far too simplistic to regard portals as just another search mechanism. The underlying supporting services of high-quality E^2IPs must provide the ability for users to capture, integrate, manipulate, and distribute information and simultaneously offer ways to consult and easily collaborate with others (Jackson, 2002). The key element of any high quality portal is choice.

An E^2IP can serve as an integration point for applications such as Web-mail, or, as is the case of some school districts who currently use thin-client technology, (Bethpage, LI, Edison School District, Hudson Falls, and others) operate as an Application Service Provider (ASP) and offer Web-based access to classroom folders and school housed software to users in the immediate and surrounding school community.

Describing Thin Technology

Begin with a typical personal computer (Apple or PC), remove the hard disk, floppy drive, and CD-ROM (just about everything that spins or moves) and what remains is a simple, reliable "thin" hardware device that connects to a server (running MS Windows NT 4.0), Terminal Server Edition) containing a variety of software applications. The terminal server, just as with the historical mainframe, acts as a host to a variety of software programs (textual, graphical, and even video). Any regular end user "fat client" (CPU or personal computer) can access the software that resides on the server. User input (keystrokes and mouse clicks) are sent directly to the server, in turn graphics, audio, and video are sent directly to the thin client. The thin client device has access to the software residing on the terminal server with a simple mouse click. Legacy equipment, acting as a "thin client" can perform just as quickly as regular CPUs (even old 486 PCs or Apple 5500s) or older machines will run just as fast and efficiently as the processor of the server hosting the software. The thin client unit contains the RAM and an Ethernet connector to enable the standard input/output devices to communicate with a server, where all functions occur. The value of a thin client network lies in its management and administration. Software is updated on the server, without having to reinstall and configure such software on all individual PCs. In addition, the latest application tools are available from anywhere there is a Internet connection. Students and teachers can access their work and applications from any computer at any time. This makes it an attractive technology solution for libraries and K-12's.

Students and teachers in districts employing "thin client" technology can log on to their school homepage from anywhere they have access to the Internet (homes, local libraries, and/or Internet cafes) and access individual school folders, work on school initiated projects, save their work, and then open it up in school the next day. This extends the school day and provides students and teachers the opportunity to work on school-based projects using the same software applications and tools they use at school. This strengthens the home-school connection and extends the traditional notion of "school" and "learning" to seven days a week, twenty-four hours a day. (Whether or not this is a good thing is quite another issue).

Customized information can also be provided to user groups based on a context such as the user's role in an organization or affiliation with a community of interest such as Ms. Smith's ninth grade Global Studies students, District A's fourth grade teachers, or the parents or guardians of incoming high school freshmen. Customization features can provide users with information that is dynamic and relevant to a particular user, user group, and or community of users, at any given time (Little, 2001).

In sum the potential of an Education Enterprise Information Portal (E^2IP) lies in its ability to:

- Go beyond a simple listing – contributing structure and order
- Offer quality and dynamic content
- Offer customized features designed with user and community in mind
- Be purposeful and focused

- Address and lessen the digital divide
- Provide rich content and interactivity to a greater range of students, teachers, administrators, parents, and community members.
- Capture information resources and bring them easily to the desktop (wherever that might be).
- Integrate some or all information into a variety of related applications.
- Integrate easily with local email systems, calendars, and schedules.
- Enable the availability of shared electronic community space to foster collaborative engagement.

The challenge that lies ahead for learning communities is to design flexible and malleable portals that grow and respond dynamically to user preferences and community information needs. Thin client technology may provide a better understanding of who, what, where, and when technologies are actually being used in K-12 environments.

The Future: E^2IPs

If the era of mass production has ended for business and government, then the industrial revolution model of teaching to the masses should soon meet its demise as well. It is doubtful that few, if any, will mourn its passing. For over a decade educational institutions have struggled with the emerging information society and its computer-related technologies. "The fact remains that the question of how best to teach our children remains an empirical question that has not yet been fully answered" (President's Committee of Advisors on Science and Technology,1997, p. 35). One common element of many plans suggested for the improvement of K-12 education in the United States has been more effective utilization of computer, networking and other technologies. Thanks to the Internet and portal technologies, consumers have more power and more choices and companies are quickly developing "learning relationships", at least on the surface, to better understand consumer buying habits (Zellner, 2000; Peppers & Rogers, 2001). School media specialists, as information literacy specialists need to be at the forefront of the development of Education Enterprise Information Portals. As educators, we need to collectively explore portals as tools to offer one-to one customizable learning alternatives and strategies for students, teachers, administrators, parents, and local and global community members.

Portal development requires a collaborative, iterative, and reflective community effort. This is by no means an easy process. There are no shortcuts, guideposts, or precise blueprints for what should be (see Chapter 6 for more information about successful learning community partnerships). What roles portals will play three, five, or ten years from now is impossible to determine, but educational entities need to ensure that the foundational structure of Educational Enterprise Information Portals (E^2IPs) contains content that is clear, logical, well organized, robust, customizable, easy to navigate, and has the ability to change as the growth and educational needs of learning organizations change. Energy and resources need to be focused on maintaining interoperable standards, for otherwise, as Little (2001) observes there will be "data silos that cannot share data..." that will "...clutter the data landscape with multiplying user accounts and passwords" (p.54).

Technology cannot, by itself change an organization into a learning community, however technology can be part of a process that optimizes learning through the creation of an open enterprise that distributes knowledge and information expertise and the sharing of tacit knowledge. Open enterprise learning communities will provide learners access to people and ultimately tacit knowledge.

> Tacit knowledge is vita to the organization because organizations can only learn and innovate by somehow levering on the implicit knowledge of its members. The most advanced computer-based information systems on their own do not generate new knowledge, only human beings led by tacit –know-how have the capability to do so (Choo, 1998, p.112).

An Education Enterprise Information Portal (E^2IP) comprises only one component of a Knowledge Community and it exists because of online and offline institutional and community nurturance and financial support. Education Enterprise Information Portals can provide collaborative opportunities for users to interact with and learn from one-on-one with experts, colleagues, and peers. E^2IPs provide teachers the opportunity to communicate and collaborate freely peer-to-peer inside their district, outside to neighboring communities, and globally with other educators around the world. This professional exchange may indeed revolutionize the art of teaching and in doing so improve the minds and lives of the people who control our future – our children.

E^2IPs and the School Library Media Specialist – The Vital Link

Davenport (2003) defines knowledge workers as "people who, as a primary aspect of their work, create knowledge, share it with others, or apply it in decisions and actions" (p.1). For over two thousand years, librarians have steadfastly collected and preserved the world's knowledge and cultural heritage (American Library Association, 2001). School Library Media Specialists are information professionals and experts in information management. They hold master's degrees in library and information science and are certified as teachers. Some have additional graduate degrees. As information professionals they have the experience and the expertise to act as information gatekeepers for communities (Britten, 1995), thus it is natural for the School Library Media Specialist (SLMS), as information literacy specialist, to assume this responsibility within a K-12 learning community.

> In a world that is information rich, librarians are information smart. They know that having more information isn't necessarily better and that the best source of information isn't always Google… The new millennium has brought an urgent need to help our institutions and communities understand the changes brought by new technology, how to reap the benefits, and how to minimize the risks"(American Library Association, 2001, p. 10 - 11).

Portals, according to Rowley, are the electronic equivalent of an agency that tailors document access and information service for specific communities. Although the type of community associated with a portal will vary with the type of portal, there remains an imperative to develop "community," and the development of learning communities cannot be left to chance. School library media specialists know and understand their respective learning communities and are experts at assessing their community's information needs. Librarians have long served the informational needs of their respective communities:

> Libraries, whether they be public libraries, academic libraries, or workplace libraries have always been established to serve a community. Through user studies, service delivery, committees, involvement with stakeholders in the community and other interaction with the community, the needs of the community for information, documents, education and recreation are established...Portals and others need to take the lead in defining their desired communities (Rowley, 2000, p. 218).

The characteristics of communities will serve to define not only information and services that they need and/or will accept, but also the way in which the information needs to be organized (Rowley, 2000).

Portal technology has the power to transform educational entities by providing the K-12 community an opportunity to share themselves with local and global communities via the World Wide Web and distribute one-to-one and one-to-many learning opportunities for students, teachers, administrators, parents, and community members.

Portals – The Name Game

Portals, Vortals, Portlets, Enterprise Information Portals, Enterprise Knowledge Portals, Education Enterprise Information Portals, Learning Communities, Communities of Practice, Portal Performance Cultures, Practitioner Portals, Knowledge Communities, Digital Dashboards, Gatekeepers, and Moore (2001) has even suggested "Screendoor" to highlight the ventilation of content that permeates bi-directionally. Whatever the nomenclature the names are irrelevant, for they are "...merely vessels, frameworks, or infrastructures for training, learning, and assessing knowledge and competency" (Brockbank, 2002). In the future portals will dynamically connect people to appropriate social networks and learning communities that are relevant to users' current contexts and information needs.

The creation of Education Enterprise Information Portals can unite people in a global learning community. Marshall McLuhan posited that the greatest potential of participation in the electronic media was uniting people in a "global village" (Campbell, S. 2003, p. D1). Portal technology offers the promise of fostering, maintaining, and strengthening important social connections. The development of successful Educational Enterprise Information Portals (E^2IPs) will require tremendous cooperative and "social" effort. The importance of improving decision-making processes, not only in business but in education is far too important to overlook. Shall we make the financial and philosophical commitment to be responsive to the intellectual and developmental needs of learning communities? Or will the greatest peril that stands in the way of realizing the promise and potential of technology be our inability to collaboratively share our knowledge?

Works Cited

American Library Association. (2001). *The Campaign for America's Libraries.* Retrieved July 21, 2003, from American Library Association: http://www.ala.org/Content/NavigationMenu/Our_Association/Offices/Public_Information/Campaign_for_Americas_Libraries/Academic_and_Research_Library_Campaign/toolkitfinaltext.pdf

Ash, J. (2003). STARS of the New Order: What they're telling business leaders. Retrieved September 9, 2003 from http://www.kwork.org/Book/Book.pdf

Bolds, R. (2001). Enterprise information portals: Portals in puberty. *Special whitepaper supplement to KMWorld*, July/August 2001, S16-S17. Retrieved July 23 2003, from http://www.kmworld.com/publications/whitepapers/portals/bolds.pdf

Britten, W. (1995). Building and organizing Internet collections. *Library Acquisitions: Practice & Theory, 19* (2), 243-252.

Brockbank, B.J. (2002). *Demystifying e-learning portals.* Advisor Network Websphere@Advisor.zone. Retrieved January 10, 2003 from http://websphereadvisor.com/doc/09267

Brown, J.S., & Duguid, P. (2000). *The social life of information.* Boston, MA: Harvard Business School Press.

Campbell, S. (2003). Seniors share wisdom on Internet site. (22 May). *Times Union*, p. D1.

Cathro, W. (2001). *Smashing the silos: Towards convergence in information management and resource discovery.* A paper presented by Warwick Cathro, Assistant Director-General, Information Technology, National Library of Australia at the Information Orienteering Conference, Canberra 5 April 2001. Retrieved July 10 2003, from http://www.nla.gov.au/nla/staffpaper/2001/cathro2.html

Choo, C.W. (1998). *The knowing organization: How organizations use information to construct meaning, create knowledge, and make decisions.* MA: Oxford University Press.

Davenport, T. (2003). The new work order: A measurable proposal. Retrieved July 18, 2003, from AOK: Association of Knowledgework: http://www.kwork.org/Stars/santosus.html#Work

Drucker, P.F. (1993). *Post-capitalist society.* New York: Harper & Row.

Duffner, R. (2001). Portals unlock the knowledge that drives business. *Special whitepaper supplement to KMWorld*, July/August 2001, S21. Retrieved July 23 2003, from http://www.kmworld.com/publications/whitepapers/portals/duffner.pdf

Eisenhart, M. (April, 2001). Gathering knowledge while it's ripe. *Knowledge Management Magazine*. Retrieved January 13, 2003 from http://www.destinationkm.com/articles/default.asp?ArticleID=209

Firestone, J. (2000a). Defining the enterprise information portal. *DSstar*, 08/22/2000, 1-8. Retrieved July 22 2003, from http://www.tgc.com/dsstar/00/0822/102054.html

Firestone, J. (2000b). The enterprise knowledge portal revisited. *DSstar*, Retrieved Jul. 22, 2003, http://www.tgc.com/dsstar/00/0829/102083.html

Firestone, J. (2001). Enterprise information portals/enterprise knowledge portals. *DSstar*, 5(3). Retrieved Jul. 22, 2003, http://www.hpcwire.com/dsstar/01/0116/102552.html

Firestone, J. (2003). Defining the enterprise information portal. *IntranetStrategist*, 1 (4), 1-13. Retrieved July 23 2003, from http://www.intranetstrategist.com/xq/asp/sid.0/articleid.A54E30F9-71D1-4E6B-B552-EE45261C4C95/qx/display.htm

Fullan, M. (2001). *Leading in a culture of change*. San Francisco: Jossey -Bass.

Greengard, S. (2003). Portals shape the promise of the Internet. *Internet World*, *9*, 26-32.

Hargittai, E. (2000). Open portals or closed gates? Channeling content on the World Wide Web. *Poetics, 27*, 233-253.

Huhns, M.N., & Stephens, L.M. (1999, November/December). Exploiting expertise through knowledge networks. *IEEE Internet Computing*, 89-90. Retrieved July 19 2003, from http://80-lib.computer.org.silver.ulib.albany.edu/ic/books/ic1999/pdf/w6089.pdf

Jackson, M.E. (2002). The advent of portals. *Library Journal*. Retrieved November 4, 2002 from http://libraryjournal.reviewsnews.com/index.asp?layout=article&articleId=CA242296&display=searchResults&stt=001&text=the+advent+of+portals

Jempson, M. *Children and the Media*. Retrieved May 23, 2003, from Unicef: http://www.unicef.org/magic/briefing/childmedia.pdf

Keen, P. (1997, November 17). Let's focus on action not info. *Computerworld*, 1-4. Retrieved July 16 2003, from http://www.computerworld.com/news/1997/story/0,11280,11306,00.html

Ketchell, D. (2000). Too many channels: Making sense out of portals and personalization. *Information Technology and Libraries*, *19* (4), 175-179.

Koniger, P., & Janowitz, K. (1995). Drowning in information, but thirsty for knowledge. *International Journal of Information Management 15*(1), 5-16.

Lewis, J. (2003, February). Memory overload: As hard drives get bigger and cheaper, we're storing way too much. *Wired*, 78-79.

Licklider, J.C.R., & Taylor, R.W. (1990). The computer as a communication device. *In Memoriam: J.C.R. Licklider 1915-1990 Research Report 61, Digital Equipment Corporation Systems Research Center* (pp.20-41). Retrieved July 25 2003, from http://gatekeeper.dec.com/pub/DEC/SRC/publications/taylor/licklider-taylor.pdf

Little, J.R. (2001). A librarian's perspective on portals. *Educause-Quarterly*, 2, 52-54.

Lyman, P., & Varian, H.R. (2000). How much information? Retrieved January 13, 2003 from http://www.sims.berkeley.edu/research/projects/how-much-info/summary.html

MacKay, P. (2003). In search of ...the perfect search. *Technology & Learning*, April, 1.

Moore, A. (2001). Enterprise information portals: The power and the peril. *Special whitepaper supplement to KMWorld*, July/August, S2-S3. Retrieved July 23 2003, from http://www.kmworld.com/publications/whitepapers/portals/moore.htm

Newman, R. (2002). Professional point: A gateway for practitioners. *Monitor on Psychology, 33* (7), 1-3. Retrieved July 22 2003, from http://www.apa.org/monitor/julaug02/pp.html

Newsday.com. (hs628a). Cars tailgating the horses. *Time Machine: A Weekly Series Picturing the Past*, 2. Retrieved , from http://www.newsday.com/extras/lihistory/tmachine/hs628a.htm

Page, D. (2001, September 2). The power of portals: Personalizing the web to build community. *Convergemag.com*. Retrieved July 10 2003, from http://www.convergemag.com/magazine/story.phtml?id=5893.

Page, D. (2001, September 3). Robert Kvavik: Portals of excellence. *Convergemag.com*. Retrieved July 13, 2003, from http://www.convergemag.com/magazine/story.phtml?id=5854.

Peppers, D., & Rogers, M. (2001). *The one to one B2B: Customer relationship management strategies for the real economy*. New York: Doubleday.

President's Committee of Advisors on Science and Technology. (1997, March). *Report to the President on the use of technology to strengthen K-12 education in the United States*. Washington, DC: Author.

Raghavan, P. (2002, January/February). Social networks: From the web to the enterprise. *IEEE Internet Computing*, 91-94. Retrieved July 19, 2003, from http://80-dlib.computer.org.silver.ulib.albany.edu/ic/books/ic2002/pdf/w1091.pdf

Rowley, J. (2000). Knowledge organisation for a new millennium: principles and processes. *Journal of Knowledge Management* 4(3): 217-220.

Sadowski, M. (2003). *Adolescents at school: Perspectives on youth, identity, and education*. Cambridge: Harvard University Press.

Senge, P. (1990). *The fifth discipline: The art and practice of the learning organization*. New York: Doubleday Currency.

Shilakes, C.C., & Tylman, J. (1998). *Enterprise information portals,* Merrill Lynch, Inc., New York, NY, November 16th, 1998.

Sistek-Chandler, C. (2000, September). Learning portals for K-12 education and beyond. *Convergemag.com*. Retrieved July 14, 2003, from http://www.convergemag.com/Publications/CNVGSept00/k12portals/k12.shtm

Uimonen, T. (1999). Oracle sees portlets behind corporate portals. *NetworkWorldFusion News*, 902399, 1-2. Retrieved July 22 2003, from http://www.nwfusion.com/cgi-bin/mailto/x.cgi

Weinberger, D. (2001). David Weinberger's Intranet buzz: Reed's law - An interview. *Intranet Journal*, 1-5. Retrieved July 25, 2003, from http://www.contextmag.com/setFrameRedirect.asp?src=/archives/199903/digitalstrategy.asp

Zellner, W. (2000, August). Hey, are you listening to me? *Businessweek Online, 28*, 1-5. Retrieved July 14, 2003, from http://www.businessweek.com/2000/00_35/b3696027.htm

Zirpins, C., Weinreich, H., Bartelt, A., & Lamersdorf, W. (2001). Advanced concepts for next generation portals. *Proceedings of the 12th International Workshop on Database and Expert Systems Applications (DEXA'01). IEE Computer Society*. Retrieved July 19, 2003, from http://80-dlib.computer.org.silver.ulib.albany.edu/conferen/dexa/1230/pdf/12300501.pdf

WINDOWS INTO INSTRUCTIONAL COLLABORATION
ABSTRACT

Shirley Weisman

Windows into Instructional Collaboration; Information Power in the Real World (San Jose, Calif.: Hi Willow, 2002.) uses the power of story to demonstrate:

- how library media specialists (LMSs) and classroom teachers, working together, improve student achievement;
- that teaching is a risk-taking endeavor that involves learning and growth on the part of LMSs, classroom teachers and students;
- that knowledgeable dedicated LMSs and classroom teachers, working together, make good things happen no matter what the socioeconomic circumstances of the students.

Current research by Lance, Rodney, and Hamilton-Pennell[3] supports the efficacy of the successful library media center (LMC) programs described in the case studies in *Windows into Instructional Collaborations.* The elements of LMC programs that increase student achievement identified by Lance, et al, and observed by this author in LMCs throughout California include but are not limited to:

- Level of LMC program development (e.g., staffing level, collection size, expenditures
- Collaboration
- Technology (e.g., school-wide networks, access to licensed databases, access to the Internet)

How are these elements of successful LMC programs achieved? LMSs build strong relationships by meeting the needs of others. For instance, they offer to co-plan, co-implement and co-evaluate lessons with veteran teachers, student teachers and new staff members. They initiate collaborations with staff members teaching in curricular areas that are new to them. They write technology grant proposals. As they meet the needs of others, they build awareness of the strengths and needs of LMCs.

LMSs build strong relationships by being persistent. They propose collaborative activities whenever they can create an opportunity to do so. Their positive attitudes overcome hesitancy on the part of others.

Accomplished LMSs take on leadership roles on school-wide and district-wide committees. They exercise leadership by providing staff development, especially on the use of computers and on integrating technology into the curriculum.

LMCs are hubs of activity providing crucial links, both physically and intellectually, to the best information and thinking available. LMSs and classroom teachers working together help students use those links to achieve curricular and information literacy standards. LMSs collaborating with classroom teachers in LMCs in which there are sufficiently abundant resources increase student achievement. The studies and these educators' experiences tell us so.

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[3] Lance, Keith Curry, Christine Hamilton-Pennell, and Marcia J. Rodney. (2000) *How School Libraries Help Kids Achieve Standards.* San Jose: Hi Willow Research &

NARRATIVE INQUIRY:
CAPTURING INFORMATION LITERACY IN K-12 SETTINGS

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In the accompanying document, I described ways that graduate students can use reflective journaling to contextualize concepts and optimize learning. This same approach can be used with K-12 students, particularly in high school where learners normally can make logical deductions and abstractions. Extrapolating from the two case studies I traced, here are some ways to use those same exercises for high schoolers, which reflect information literacy. The writing process itself, as mentioned in the document, provides a means to reflect on one's activities and contextualize learning. By examining that writing, analyzers – be it the writer, peers, or adults – can gain insights about student learning, teaching, and information literacy (sources, assessment, application) in general.

Over an extended time period, say a month to a semester, have students write weekly journals about the subject matter that they are learning or about their life of information (e.g., connecting the concepts of information literacy to their personal lives). Topics that work well are social issues, health, math, science, communications, economics, government, arts. Teachers can look for connections between school and personal life, connections between classes, commentary on what they're reading, discrepancies between prior beliefs and new information. When these journals are analyzed over time, trends should arise: deeper thinking, more connections between class and life, more objectivity or justified opinion, richer commentary, increased understanding, greater application of information. Concept mapping also work well with this process, especially if they are done at the beginning, middle, and end of a unit or other natural period of time.

Another beginning/middle/end reflective process applicable to K-12 settings, is identifying problems or issues of concern that arise from the course – and connect with daily life. Again, those classes where ideas are controversial work especially well. A good way to structure the writing could be as follows: 1) identify the problem, and state why it is important to you; 2) identify the factors underlying the problem; 3) identify possible solutions, and justify your basis for each; 4) decide on one solution, and test it out. Alternatively, one student could pose a problem and factors, and peers could suggest solutions. Take a health education class, for example. An early problem might deal with negative self body image, an issue discussed in class. A student might list weight or physical appearance issues, and might also mention peer and media influence. Among the solutions might be to analyze advertisements to identify the overt and covert messages being given about body image.

Besides the trends mentioned in the weekly journal analysis, teachers could also note the reason for problem choice (e.g., is it an enduring problem, does it arise from problems that peers have, does it reflect current class topics of discussion, is it a more substantial problem?). In examining the solutions, teachers should also look for the quality and source of information for the solution (e.g., class, reading, peers, family, past experience). This process reveals students' decision-making process, which underlies information literacy. It also helps the teacher determine how well the course content fits students' needs and interests; perhaps some important topic is being omitted; in health education it could be media literacy. Doing K/W/L charts in the same time framework would work well too.

Other reflective practices include:

- taking Cornell notes
- doing I-Searches
- keeping a diary
- recording one's thoughts verbally (using an audiotape, videotape, or computer recording feature)

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- taking photos that connect information literacy or specific coursework to personal life.

School library media specialists (SLMS) should also read these reflections for several reasons:

- to understand students' information literacy processes, and identify possible needs for timely instructional interventions in collaboration with the classroom teacher
- to discover students' sources of information, and address identify needs
- to learn more about the courses students are taking – and about students' personal lives, which can translate into more informed media programs through collaborating with the entire school community.

Ideally, the reflective writing process should be planned collaboratively between the SLMS and the classroom teacher in so that both content and information process thoughts can be garnered. Analysis can help each other in optimizing students learning.

It should be noted that great care should be taken relative to reading students' reflections. Expectations must be made clear at the beginning. Theoretically, peers could also analyze these entries, and gain important insights about content and information literacy processes, but ALL readers must be assured confidentiality, and students must have the power to deny access to their personal writing. Typically, if students know the audience, they will write accordingly (e.g., if the writing is graded, they might write differently from it not being graded; if the audience includes peers or another teacher, their writing might change). Teachers should ask for honest/truthful writing, even if it means that little personal information is included, rather than fabricated stories to impact some audience. Teachers should also remind students that writing that reveals some kind of child abuse, or injury to others/self in general, has to be reported.

Supporting Studies (excerpted from ERIC):

Blakey, E. & Spence, S. (1990, May). Thinking for the future. *Emergency Librarian*, 17, 5, 11,13-14

Discusses metacognition and offers strategies for developing metacognitive behaviors that can be used in school library resource centers. Topics discussed include thinking processes; problem solving; student journals or learning logs; student planning and self-regulation; closure activities for evaluation; self-evaluation; and shared planning between teachers, librarians, and students.

Gordon, C. (1999). Students as authentic researchers: A new prescription for the high school research assignment. *School Library Media Research, 2*, 1-21.

Grover, R. (1994). Assessing information skills instruction. *Reference Librarian*, 44, 173-89.

Reviews current trends in instructional assessment and proposes a model for assessing information skills instruction in school library media centers using principles advocated in outcome-based education (OBE). Assessment techniques discussed include observation, journals, student projects, paper and pencil tests, self-evaluation, peer evaluation, and portfolios.

Jones, B. (1991, May). Writing-to-learn assignments for secondary-school earth-science classes. *Journal of Geological Education, 39*, 3,176-77.

Author describes use of writing assignments to help ninth grade students learn earth science and increase their interest in it. Presents advice for both formal writing assignments (laboratory reports and library-research papers) and informal assignments (learning logs or journals and role writing). Frequent review and encouragement with lots of opportunity for revision are viewed as crucial to student performance.

Newman, V. (1994). *Math journals: Tools for authentic assessment.* San Leandro, CA: Watten/Poe Teaching Resource Center.

This book is designed to help teachers use journals to integrate authentic assessment with the instruction of mathematics. It provides a structure to encourage students to write regularly in mathematics. The book is designed to help teachers develop their own assessment questions and activities for additional mathematical explorations.

Perham, A. (1992). Collaborative Journals: A Forum for Encouragement and Exploration. Paper presented at the Annual Meeting of the National Council of Teachers of English (82nd, Louisville, KY, November 18-23, 1992). Available **ERIC_NO:** ED355555

In an introductory-level Romantic Poetry course, a loose-leaf notebook is kept on reserve in the library to serve as a classbook or collaborative journal in which all class members (including the teacher) write comments as the semester progresses. Entries are dated and addressed to individuals or to the class as a whole. Classbook entries reveal peers' praise and support of each other, students' willingness to see themselves as a community of learners, evaluative responses to class material and presentations, and the level at which students are grasping the literature. Classbooks differ from dialogue journals because they offer the opportunity for a third, fourth, or fifth person to enter into the exchange of responses. The classbook reveals not only what students come to know (and what they do not), but also what facts, concepts, and theories they return to and make integral to their reading, thinking and writing.

Perritt, L. (1997, Jan.). The learning response log: An assessment tool. *English Journal, 86,* 1, 41-44.

Discusses uses learning logs for student assessment. Defines learning logs. Discusses structuring the logs; student voices and responses; a map drawing assignment; and using logs for evaluation.

Ruiz-Primo, M.; Li, M.; Shavelson, R. (2002). Looking into students' science notebooks: What do teachers do with them? *CSE Technical Report.* Los Angeles: Center for the Study of Evaluation.

This paper proposes the use of students science notebooks as one possible unobtrusive method for examining some aspects of teaching quality. Students science notebooks were used to examine the nature of instructional activities in their science classrooms, the nature of teachers' feedback, and how these two aspects of teaching were correlated with student achievement.

Tallman, J. (1995, Sept.) Connecting writing and research through the I-Search paper: A teaching partnership between the library program and classroom. *Emergency Librarian, 23,* 1, 20-23.

Vann, S. (1999). *Assessment of advanced ESL students through daily action logs.* New York: ERIC. Available **ERIC_NO:** ED435187.

A classroom study investigated the use of daily action logs as a means for assessing the progress of advanced students of English as a second language (ESL) at the college level. The approach was intended to promote student reflection, help make explicit the class' content, and provide feedback to the teacher on the effectiveness of the instruction.

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