Treasure Mountain Research Retreat 5:

Future Scenarios for School Library Media Programs

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TREASURE MOUNTAIN RESEARCH RETREAT 5

Program

7:00 Breakfast

8:30 Registration

9:00 Introductions; overview of the day

Dan Barron, Professor, College of Library and Information Studies, University of South Carolina

Bob Grover, Professor, School of Library and Information Management, Emporia State University

David Loertscher, President-Elect, American Association of School Librarians

9:15 Thinking about Schooling in The Global Village: We Can See Into the Future of Schooling Now. And Its Name Is Not Just "Reform."

Jim Mecklenburger, President, The Mecklenburger Group

10:00 Highlights of papers presented by authors, followed by discussion.

Windows, Bridges, and Frameworks: A 21st Century School Library Media Education Curriculum

Shirley L. Aaron, Professor, School of Library and Information Studies, Florida State University, Retired; Bob Grover, moderator

The Future of Information Services in K-12 Schools in Washington State: A Future Search Conference

Margaret (Peggy) Baldwin, Seattle, Washington.

Preparing the Information Educator for the Future

Marjorie L. Pappas, Library Media Program Advisor, Wright State University, and Ann E. Tepe, Manager of Educational Services, Follett Software Corporation.

Student Centered Information Literacy Programs: The Colorado Vision

Dian Walster, University of Colorado at Denver

The Role of Library Media Services in Future Schooling: The Future of the School Library Media Center

Blanche Woolls, Professor, School of Library and Information Science, University of Pittsburgh

11:15 Presentation of 5 key ideas from each group

12:00 LUNCH

1:00 Highlights of papers presented by authors, followed by discussion.

A Leadership Role for Library Media Specialists
John Crowley, Library Media Specialist, Joel Barlow High School, West Redding, CT.

Affective Support for Intellectual Access: Preventing Accidents on the On-Ramp.
W. Michael Havener, Assistant Professor and Kathy Latrobe, Associate Professor, University of Oklahoma, School of Library and Information Studies.

Building Bridges to the Internet: Opportunities for Media/Librarians in Self-renewing Schools
John F. LeBaron, Associate Professor of Education, University of Massachusetts Lowell; Catherine Collier, Technology Consultant, Merrimack Education Center, Chelmsford, Massachusetts; Linda de Lyon Friel, Supervisor of Media Services, Methuen Public Schools, Methuen, Massachusetts

The Future School Library Media Center
David V. Loertscher, Vice President, Libraries Unlimited

The Quiet Revolution: The New Role of the Learning Resources Generalist
Marsha Rakestraw, Library Media Specialist, Stafford, KS, and Susan Fowler, Information Consultant, Emporia, KS

2:15 BREAK

2:30 Presentation and discussion of key ideas in one large group

3:30 Break

3:45 Highlights of papers presented by authors, followed by discussion.

Restructuring Preservice Education
Daniel Callison, Associate Professor, School of Library and Information Science, Indiana University.

Research Imperatives for Information Professionals: Developing Foundations for Effectiveness

Ken Haycock, Professor and Director, School of Library, Archival and Information Studies, University of British Columbia

What Kinds of Nurturing Will Be Required for Information Professionals in the Future? Possibilities and Principles--or *Alice Through the Looking Glass*

Barbara Herrin, Director of Professional Development, American Association of School Librarians

What Research Will Be Required to Lead and Support the Future Information Professional?

Ross J. Todd, School of Information Studies, University of Technology, Sydney, Australia

5:00 BREAK

5:30 DINNER
Discussion of major ideas from groups

6:30 Roving reactor reports

Mary Kay Biagini, Editor of School Library Media Quarterly and Associate Professor, School of Library and Information Science, University of Pittsburgh

Jim Mecklenburger's remarks
Closing

7:00 Depart for Indianapolis

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THINKING ABOUT SCHOOLING IN THE GLOBAL VILLAGE: WE CAN SEE INTO THE FUTURE OF SCHOOLING NOW. AND ITS NAME IS NOT JUST "REFORM."

Jim Mecklenburger

Thinking about the future is easier if you start from a candid appraisal of the present. However, candor comes hard in education. Tradition and comfort intervene. Few people relish challenges the ways we school the population by challenging what people need to learn, when and how; and even by offering up new ways to learn, new ways to educate, and new people and new institutions interested in doing the job.

We're in the midst of a profound societal revolution--the information revolution--that is altering every institution from family to business to government and creating phenomenally large new industries based on the processing of imagery and information, as well as rendering some other industries obsolete. What Alvin Toffler forecast in the 1960's as mankind's "Third Wave" is washing at our knees and rising; what Marshall McLuhan in the 1960's called "The Information Age" which would create a "Global Village" has become palpable [CNN, for example, has become a major pathway that links all the elements of the globe, just as once a local newspaper or TV station or telephone exchange linked all the elements of a village].

In this period, schools often are criticized; but only a relative handful of schools are changing fundamentally in response. Some educators and political leaders are struggling at "reform" or "restructuring" of schools; more are struggling to maintain the status quo (or modest improvements in it) as best they can.

Reforms deal with management structures, calendars, curriculum topics and sequences, financing strategies, regulations and introduction of additional technology. Other reforms alter classroom practices or the behavior of teachers, keep more useful records or assess students more usefully. For the most part, these are reforms that within the assumptions that govern the system of schools are perceived as major changes. From the perspective of a society experiencing revolutionary change, they are not major changes.

Some of these reforms will prove to be useful first steps toward more fundamental change. But there may be quicker ways, and time is an issue; other forces within the information revolution may swamp schools' relatively slower pace of change.

THE OLD REVOLUTION

There is, to be sure, more than a little irony in this Information-Age challenge to the system of schools. The present system of schools was once a radical invention, an information revolution itself! Building the system of schools was a hardfought battle to assure the right to "book learning" to every person in every part of a vast continent. Schools are succeeded remarkably at this mission--and most still do. Schools developed their systems of age-grading, formal curricula, teacher certification, standardized testing, and so on [what some call the "hidden curriculum' of schooling, what today's computer users might call the 'operating system' of schools] at a point in history when schools' ability to manage their own information was limited largely to paper and pencil, file folders, and printed books. The system of schooling developed 150 years ago pushed the limits of information processing in the 19th century, and its inventions and developments now serve as the traditions and frameworks of schooling [Horace Mann was every bit as inventive and influential as Steve Jobs or Bill Gates in our time].

The schools we operate today are descendants of the Industrial Era or "Second Wave", as it were; the period of the nearly self-contained town and village, the era that popularized the local newspaper, telephone exchange and TV station, the time of the local merchant and the local factory plant as well as the local school. Ideas that were rife in the society at large about how the world works were adapted from the rising industrial institutions to the schooling (and many other) institutions. Schools were and mostly still are designed to *manufacture* educated adults from the raw material provided, namely, *uninformed* children, who are treated in appropriate sequence from entry to exit.

What we know from subsequent research and experience about human learning belies our industrially-inspired practices of teaching; education is not so much manufactured and delivered as it is experienced and constructed; education is rarely sequential, except as it is organized to be "School-like". In the world of 1994, children are not (or need not be) uninformed; quite the contrary, children have (or can have) virtually the same access as adults to the world's information, and the adults, and to each other. As information criss-crosses the nation and spans the world with lighting speed, considerable question arises about schools' book-learning mission as well as bout the customary methods (lecture, testing, grading, et al.) used to accomplish it.

Today, for example, it would be possible (in terms of information systems) to render detailed frequent reports about students' work and progress, even on an hourly or daily basis if useful. A handful of schools do this. But our school system evolved around quarterly reports usually not rich in detail (letter grades, test scores, attendance records and the like)--a system that made tremendous sense in an era of file folder management but makes little sense in the world of database management--except that it's an ingrained practice that everyone knows. [Schools, today, are more likely to be using technology to automate the conventional reporting process than they are to be reinventing reporting processes.]

Similarly, today it would be possible to revamp the scheduling of learning processes and speed the pace for individual learners, by providing learning opportunities on a "just-in-time" basis--as soon as a lesson is mastered, on to the next point of interest. A handful of schools do this, now, using computer systems to manage the required data about learners, materials, teachers and calendar. But our systems of organizing people and resources began when attendance records and materials had to move by hand in paper form (and often, they still do move by hand in paper form). We still work in the kind of large blocks of time that once were necessary--"courses of study" or "school years" or "quarters" or "semesters"--and our calendars, teacher training, publishing systems, reporting systems, et al., are all in sync with the customary time blocks. [If students learn too fast, their time is wasted; if they don't master the material on the schools timetable, they are downgraded and caused to remediate. The way schools organize instruction makes little sense--except that it's ingrained practice that everyone knows.]

Ironically and probably inadvertently, schools have lost the cachet of being a participant in the ongoing American revolution and have become instead an American tradition; the once-revolutionary institution has become for many people a rock to cling to. Most political recipes for schools set goals and embrace strategies from past eras. School's sequential structures and built-in ideas about teaching and learning do not fit our world very well, any more, even as governments and school professionals insist on standardizing them. (Even in the name of reform, many leaders are still intent on improving all the certifying and accrediting, testing and accountability; guidelines and curriculum standards that undergird the manufacturing system of schooling.)

For the educational good of the nation, it is probably much more important to ride the Information Age storm, to be leading the information revolution (once again) rather than attempting to restrain it, but clinging to the rock has become educator's style, so it can be a struggle for education leaders even to gain permission to "reform" or to "restructure" much less think anew.

SCHOOL'S CUSTOMARY PERSPECTIVE ON TECHNOLOGY MISSES THE POINT

To speak of The Information Age and The Global Village is to acknowledge the pervasive influence in society of an array of technologies, systems, business arrangements and policies. In this sense, the issue is (as educators like to say) "technology.

The fact is, schools invest very few of their resources in electronic technology and its use, generally less than 1%. Ninety-nine percent of the budget buys other kinds of practices and means, primarily people. One percent doesn't buy much; nor does it give most educators much perspective on what might be feasible or desirable. In effect, in the name of modernity, we put some of the old educational wine in a few high-tech bottles. What schools do with their small technology investments is often called "educational technology". Two decades ago it was called "AV". More recently, it was "media". Often, by any name, "technology" gets little respect (in part because there isn't very much happening).

Some people, in the system, talk of *using* "technology" as an instrument of reform. [Some will even argue that just *using* technology is reform.] Sometimes, the introduction of new gadgets or systems into a school is the occasion or the catalyst for change, to be sure. Often, only the presence of new gadgets is the change.

School's one-percent of budget for electronic technology compares to 5-10% of budget in most low-tech industries and as much as 40% of budget in high-tech industries. Schools--with some important but rare exceptions--have simply not paid heed yet to what others in society were doing more avidly. Ideas rife in the larger society about how the world works now have only a toehold in schools.

Technology more often is perceived as an add-on, a nice-to-have, special course to teach, a new skill for students to master, a last resort for remedial students, a special enclave for a few bright students--rather that as a new social imperative that would enable educators (or others) to revamp schooling for a new era. Most schools treat technology as a novelty or convenience in their manufacturing village--copiers, for example, are popular with teacher--not as their entree to the Global Village.

THE INFORMATION REVOLUTION ARRIVES

In revolutionary times, the issue is the nature of the revolution. *The revolution is an information revolution.* **The right framing is : What shall schools be, in an information age? What shall "Global Village" schools be?** What tools, old or new, can be well-used to educate today's youngsters for today's and tomorrow's times?

In most people's "real" (out-of-school) lives, today, adults and children alike, the "information revolution" is at hand. *Moreover, in the next few years--as we build the so-called "information superhighways"--the information revolution will do as revolutions always do, proceed very rapidly and despite the heartfelt desire of some to tamp it or slow it down, or channel it, or ignore it.*

Where do people experience the information revolution? In their homes. In their neighborhoods. In their family relationships. In their work and their business. In their government. In their medicine. In their law enforcement. In their entertainment. And in much of the learning they do informally.

To perceive the revolution clearly--to see the present candidly--here are 9 things one might do, inexpensively and close to home, to stretch one's mind about the future of society, and the future of schooling.

1. Try some of today's outcroppings of unprecedented learning and approaches. Play any good simulation game. This could be *Sim City, Sim Ant,* or any of the software in that vein, or one of the fantasy interactive multiplayer games on some of the computer networks. Spend some time exploring an "on-line" or "electronic" or "multimedia" encyclopedia--

Grolier's or Encarta of Compton's. Use an audiotape or videotape to guide some aerobic exercise. Maintain you personal finances or file you income tax return using *Quicken or Manage your money.*

[In the business world, look at at the enlarging role of computer-based training, video teleconferencing and distance education, with which a few education institutions also are toying. Look at electronic mail systems such as *Lotus Notes* that help people work in teams instead of hierarchies. See the large databases that employees must have access to in order to do their jobs, and the analysis, presentation and recording tools to manage all that information.

How do these phenomena relate to ideas we call classrooms, grade levels, scope and sequence, teacher?

2. Visit the new institutions in the neighborhood. Visit the videogame arcade. The content or "curriculum" of these systems may not be to your taste, but watch how they work and how users master the games. Similarly, visit any videotape rental store. Or any software store. Or any recorded music store. Watch how people relate to information, in these environments. These are each, on a national scale, multi-billion-dollar enterprises that didn't exist a decade ago.

[In the business world, look at how engineers work with computer-aided design, how pilots function with real-time information display, how airlines and travel agencies manage ticketing and hotel and auto rental reservations.]

Ho do these phenomena relate to the ideas we call libraries, laboratories, resource centers?

3. Visit a large computer store, like *Comp USA or Computer City.* First, notice that this, too is a new American institution, growing rapidly at the moment. [And there's a parallel growth of mail-order catalog sales of the same products.]

Then, look in the store [or in a catalog like *PC Warehouse*] at what $2000 will buy in 1994. [Contrast today to 1984. $2000 will buy a computer with a high-resolution color monitor, $200+ MB hard disk plus a CD-ROM drive, 33MHZ or faster processing time, 8MB of random access memory, and the ability to display audio and video (rather crudely). $2000 in 1984 would buy a monochrome monitor, 10MB hard disk (if any), 6MHz processing time, 6 MB of random memory, and no audio or video.] While you are imagining, spend another $2000 on peripherals such as scanners and printers, and another $1000 on software of your taste.

In your mind, imagine that store and its products in 5 years. What will that same $2000 buy? Computers priced at $2000 with at least 4 to 10 times the speed and memory (it will-probably have a recordable CD-ROM drive or two), much more capable peripherals, high-resolution large display screens, and software that will be several generations better than

today's. Windows 6.0, Macintosh System 9 and Wordperfect 10.0 will just have been released. [These Computers will double as phones and TV's also--a capability you can add to your present computer for around $500. This bundle of hardware will be one version of the so-called "digital high definition TV" that is anticipated will enter the market in 1996.]

How will these computer-like tools shape the world of lecture, reading, testing, grading and age-cohorts?

4. Visit several friends' houses. Meander about. Count the information appliances: Cable TV connections. Satellite dishes or community antennas, Radios, VCR's, CD-audio players or audio-cassette players. Games machines such as those of Nintendo or Sega. Telephones and cellular phones. Calculators. You'll find each of these devices in 50-100% of the homes in which you look. Don't forget the portable versions that may be housed in drawers or in automobiles. In four home in ten, you'll find a computer with a printer and half of these will have a modem to link the computer to others elsewhere. Some homes will have large-screen or projection TV, videodisc player, stereo sound linked to some or all of these devices, and more. Many still have a phonograph. Tow homes in 10 will have home offices, which may also include copiers, FAX machines and other appliances. Find the stash of cassettes, discs and cartridges that make these tools useful.

[Visit friends' business: a bank, a grocery, most any business that accepts credit cards, retailers of household goods, and the like. Notice complex telephones, the data input and display devices, the networks within the institution and the wired or satellite-based connections to their counterparts elsewhere.]

How do this infrastructure of devices and networks--paid for privately by citizens and businesses--that will burgeon in the coming years into still-better nationwide and international systems, relate to the concepts of campus, textbook, library, curriculum, and "educational technology"?

5. Explore at least one of the electronic commercial networks--*Prodigy, America On-Line,* **CompuServe,** et al. Cruise around in these electronic communities composed of thousands, even millions of users, to see what people are doing in various segments. Don't just read the words there, but seek out some of the graphics, imagery, shareware. Try the chat functions, in which people write to each other in real time. Try the dating rooms and other socially or sexually oriented areas. Play a two-person or multi-player game. Now, imagine the system you're using working 20-50 times faster. Imagine 20-50 times more users, and therefore many more available services and experiences. Imagine the screen you look at (the "interface") being not merely graphical (as they are today) but animated and talking to you. Imagine exchanging sounds you speak or record, or video segments from your home camera, not just text. Imagine access not only to today's news but to archives and reference services. What you are imagining is the evolution of today's (or similar) online services in 1999, networks and communities that will add value to the computing devices you'll be able to purchase in your imaginary *Comp USA* of 1999.

[Or explore the government-subsidized Internet, which connects thousands of computer networks in business, universities and government agencies into one large--if somewhat awkward--nearly worldwide amalgam of information seekers and sharers. The Internet often is cited as the forerunner of future networks; it is, at the very least, a fascinating and somewhat overwhelming prototype.]

How do these networks that connect people and information resources relate to the often classroom-bound learning chores of exploring ideas, research, writing, speaking and listening? What educational enterprises--lessons, debates, projects, courses of study, whole schools--can be handled *within* these networks?

6. Interview as senior an official as you can find in your local telephone or cable company.
Ask them about the 10-year future of their business. Interview as senior an official as you can find in an educational institution. Ask them about the 10-year future of their business. Marvel at how diverse these two visions are, and that they are not working together.

7. Play with a multimedia work station--the kind of kluged system that puts a computer laserdisc player, CD-ROM drive, large hard drive, VCR, video capture system, audio system with speakers, scanner, microphone et al., all together. Get someone to show you (or try yourself) how easy it is to create communications that combine several media. You will experience something akin to work done in film and TV studios, but all integrated by you.

Such workstations today are first-generation efforts, somewhat awkward. It isn't easy for what you produce to be shared with any other people. But, imagine a huge plastic force (call it "free enterprise") that in the next few years will merge all these parts and pieces into a smoothly operating (and still-easier) standardized one-box system. In your mind, connect that box (which you'll purchase in places like *CompUSA*) to the network you imagined in #3, above. For good measure, connect it in your mind to perhaps 300 standard TV channels (cable? wireless? Satellite?), 50 electronic shopping services, and to one or more local service networks composed of physicians, library systems, welfare offices, employment counseling, marital counseling, etc. [For good measure, connect it to whatever is the successor to the Internet, *Prodigy, America on-line, etc.*] Having access--being able to input as well as gain from--all these resources is the dream that's fueling the national discussion of "information highways". We're a lot closer to this dream than we were in the 1960's to putting a man on the moon.

Today's schools may expect to be somehow attached to these networks, especially it this happens at no cost (as some communications companies and some politicians are now promising, vaguely, will occur). But the more important question is whether school can be carried on within and through these networks? If so, who will create the educational services? What would such educational services replace?

8. Think of the "desktop" and "laptop" metaphors, as in "desktop publishing", "desktop video", "desktop multimedia" and "laptop computing".

How far are we from "desktop teaching", "desktop schooling", "desktop learning"? How far from the "laptop classroom" or "laptop school" or "laptop University"?

9. Read *Life After Television* by George Gilder. Read *School's out* by Lewis J. Perelman.

IN SUM

A societal revolution is creating the Global Village. People do and will learn there. There will be schooling (of some kind, managed by someone) in the Global Village, but it will not be the industrial age school; that school doesn't work well enough any more. New ideas in new times make it moribund if not obsolete. Nor will it be the industrial age school "reformed", nor the industrial age school with 1 or 2% of its budget for some "educational technology" mixed in.

There will be a next generation of American schooling, crafted in large measure from the ideas and tools of the Information Age. If has begun, and it is overdue. There are some examples to be found created by educators--some entirely new, some revamped from old practices. There are other examples created by newcomers to education. All these examples together are a trickle that should and will become a wave.

Whether today's educators and political leaders or newcomers will create the next generation of schooling, only time will tell. Educators, for the moment, have the fiscal resources (more that anyone else does), they have the mandate, and they certainly have the native intelligence. It is not clear that educators have the will. the interest, the fortitude or time. The railroad industry saw the propeller and then the jet engine as irrelevant. Others (including, we expect, some former railroaders) created the airlines. It could be they are tomorrow's railroad firemen, no longer riding the rails because their job has been displaced by new systems run by others.

Let's get on with creating schools for the Global Village. If educators do not swiftly and aggressively address schooling in the Global Village, others will.

WINDOWS, BRIDGES, AND FRAMEWORKS: A 21ST CENTURY SCHOOL LIBRARY MEDIA EDUCATION CURRICULUM

Shirley L. Aaron

Upon reading the title of this article, some people may ask why we should consider school library media education in the twenty-first century. After all, there have been forecasts of the death of libraries because of the increasing availability of electronic data bases. Others describing schools of the future scarcely mention the role of the library media specialist and program. Yet they envision schools filled with complex technologies, information rich environments, and teachers who are expected to be expert in content, process and instructional technologies.

These visions of schooling raise some very serious questions. The most troubling is, How can teachers realistically be expected to be expert in all these areas? Think, for a moment, about the last elementary classroom you visited. Did you observe the whole language approach? Were students constructing their own meaning through cooperative learning activities? Was the teacher wracking her brain to give students more examples so they could reevaluate whether a car or a clock is a living thing? Were students interacting electronically with students in another country about their interests? Was this activity seamlessly woven into the classroom fabric? Had the teacher adopted (or even heard of) the approach recommended in Tom Snyder's book entitled *Great Teaching in the One Computer Classroom?* Etc., Etc., Etc.

Many have criticized the present paradigm in education, but most current proposals fail to address the bloated role of the teacher adequately. Rather, educational reform literature is filled with material on expanding the teacher's role to deal with new technologies, new and changing content, new types of learning activities, and new teaching roles. Two recent special reports in *Education Week* reveal the magnitude of these demands. "Thinking about Thinking" (October 9, 1991) considers new theories about how people learn; "Profiles in Technology" (January 8, 1992) explores the potential of technology to improve schools. The goal for the child being educated in this environment is to become a productive worker, effective thinker and problem solver, lifelong learner, and an informed, responsible citizen of this planet.

If schools of the future reflect the significant changes suggested by those frustrated with current educational practices, the library media specialist's role and educational preparation must be different. The teacher's role will also change significantly. In a restructured school the self-contained teacher generalists becomes an anachronism. It is time to adopt a new

paradigm in education--one where instructional specialization is used to redefine teaching roles realistically.

AN EDUCATIONAL MODEL BASED ON INSTRUCTIONAL SPECIALIZATION

Specialization is a way of life for doctors. Many deal with only one part of the human body. Management consultants are currently advocating a flatter more flexible organization. With these changes experts in different parts of the organization can more easily collaborate to address problems. Teachers, like the high school teacher who is preparing students for a workplace where they may ultimately have ten careers, daily face equally complex problems--problems that are sure to intensify.

My vision of the twenty-first century library media education curriculum is predicated on a realigned staffing pattern for professional library media staffs and teachers. Educators supporting this collaborative instructional model will have moved beyond the teacher generalists mind-set to a more rational view based on the need for a division of instructional responsibilities. Space limitations confine the curricular description primarily to instructional services of the library media staff. Collection development, administration, and similar support functions will be discussed only as they relate to these services.

Two central assumptions are fundamental to this vision of the library education curriculum. **First, like teachers, library media specialists currently lack the time and expertise to perform all assigned functions.**[1] A media services staff will be composed of professional specialists in complementary areas, such as instructional technology, instructional information and materials and instructional design. The unifying thread will be their focus on the teaching and learning processes that enable students to locate, use, communicate, evaluate the technologies, knowledge, and instructional strategies that promote informed decision making and an improved quality of life. This new professional will be referred to subsequently as an educational processes specialist.

Second, the school of the future will require a team of specialists with complementary expertise to educate youth adequately. The basis for differentiating roles is the type of involvement in the instructional process. The major role of the teacher will be content specialist; the educational processes staff member will be mainly a process specialist.

A visit to the elementary classroom using this collaborative model highlights the division of instructional responsibilities. The class includes children from Greece, Mexico, Peru, Malaysia, and Taiwan. Because students want to learn more about countries and cultures represented in the class, they have decided to select one country and study it in depth. Through a class poll, Peru was chosen.

The teacher's major responsibility in this learning experience is to facilitate students as they explore content-related ideas and principles concerning the country, its people, land, cultural

contributions, commerce, etc. The educational processes specialist facilitates the identification and use of effective strategies for helping children learn these concepts.

One strategy selected by the class is to use an on-line network to establish an electronic connection with a classroom in Lima, Peru. The teacher assists learning of the content aspects of this activity. The educational processes specialist helps students to use the network effectively to retrieve information and provides the technological expertise to assure a successful experience.

Both specialists are responsible for promoting thinking and problem solving activities.

Solidifying the link between content and process will be a primary concern in this instructional specialization model. Educational processes specialists will need a basic knowledge of specific subjects covered in the school's curriculum. This knowledge reveals important thinking pattern differences and current approaches in various subject areas such as social studies and science. These specialists realize that processes for providing access to content are tied to these subject area difference. The educational processes staff's content knowledge will also facilitate the transfer of process skills when concepts in different content areas are similar.

Process knowledge needed by the teacher is the obverse of that of the educational processes staff. In other words, the teacher should be aware of the principles, range of processes, and strategies that promote effective student use of information and ideas in a content area. With this type of knowledge the geography teacher who wants to use "Where In the World Is Carmen Sandiego" with her class doesn't need to feel guilty about lacking in-depth knowledge about incorporating new technologies, experiences, or materials. Instead, this collaborative content/process model gives her a different expectation of her contribution. Working with the content specialist to seamlessly integrate these activities becomes a major responsibility of process specialist.

THE ACADEMIC PROGRAM OF THE EDUCATIONAL PROCESSES SPECIALIST

Three types of instructional roles will receive greatest attention in the academic program of the educational processes specialist. They are "bridges", "windows", and "frameworks" roles. The "bridges" roles emphasize the connections that allow learners to move from known to unknown; the "windows" roles focus on new information and ideas discovered by the learner; and, the "frameworks" roles concentrate on creating meaningful contexts for the information and/or ideas learners discover. Although these roles are treated separately, they often overlap or exist concurrently.

Bridges Roles

The educational processes staff's responsibilities in the new instructional model require real expertise in recognizing and establishing connections. Roles based on these responsibilities

encompass the world of information and ideas as well as collaborative instructional and learning relationships. Some major bridges are:

Instructional linker--Solidifies the connection between content and process skills in instructional activities; between content and instructional strategies; between students and instructional strategies; etc.
Example: The educational processes specialist acts as instructional linker by helping the teacher to incorporate critical listening and viewing skills activities into a lesson based on a series of television newscasts about Peru.

Information linker--Promotes an understanding and appreciation of how information and ideas are connected; of the information world beyond the school; etc.
Example: One of the educational processes staff's most common information linker roles is facilitating students'understanding of the links that connect information within and outside of the school. During the learning experience related to Peru, students investigated various means to obtain needed information. These included, community members from Peru, travel agency information, video tapes on Peru from the public library, electronic on-line services, such as Prodigy, etc.

Technology linker--Encourages use of current and emerging technologies to produce appropriate learning experiences; to emphasize global connections; etc.
Example: The educational processes specialist acts in a technology linker role with the elementary class when she establishes and facilitates the on-line hook-up to a classroom in Peru.

Each of these bridges roles requires different competencies. These competencies focus on the educational processes specialist's ability to facilitate the identification, development, use and evaluation of various types of concrete and conceptual links in learning situations. These competencies and those from the windows and frameworks roles will shape the educational processes specialist curriculum.

Windows Roles

Windows roles are central to the new instructional model. They are concerned with the insights, new information, ideas, and concepts that students gain when they have established the links referred to above.

Educational processes specialists engaged in windows roles make available to students activities, strategies and materials that encourage them to be creative, enlarge their perspectives, and prepare for the future. Two windows roles that will continue to expand into the twenty-first century are promoting a global perspective (A window to the world), and developing information literacy (A window to the future).

Promoting A Global Perspective--To promote a global perspective the educational processes specialist helps students gain access to:

instructional strategies, materials, and new technologies that emphasize a global mind-set;

information and ideas contained in sources beyond the school;

electronic sources, such as *Magazine Index,* and interactive information structures, like hypermedia; and

hardware, images, sounds, etc. in forms that allow students and teachers to create their own products using new technologies,[2] etc.

Developing Information Literacy--To develop information literacy the educational processes specialist helps students:

learn the skills required to use information and ideas effectively in making life decisions;

realize the ethical and policy implications of decisions related to information generation, use and destruction;

gain the skills required to think critically about information and ideas presented through all types of media;

recognize the importance of gaining access to a wide range of information and ideas representing different points of view in a democratic society; and,

appreciate the role of information and ideas in promoting a better quality of life.

The educational processes staff assists teachers in integrating these skills, knowledge, and attitudes in all content areas.

Skills and techniques suitable to a traditional library media program are inadequate for professionals who will engage in windows roles. This is particularly true in an electronic environment where global issues predominate. A trip back to the elementary classroom studying Peru highlights some specific windows contributions pertaining to global education.

When we arrive at the classroom, the educational processes specialist and the teacher are discussing the unit on Peru. They are trying to decide how they can assist students participating in active, cooperative learning activities.

As the discussion progresses, the teacher expresses a need for additional help with the Peruvian culture. From the global resources file the educational processes specialist identifies a cultural consultant from Peru to help develop potential learning opportunities. The contact this specialist through the electronic education network to obtain assistance.

Finally, the teacher and the educational processes specialist choose five global perspective-expanding activities they think some or all students might be interested in. These include:

- establishing regular on-line contact with students in a Peruvian classroom;
- receiving basic Spanish lessons through distance education programming;
- developing a hypermedia package on Peru with special emphasis on cultural similarities;
- planning a trip to Peru; and,
- hearing a story about the Incas read to them by their teacher.

These and similar activities have the potential to provide or support mental windows to new insights, information and ideas. The development and integration of appropriate windows experiences require a broad range of knowledge, skills, and attitudes. Educational processes specialists who assume windows roles must develop a global mind-set. They must also keep up with rapidly changing technologies, developments in global education and new information structures and packages. Further, research findings about learners and learning must guide collaborative instructional efforts.

Frameworks Roles

Frameworks roles in the new instructional model also deal with connections and relationships but on another level. They are concerned with the structure that exists in a student's mind when the relevant connections among information, ideas and attitudes are linked to form schema.

Major difficulties in constructing effective mental frameworks result in part from the amount of unprocessed data and fragmented information that inundates us through all types of media. The rapid rates of information obsolescence and technological advances are other factors that complicate this process.

Educational processes specialists acting in framework roles search for ways to enhance users' ability to understand important connections. Specifically, they do the following:

- Aid students in perceiving relationships on multiple levels and establishing broad frameworks within which to fit seemingly disparate ideas and information;

Example: The educational processes specialist works with the elementary class studying Peru to complete an interactive, multimedia project using HyperCard. They create a hypermedia package containing more than twelve topics, each with sound, images, and stories linked together. Through this experience students become aware of many different relationships at varying levels as they create countless paths through these materials.

- Help students to learn to codify information and ideas effectively and to evaluate mental frameworks;
  Example: The educational processes specialist facilitates a student discussion on organizing information as they plan their imaginary trip to Peru. Webbing and other techniques for depicting relationships and categorizing information are explored.

- Model and advocate framework-oriented thinking in instruction and information providing activities;
  Example: When the on-line networking project connecting the class to a classroom in Peru is introduced, the students talk about the framework of the information world. They identify their school as the point of first access and explore where and how they can obtain relevant information outside the school.

- Provide students with learning opportunities leading to the adoption of forward looking and dynamic mental frameworks;
  Example: The educational processes specialist makes sure that these elementary school students have the opportunity to explore new forms of information, like hypertext, and new technologies as they study Peru. These students also have the opportunity to evaluate materials presenting different point of view about the contribution of the Peruvian culture.

- Assist teachers in carrying out these same types of framework roles in their content areas.

To gain the competencies needed to perform these frameworks roles, the educational processes specialist will be concerned with how schema are developed and what services, resources and technologies can be used to provide effective framework-building learning opportunities. Further, this professional must personally adopt a forward looking and dynamic framework that includes technological advances and eliminates obsolete, irrelevant information.

CONCLUSION

This new instructional model calls for significant changes in the preservice education of teachers and library media specialists. Teachers will concentrate to a much greater degree on

content. All educational processes specialists will have the same educational core but will specialize in different areas, such as instructional technology, or educational information packages. The degree that educational processes specialist receive will be a joint degree from education and librarianship/instructional design/instructional technology. The locus and nature of the educational experience would be worked out among the concerned parties.

From the beginning of the preservice experience content and process specialist will be educated as a team. They will recognize that neither can offer a quality education for students without the complementary expertise of the other team member. Certification standards would reflect the specialized approach.

Is this new instructional model a pipe dream? Definitely not if school restructuring efforts are to be taken seriously. This model empowers teachers to assume a manageable role in the educational process. It recognizes the complexities facing students who must compete on a global level. America's students cannot afford to wait for the benefits that this type of instructional specialization can bring. We must help them to obtain the educational windows, bridges, and frameworks that will prepare them to meet the daunting challenges of the 21st century.

INSTRUCTIONAL ROLES OF THE EDUCATIONAL PROCESSES SPECIALIST

BRIDGES ROLES (Focus on connections that allow learners to move from known to unknown)	WINDOWS ROLES (Focuses on new info and ideas discovered by learners)	FRAMEWORK ROLES (Focuses on creating meaningful contexts for info and ideas)
Act As: Instructional linker •Solidifies connection between content and process skills; etc. Information linker •Promotes an understanding and appreciation of how information & ideas are connected; etc. Technology linker •Prompts use of current and emerging technologies; etc.	**Promotes Global Perspect. by:** •Providing instructional strategies, materials, & new techs. emphasizing a global mind-set; etc. **Aid Students to Dev. Info Literacy by Helping Them To:** •Learn lifetime info skill •Understand info ethics •Think critically about info in all media formats •Appreciate role of info in attaining better life qual.	**Assists Students to:** •Perceive relationships & establish broad framewks. •Codify info & ideas •Evaluate mental frameworks •Be aware of & value framewk-oriented thinking •Adopt forward-looking & dynamic frameworks **Assists teachers in carrying out these same types of framewk roles in their content areas**

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THE FUTURE OF INFORMATION SERVICES IN K-12 SCHOOLS IN WASHINGTON STATE: A FUTURE SEARCH CONFERENCE

Margaret Baldwin

Abstract

A Future Search Conference is a very specific and fascinating whole systems approach to planning and addressing challenges before us. It is a new way to learn; it is a quick way to effect change. It has been used successfully in business since the 1960s and has been delineated by Marvin Weisbord in DISCOVERING COMMON GROUND.

Such a conference creates a temporary community; it convenes a wide variety of stakeholders to address a common issue. The conference is designed not so much to solve the problems of today, but instead to create the world of tomorrow--a common ground toward which all want to work. It is a five-step process: 1) an environmental scan of the past, 2) an analysis of the present, 3) listing of the potential for and barriers to progress, 4) creation of future scenarios, 5) development of specific action plans that can be accomplished. This method actually redefines the problems to be addressed and suggests solutions in terms of plans of action. It is a way for collective learning and planning to take place. Such participative planning leads to shared vision and shared responsibility at the same time that it instigates fast action.

In Washington State there is to be a state-wide Future Search Conference in October 1994 specifically on the topic "The Role of Information Services in K-12 Schools." Data will be available in November on the effectiveness of the process in the educational arena and the vision and plans of action that stakeholders in Washington hold for their own state

THE FUTURE OF INFORMATION SERVICES IN K-12 SCHOOLS IN WASHINGTON STATE: A FUTURE SEARCH CONFERENCE

Margaret Baldwin

The information revolution is upon us: it is true. School libraries are not what they used to be, and they are going through rocky times. Funding is a continual problem. Technology is a big question mark. The role of the school library media center as an information provider in education seems to be ill-defined. The role of the library media specialist in the school setting is different depending on whose perceptions one consults. The education of administrators and teachers at the university level regarding the information needs and services seems slim. There are hundreds of projects, pilot projects, and an infinite number of studies done relating to school libraries throughout the country. However, as we move to change in education, as we move toward restructuring or renewal in the schools, we seem to lack an overview of the entire system and the future of information services in that system. School libraries as the traditional information infrastructure are going to become dispensable, become expensive non-essentials, or become the hub of the learning in the school and the global link. The question is, Which?

Marvin Weisbord (1992) in Discovering Common Ground proposes a fascinating approach to whole systems analysis.

> To change an organization, the more people you can involve and the faster you can help them understand how the system works and how to take responsibility for making it work better, the faster will be the change. It doesn't happen through isolated pilot projects (Weisbord, 1992, p. 33).

A future search conference specifically on the topic of the future of the school library media center and information services is taking place in October, 1994, in the state of Washington. This will give a holistic approach to examining the nature and future of school libraries. It will give a different way of looking at and understanding the place of school libraries rather than the piecemeal approaches used in education thus far (Rudestam, 1992). While Information Power (1988) published by ALA defines, in terms of guidelines, what the professionals of librarianship would like the role of the school library media center to be, it does not describe how we are going to get there. Washington state has a corresponding Information Power for Washington State (1991), but this document is not necessarily shared or looked to outside the library community itself. We need a broader perspective--a full range of stakeholders confronting the same issue from their various perspectives.

"A first principle for encouraging new actions is creating a new temporary system. In future search conferences, this means having people come together as peers who would not ordinarily meet" (Weisbord, 1992, P. 375). This means that it is of value to have the largest possible representation of a cross-section of stakeholders. So far, mostly the librarians have been talking to librarians, administrators to administrators and teachers, teachers to other teachers, and nobody is talking to parents, students, etc. The theory is that getting a representation of all these different stakeholders to talk together on a common topic--such as information services--we can move toward significant understanding of what we want the future of school library media centers to be and how to get there.

Therefore, by creating this temporary community in Washington state, we hope to generate a ground swell of working plans in different arenas to put complementary action plans into effect simultaneously; we have the potential for more and faster change than any individual pilot project. Participative planning leads to shared vision and shared responsibility, increased individual productivity and commitment, ownership.

Additionally, an approach like this brings the focus beyond the level of conflict resolution or problems of any one school or district. It actually redefines the problems to be addressed and suggests solutions in terms of plans of action. Participative planning leads to more innovative approaches and serious networking. This model has been used very successfully in businesses since the 1960's; it should work very successfully in education. While this particular future search conference zeroes in on information services and the school library media center, the basic problem it addresses is to a larger extent that of the role of specialization in any large organization.

The conference is based on a modification of the future search conference models outlined in Weisbord's book Discovering Common Ground or the ICA (Institute of Cultural Affairs) model as outlined in Winning Through Participation. There would necessarily be certain modifications because this is a small, shorter conference with just a few representatives from each of the different stakeholder groups.

In addition to being a working conference for Washington state, the conference itself is a research activity. The sample group is a purposive sample; the criterion for selecting each participant is directly related to that person's professional position relative to the topic. This is maximum variation sampling (Patton, 1990, p. 172). Identified are a "small sample of great diversity...individuals...that have quite different experiences" (Patton, 1990, p. 172) in relation to the problem and yet are all intensely interested in the problem and solutions. The stakeholders imperative to successful dialogue on this topic are as follows: (maximum 32)

school library media specialists
school principals
state and district level school administrators
university educators
K-12 educators

business representatives and parents
technology experts, consultants
students

The actual participants for each of these categories comes through recommendations from leaders in the field, my own personal experience of the professional expertise of potential candidates, and a few probably by convenience of the location--students and parents, for example.

In addition to the professional diversity, hopefully the group will represent diversity in other ways as well: ethnic, male/female, public/private schools, age variation, wide geographical representation.

The specific questions to be addressed by participants during the various sessions regarding the future of information services in the schools are as follows:

1. Past--how did we get where we are today (from 1950's)?
2. Present analysis--environmental scan of global and specific trends?
3. Prouds and sorries? Potentials and barriers?
4. What is the ideal future scenario for the school library media centers?
5. What are the specific action plans that we can develop and work on in our individual arenas to move us toward that future? Short term? Long term?

A Future Search Conference is a new way to learn; it is a quicker way to effect change. It starts with candid appraisals of the past and present, creates the future, and defines plans of action for getting there. This approach is an example of just what we need to address the challenges before us. 1) It is a proven approach to use in the field of education, an approach which does not maintain the status quo. 2) It can effect change quickly; therefore, it forces a leadership role in the information revolution. 3) The stakeholders involved are a microcosm of the society with which they are dealing. The process prepares its participants to be significant, active members in the Global Village.

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PREPARING THE INFORMATION EDUCATOR FOR THE FUTURE

Marjorie L. Pappas
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Abstract

Library media specialists will become information educators in the learning environment of the future. In an age where information is stored primarily in electronic formats, students and teachers will use the services of an information educator to access information locally and globally. The information center will be the information hub for the learning environment and will retain a basic resource collection. The information educator will have four primary roles in this learning environment; information manager, curriculum consultant, teacher, and manager of information center. The functions of leadership, change agent, and staff development are an integral part of these roles. This paper develops these roles and identifies appropriate competencies for an information educator preparation program.

PREPARING THE INFORMATION EDUCATOR FOR THE FUTURE

The library media specialist of today is the information educator of the future. Proposing an educational program for this information educator requires developing a vision of the roles this professional will play in a future learning environment.

The learning environment of the future will be influenced by technologies which store information electronically, enabling a nonlinear and global information access process that transcends the walls of classrooms, school library media centers, and homes. The educational restructuring process currently underway suggests the traditional roles of students and teachers will change, putting teachers in the roles of coach and facilitator, while students become responsible for their own learning. As students use technology to enable their information gathering, curriculum becomes much more fluid, reflecting an emphasis on critical and creative thinking rather than on a regurgitation of facts. As students are challenged with authentic problems and wholistic learning programs, information becomes a vital element.

Mecklenburger (1994) suggests that schooling today is based on the factory model, and many educators fail to understand that "(w)e're in the midst of a profound societal revolution--the information revolution that is altering every institution . . . "
(p. 1)

As a new model of schooling emerges, with great changes in the learning environment, curriculum, and pedagogy, what is the role of the information professional? The library media specialist of today serves the roles of information specialist, teacher, and instructional consultant, with a primary focus that says, "the mission of the library media program is to ensure that students and staff are effective users of ideas and information." (AASL/AECT, 1988, p. 1). What about the future?

A conceptualization of the future information educator is presented in a webbed diagram in Figure 1, which suggests there will be four roles: information manager, curriculum consultant, teacher, and manager of information center. The title for this future professional will be debated by many over the next few years. Carr's (1991) perspective on the future names for the library media specialist and the library media center sets an appropriate foundation for this discussion.

> Since it is information that a learner needs, not 'media,' to refer to the school as an information center will not only emphasize that information is its business, but also that information is an intellectual commodity to be considered when solving knowledge-based problems. To transform the media specialist into an information educator might have a similar effect. The word "information" applied to both the place and the person who inspires it promises the possibility that information is here to become part of the learning

> experience in school and that there is a human being present whose sole mission is its transmission. (p. 221)

Therefore, for the purposes of this paper, the future library media specialist will be referred to as an *information educator*, and the library media center as the *information center,* operating in a learning environment that is connected to the total community., and to Mecklenberger's (1994) notion of a Global Village.

ROLES OF THE FUTURE INFORMATION EDUCATOR

Information Manager Role

As the Information Age gives way to the Communication Age, and the notion of an information explosion abounds, the role of an information manager in a school environment seems of critical importance.

One of the most significant roles of the information educator will be that of information manager, with a focus on both the accessing of information and the acquisition of resources. The information center of tomorrow will be an information hub with information flowing in and out of the center. McKenzie (1993) suggests these information managers will become "Pilots,"

> . . . (b)ecause more information is not always better, the smokestack agenda of showing children how to find information by 'looking things up' will be shifting to the task of showing children and teaching staff how to navigate through oceans of data purposefully . . . . (t)he media specialist who sharpens her or his searching skills will prove an invaluable team member and consultant as classes venture out on LANs and WANs and Internet. (p. 4)

Students and teachers will access information globally from a variety of online services and the information manager's role is to guide and facilitate this process. As the focus on authentic learning encourages students to gather information from people in the local community, the information manager will need the ability to access community resources as well.

The information manager role suggests an expanded involvement with the process of using information. McClure (1994) believes that filtering and synthesizing will become critical skills, with "such information retrieval techniques . . . uniquely individualized in their design." (p. 120) A specialized knowledge of intellectual freedom and copyright issues will be a part of the information manager's role. As the electronic manipulation of information increases, students and teachers will require assistance with establishing the integrity of information.

Collections in information centers of the future will change because formats are shifting from paper to electronic, enabling access to information stored on computers around the world, available on demand wherever the student might need that information. The emphasis today is on acquisition of resources, but in the future this emphasis will shift to access of information. (Pappas, 1993) Mancall (1991) reinforces this perspective by suggesting, "(a)s more libraries of all types become interconnected with each other and with the world of information available electronically, either through online databases or in-house CD-ROM, extensive ownership of materials in-house will become a less-emphasized goal." (p. 85)

This emphasis on accessing information does not mean there will cease to be a need for books and other resources in the information center. Reading will continue to be an important skill and students will need to develop an appreciation for good literature. The resource collection will be more focused and specifically related to the curricular needs of students, thus the information manager's role will include very specialized selection skills.

The information center will have a variety of electronic resources, databases, and catalogs available for student and teacher use, searchable from either the center itself or remote locations. Electronic catalogs will be available for both the information center and other local and regional collections and these will be maintained by regional database specialists, eliminating the cataloging function from a local information educator's responsibilities. All of these electronic systems will have sophisticated data collection and statistical analysis features to enable the process of collection development, based on both usage patterns, and correlated with the curriculum.

Curriculum Consultant

The curriculum consultant role of an information educator encompasses and expands upon the instructional consultant role defined in *Information Power* (AASL/AECT, 1988). The information educator of the future must be a consultant for both pedagogy and the curriculum development process. Indeed, Harris (1992) suggests ". . . that the most significant roles remaining to librarians in the face of automation will be teaching and consulting." (p. 12)

As information continues to expand at an exponential rate, educators will be forced to glean their curriculum to a focus on essential knowledge, using the real world as a learning laboratory, shifting from a teacher-centered to a student-centered pedagogy, and encouraging students to think and problem solve. Text books will cease to exist and students will use information gathered from multiple sources as a basis for constructing their own knowledge. In this type of learning environment, the curriculum consultant role suggests a specialized knowledge of the curriculum and newly developed pedagogies to enable a collaborative planning process with teachers. Information literacy will be a fundamental part of the curriculum and integration will cross all areas. The information educator will serve as a consultant as teachers include concepts of information literacy within their curricula.

An information-seeking model that follows a process approach is essential in this type of learning environment, one that is applied by all teachers when students gather and use information. This means information educators become more of a consultant to teachers. They must know, and be able to use, information skills process models, and be able to integrate this model across the curriculum.

The Teacher Role

Teaching has been a significant role of the library media specialist and *Information Power* (AASL, AECT, 1988) underscored the importance of this role. The information educator of the future must also be a teacher, one that facilitates the learning process.

The teaching of an information gathering model is a fundamental part of this role, which occurs in collaboration with other teachers. With the constant emergence of new technologies and pedagogical paradigm shifts, the teaching role of the information educator includes information skills and communication technologies. These changes also suggest the teaching role of the information educator is to model the use of these innovations for other faculty.

As teachers integrate information skills across the curriculum, students become engaged in a process, and the information educator must be available to facilitate and assess their progression through this process. With a focus on authentic assessment, the information educator and teachers share assessment responsibilities.

The end product for students in an information-seeking activity usually means students need to communicate their new knowledge. Carter (1994) suggests

> (w)e are finding more and more that the use of presentation technologies is a critical learning outcome for this generation of students, particularly such skills as videotape recording and editing and using interactive media. (p. 29)

The information educator will often be in a position to teach students the use of electronic tools enabling the communication of the knowledge they construct. Information educators must be on the cutting edge with new technologies and pedagogies, modelling these in their own teaching enabling other teachers to grow and learn.

Manager of Information Center

The information center in the school of the future will house much of the technology which enables a flow of information making this center the information hub of the school (Pappas, 1994). The information center will continue to house books, primarily literature, and other materials which support the curriculum. The operation of this information center will require the role of a manager, which includes administration of services, finance, personnel, resources, and the facility itself. This role includes a focus on long range planning, providing leadership and a focus on change. The management of technologies includes acquisition,

maintenance, and operation of the network which links classrooms with the information center. The information educator works collaboratively with others in the schools who are specialists with technology.

Leadership, Change Agent, and Staff Development
There are three additional functions which permeate the roles of information educator; leadership, change agent, and staff development.

The future information educator is a leader in the school community, a role initially promoted in *Information Power* (AASL, AECT, 1988), which suggested that "(l)eadership is the crucial factor in creating a quality library media program that is an integral part of the school curriculum." (p. 42) Vision is an important extension of leadership and the information educator combines these to become a change agent as new technologies continue to emerge. With change as a constant, the information educator plays an important role in staff development, continually updating the technology literacy level of teachers and administrators.

COMPETENCIES FOR THE INFORMATION EDUCATOR OF THE FUTURE

As the roles of the information educator change, the preparation programs must change also. The information educator of the future will operate in an environment where collaboration and communication are critical skills, where the curriculum has a real-world focus, and pedagogical modes are those of coach and facilitator. The faculty and curriculum of future information educaor programs must model this same learning environment, providing students with opportunities to experience student-centered, authentic projects. The laboratory setting for these e xperiences must be varied, including information centers and learning environments for students of all ages.

The various roles of the information educator as described in this paper would require the following competencies:

Information Manager Role
The information educator will demonstrate a knowledge of:

* information access strategies appropriate for print and electronic formats, and community resources.

* the ethical issues which impact the use of information, i.e. principles of copyright, intellectual freedom, and the intellectual integrity of information.

* the appropriate filtering strategies to assist researchers.

* the appropriate selection strategies for the acquisition of resources which correlate with unique student and curricular needs.

Curriculum Consultant Role
The information educator will demonstrate a knowledge of:

* appropriate curriculum designs and pedagogy relevant to the specific learning needs of students.

* information literacy to enable an integration process across the curriculum.

* appropriate communication and group process skills to enable a collaborative planning process.

Teacher Role
The information educator will demonstrate a knowledge of:

* a process model for information skills which enables nonlinear information seeking and empowers learners to develop their own unique information seeking process.

* appropriate communication technologies and facilitate the use of these technologies with students who are preparing presentations.

* appropriate use of information and tool technologies in his/her personal teaching process as a model for teachers.

Manager of Information Center Role
The information educator will be able to demonstrate a knowledge of

* budget and finance applications, appropriate facility design and maintenance strategies, and effective interpersonal and communication skills for personnel supervision, to enable the effective management of a learning environment information center.

* service features which provide a structure and foundation for a positive, creative, and inviting learning environment for an information center.

* effective management strategies for student, faculty, and community use of the resource collection.

* the long range planning process.

* selection and use of those technologies which enable the use of electronic tools, and the electronic storage and access to information throughout the school community.

Leadership, Change Agent, and Staff Development
The information educator will demonstrate a knowledge of:

* leadership and organizational theory.

* an acceptance of the paradigm change process and effective communication strategies for conveying this to others.

* adult learning theory and instructional stragegies for planning and implementing staff development.

Delivering the Preparation Program
It is important to remember that while the vision of learning provided in this paper will be the norm for children, many of the adults who would become students in an information educator preparation program will have previous schooling experiences which were teacher-centered and textbook based, with a focus on knowing facts. Collaborative learning was considered cheating. Before these individuals can become leaders, change agents, and curriculum consultants in an information center which supports a student-centered learning program focused on critical thinking and authentic projects, they must transform themselves with some major paradigm changes. This must be a primary goal of information educator preparation programs.

As the library media specialist of today is transformed into the information educator of the future, there will also be the challenge of retraining. The competencies identified in this paper would apply to that process as well.

A MODEL FOR THE INFORMATION EDUCATOR OF THE FUTURE

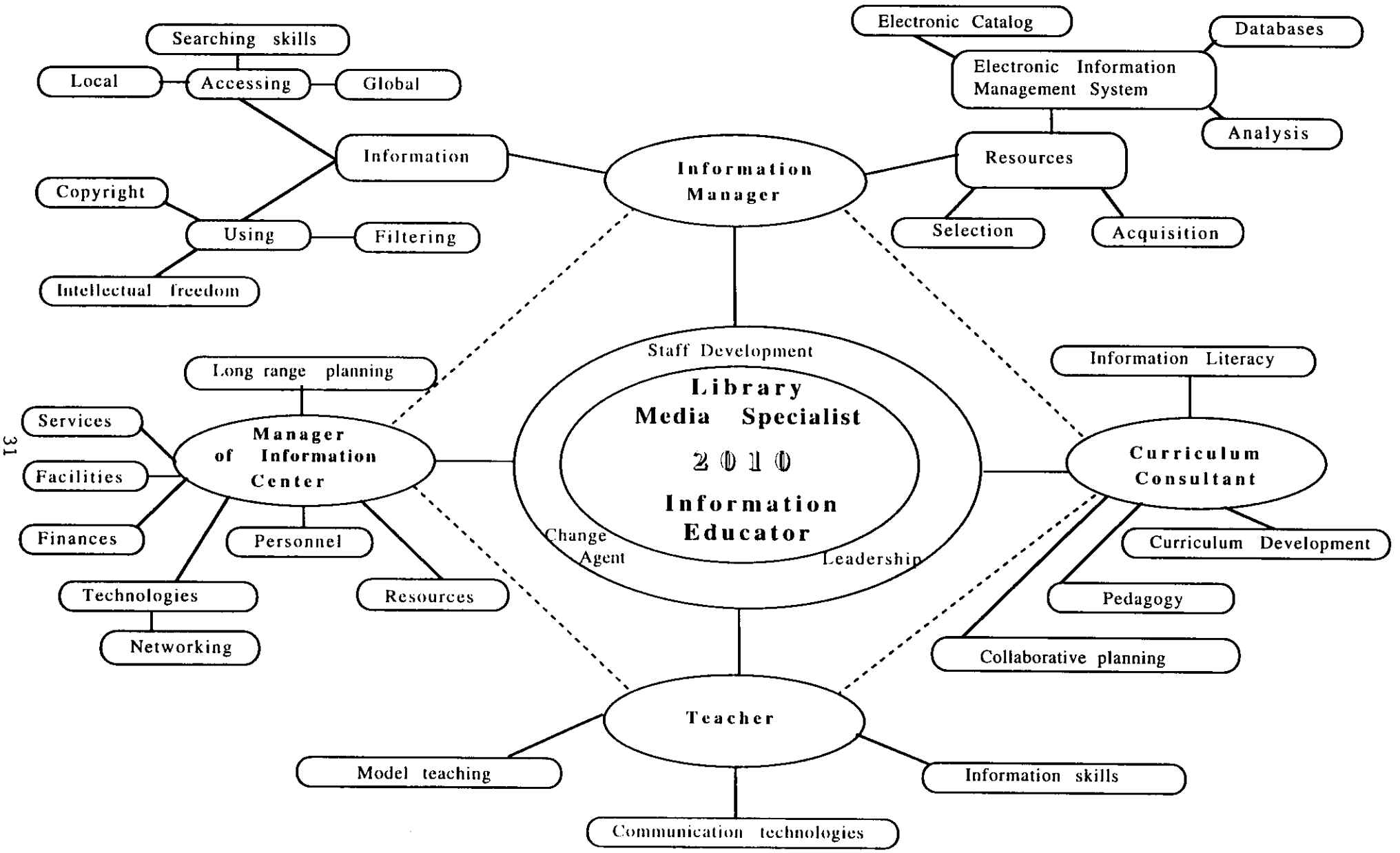

Figure 1

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STUDENT CENTERED INFORMATION LITERACY PROGRAMS: THE COLORADO VISION

Dian Walster

Abstract

Library media specialists in the state of Colorado have a vision of the future for their students and information literacy. This vision can be traced through *The Impact of School Library Media Programs on Student Achievement* (Lance, Welborn & Hamilton-Pennell, 1992) to the federally funded Information Literacy Institute (Welborn & Bolt, 1994) based on Colorado Information Literacy Guidelines and into the 1994 AASL/Highsmith Research winners (Ponis, Walster & Welborn, 1994) alternative assessment project. This paper outlines the Colorado vision for student information literacy and discusses its implications for other states and communities. The Colorado vision is part of a national effort which is creating the future of school library media programs.

INTRODUCTION

Library media specialists in Colorado have been leaders in integrating information skills into the curriculum for many years. Nationally, Colorado media specialists have won awards, presented programs at ALA and AASL, been highly visible in national committees and published in national journals. Within the state there are ongoing efforts to integrate the library media perspective into many levels of school decision making. Media specialists sit on collective decision making committees, district wide curriculum committees, outcomes based education committees, site based management teams and restructuring planning teams. In Colorado former media specialists are superintendents of schools, principals, assistant principals and district level administrators. Now media specialists are leading the state in developing information literacy guidelines as a companion process to be used with the state mandated content area standards. This paper discusses the implications of the Colorado vision for implementation in other states and discusses the ongoing Colorado research program.

THE "COLORADO IMPACT STUDY"

In 1992 Colorado burst onto the library media research scene with publication of the *Impact of School Library Media Centers on Student Achievement* (Lance et al, 1992). The study attempted to answer three interrelated questions:

- Is there a relationship between the money spent for library media programs and students test scores?

- If there is a relationship are there variables which may intervene between the expenditures and the norm based scores?
- Does the instructional role of the media specialist affect test scores? (paraphrased from p.2)

The answers to these questions are the reasons the document has drawn such wide spread national attention. It created, for perhaps the first time, sound statistical evidence of the importance of library media centers.

- Yes. Students at schools with better funded LMCs tend to achieve higher average test scores, whether their schools and communities are rich or poor and whether adults in the community are well or poorly educated. (Lance et al, p.97)

- The size of an LMC's total staff and the size and variety of its collection are important characteristics of library media programs which intervene between LMC expenditures and test performance. (Lance et al, p.97)

- Yes. Students whose library media specialists played such a role--either by identifying materials to be used with teacher-planned instructional units or by collaborating with teachers in planning instructional units--tend to achieve higher average test scores. (Lance et al, p.97)

The results of this study are used to justify the importance of library media programs in schools across the country. Other states are in the process of replicating the study. In the past two years, Keith Lance has travelled widely discussing the study and helping others develop their own research agendas. In Colorado the "Impact Study" was but one of a variety of approaches undertaken to examine the nature of library media programs and their effect upon students.

COLORADO INFORMATION LITERACY GUIDELINES

For Colorado, the impact study was not the beginning but a pivotal point in changes that had been occurring throughout the state due to the widespread implementation of site based management, outcomes based education and school restructuring efforts. While the impact study met the needs for statistical data, it still did not provide the philosophical foundation necessary to deliver the kind of program for students that library media specialists felt the state needed. In the summer of 1993, under the auspices of Nancy Bolt and the Colorado State Library a team of people was assembled to develop that foundation and write information literacy guidelines. The team consisted of state level personnel, building, district and regional library media specialists, representatives of higher education and public libraries and content area specialists. Members of the team represented all geographical areas in Colorado. In a three day retreat five critical areas for student development were identified and writing teams assigned. Over the next year, these five areas turned into five information literacy guidelines. Written from the point of view of student outcomes and focusing on process rather than content, they stand as a model for what constituents an information literate person.

Information-literate students are competent, independent learners. They know their information needs and actively engage in the world of ideas. They display confidence in their ability to solve problems and know what is relevant information. They manage technology tools to access information and to communicate. They operate comfortably in situations where there are multiple answers, as well as those with no answers. They hold high standards for their work and create quality products. Information literate students are flexible, can adapt to change ad are able to function independently and in groups. (Colorado Information Literacy Guidelines, p.1)

The information literacy guidelines are designed as processes to be integrated with content standards in areas such as social studies, geography, reading, writing, science and mathematics. By collaborating with classroom teachers to integrate the information literacy processes with the content area standards the expected benefit is more knowledgeable and able students. The five information literacy areas in the guidelines are:

- Student as knowledge seeker
- Student as quality producer
- Student as self-directed learner
- Student as group contributor
- Student as responsible information user

Each of these standards is accompanied by a list of actions which students complete to accomplish the standard. The Colorado writing teams consulted the existing information skills and information literacy programs guidelines. While the Colorado guidelines were developed to meet the needs of this state they acknowledge the contributions that other states and district have made to the body of knowledge about information literacy. One consistent theme was repeated through all the information skills and information literacy documents. Students engaged in a process of seeking knowledge and constructing their own information. This formed the foundation for the first guideline.
The student as a knowledge seeker is divided into eight actions which include:

- determining information needs
- developing information-seeking strategies and locating information
- acquiring information
- analyzing information relative to need
- organizing information
- processing information
- acting on information
- evaluating both process and product

The writers of this standard are still working on creating a graphical organizer to depict the relationships between the areas of this standard. As codified on paper it looks like a logical sequential process. This is not the intention of the standard. While the process may proceed logically and sequentially it may also be applied in a more random or non-linear fashion. The

committee is still trying to resolve the problem of how to depict the relationships of the pieces of this process.

The student as a creator of a quality product is seen as both an outcome of the previous standard and a reason for the existence of the previous standard. Students who are quality producers:

- recognize quality and craftsmanship
- plan quality products
- create quality products
- present quality products
- evaluate quality products

Library media specialists work in cooperation with classroom teachers to help students create quality products. These products are one way of assessing the impact of the information literacy guidelines on student achievement.

The student as a self-directed learner is a guideline to help students focus on their own independence and individual needs. It is the standard which recognizes that not everything in life is a class assignment. Students have questions, ideas and needs which are independent of the academic environment. They need to have the skills to be successful on their own to:

- voluntarily establish clear information goals and manage their own progress
- voluntarily consult media sources and read, listen and view for pleasure
- explore topics of personal interest
- identify and apply personal performance standards

Student's abilities to participate effectively as a group contributor has become a focus of job oriented education. More and more employers are asking that new hirees be able to work as a team. This requires students who can:

- help a group determine their information need
- share responsibility for planning and producing a quality group product
- collaborate to determine relevant information
- acknowledge diverse ideas
- offer useful information to the group
- clearly communicate ideas in presenting the group product
- evaluate the product, the group process and individual roles continuously

The student as a responsible information user is perhaps the most controversial and most foundational in the library media profession. It is the piece which asks students to:

- practice ethical usage of information and information technology
- respect the principle of intellectual freedom
- follow guidelines and etiquette using electronic information sources

- maintain the physical integrity of information resources and facilities
- recognize the need to equal access to materials and resources

Taken together the five Colorado Information Literacy Guidelines are "a process for learning that is transferrable among content areas and from the academic environment to real life." (Colorado Information Literacy Guidelines, p.1)

INFORMATION LITERACY SUPERTRAINERS INSTITUTE

Once the guidelines had been written, they formed only the skeleton for a statewide program. Further development of methods for integrating the guidelines with content standards and implementing the guidelines needed to occur. In Spring of 1994 Lynda Welborn and Nancy Bolt applied for and received a U.S. Department of Education grant for approximately $80,000 to develop state wide training in integrating the information literacy guidelines and content areas standards.

This training began the first week in August, 1994. In a five day institute participants examined the historical foundations of information literacy, were guided through the connections between the national Goals 2000, the Colorado state mandated content standards and the newly developed information literacy guidelines. Bob Berkowitz provided an instructional consultant process for integrating information literacy guidelines with content standards. Local teachers and media specialists demonstrated how they had begun the process in social studies, math, science, reading and writing.

The next stages of the project are a state wide teleconference which will result in a video tape available for national distribution, regional workshops, district level mentoring and e-mail communications between participants. Over the course of the 1994-95 school year, these activities are expected to result in a majority of media specialists in the state beginning to integrate information literacy guidelines with content area standards. In addition, a database of actual units and lessons will be created and will be available on-line and through a new statewide CD-ROM project. The evaluative portion of this project is extensive and includes both qualitative and quantitative measures of the project's success.

Media specialists in Colorado are taking an active and assertive role in developing their own agenda for students and library media programs. The Information Literacy Guidelines and the Information Literacy Institute were the result of a need within the library media community to direct their own destiny. We can no longer afford to let state and national mandates be the driving force for change. We must develop our own goals and follow through with appropriate actions and activities that focus on what we believe is best for student's information needs.

ASSESSMENT MEASURES

Implementation would not be complete without appropriate assessment. In 1994 Lynda Welborn, Roberta Ponis and Dian Walster received the AASL/Highsmith research award to develop alternative assessments for two of the information literacy guidelines. The purpose of this project is to provide measures beyond standardized tests that are founded in authentic assessments. Initially focus groups will be conducted to choose which two information literacy guidelines will be used to develop assessments. Multiple assessment measures for the two standards will be developed and field trials conducted in Jefferson County Schools. Variables such as grade level, information literacy level, professional staffing and school demographics will be part of a multiple analysis of variance. In addition, participant observation will also be included as part of the validation process. Results of the field tests will be used to revise and develop written protocols for the administration and evaluation of the alternative measures of information literacy. The final outcome is assessment tools which will be shared nationally.

IMPLICATIONS FOR A RESEARCH PROGRAM

The struggle in Colorado is but a mirror of the struggle around the county. One of the pieces that has become clearly evident to researchers in the state is that it will take a wide range of activities to understand the implications of this change. It requires the cooperation and research efforts of the state library, the library media professional organizations, higher education and individual media specialists. The following is a list of research projects which are currently underway in the state:

- A five year state-wide random stratified survey began this year as a function of the Colorado State Library.
- The Denver based Library Power project under the auspices of the Public Education Coalition is collecting baseline data on its current 15 schools (in 4 different districts) and will add 15 more schools in Fall, 1994. Three years of data will be collected in these schools.
- The School Library Media Program at the University of Colorado at Denver is part of the AASL/Highsmith alternative assessment project and is offering courses in action research for librarians.
- The Colorado Educational Media Association has developed a leadership activity in conjunction with the Information Literacy Teleconference which will result in integrated units and lessons. These units will be evaluated for integration of information literacy guidelines and content standards.
- Jefferson County school library media specialists will be working to develop and test alternative assessment measures as part of the AASL/Highsmith research award. Other library media specialists in districts around the state have requested to participate in the field testing.

The stage has been set. A philosophical framework with specific student outcomes has been established. Assessment and research projects have been put in place. If the future matches even part of the vision, Colorado's information literacy program could provide a model for

the rest of the county. Colorado is a ongoing testing ground for an exciting student centered information literacy program.

FUTURE SCENARIOS

It is difficult not to be pessimistic about the future and wonder if any educational change can significantly affect problems that have social, cultural and political foundations such as unemployment, social class conflicts, violence and abuse, environmental pollution. The wider issues that impact children require concerted effort in many different arenas not just public education. However, given these constraints what can an educational change such as integrating information literacy with specific subject content be expected to accomplish.

Short Term Effects

Increased self reliance and decision making skills by individuals.

Students who can demonstrate the skills outlined in the Colorado Information Literacy guidelines will be able to more effectively answer the questions and problems which occur daily. Over the course of a lifetime, the future for a child with these skills could have the following effects:

- As a young adult being able to create a quality product such as a paper, a report, a portfolio would increase the student's probability of getting good grades. Good grades could lead to greater opportunity for higher education, better jobs and a higher standard of living.
- As an adult in their early 20's, the ability to function as an independent learner could result in analysis of job opportunities. Strengths and weaknesses of the job, possibilities for advancement, treatment by the company of employees, and the company's future could be part of the problem solving and decision making process for an adult who knows how to locate, sort and process information. This could result in more consistent long term employment and greater stability for both the individual and their family.
- As a 30 something adult, the ability to carefully find, analyze and act on information could result in better decisions on medical care for a child who is chronically ill. This could result in reducing some of the emotional stress caused by a child's illness and increase the probability of diagnosing and stabilizing, if not curing, the illness.
- As an older adult, the ability to ask probing questions about the reliability and validity of offers such as extended medical coverage or aluminum siding could result in retention of savings rather than being taken in by unscrupulous con artists.

Long Term Effects

A larger and more diverse community of people with the ability to ask questions about difficult problems and as a group work toward solutions.

As a larger segment of the community develops skills in asking questions, gathering information and working as a group to solve large and more complex problems the following effects might take place:

- Neighborhoods or homogeneous groups working together to gather information to solve local problems such as gang violence, localized pollution or child care needs. If many members of the group can gather, analyze and work together to use information there is a greater likelihood that problems can be dealt with before the frustration level of trying to figure out how to do something overcomes the initial enthusiasm.
- As students proceed through elementary, middle school and high school their information literacy skills should increase in depth and complexity of ability to deal with problems and find answers. The results could be a larger percentage of the population with the skills and the need to probe for answers to difficult problems such as pollution and violence. As a group a larger number of individuals would be capable of dealing with more difficult issues.
- Students with these skills will become the teachers, business leaders and cultural influences of the future. Their expectations will be different. They will expect information to be available. They will expect analysis to occur. They will expect to ask difficult questions and sometimes not find answers. They will persevere over time to solve problems. They will expect to work together to help find answers to more complex issues.
- Responsible and ethical users of information create responsible and ethical information. They create an environment that requires information to be available and usable by many people of all backgrounds. Sharing a terminal in an elementary school library media center is the first step in increasing the sharing of information around the world. As larger groups of people focus on responsible information use and making information available the probability increases for more effective decision making. For example, the information recently released on the more widespread atomic testing in the continental United States than previously suspected has helped in medical diagnoses and personal trauma associated with increased cancer in some areas of the country. If this information had been released earlier, perhaps some of the physical and emotional effects could have been countered sooner.

IMPORTANCE OF THE COLORADO VISION

The Colorado vision is only one among many ways of approaching the need for developing foundational library media programs. It's importance nationally is that it is a systematic approach to developing, implementing and assessing a broad range of information literacy outcomes for students. It is not founded on things or facilities or materials but on the need for students to have process knowledge. The foundation is the student as questioner, as individual, as group member, as a producer of information and as a responsible and ethical human being. It creates a context for the development of an information user who is balanced and understands the ambiguities of the information environment. As yet it is still a vision. Media specialists in the state are just beginning to implement this philosophy. What happens

in Colorado can help other states and communities. The strengths of the Colorado vision can be implemented. Lessons for needed changes can also be developed.

Colorado does not have an ideal environment for library media specialists and library media programs. Many districts in Colorado do not have full time endorsed media specialists in each school. Each year ground is lost and ground is gained somewhere else in the struggle to make the information environment better for students. But in Colorado the struggle is carried out by strong and committed people. It is a community of media specialists who work together to promote their vision.

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THE ROLE OF LIBRARY MEDIA SERVICES IN FUTURE SCHOOLING: THE FUTURE OF THE SCHOOL LIBRARY MEDIA CENTER

Blanche Woolls

Abstract
by Emily Stewart

Traces the history of education in the United States, beginning with Protestant and Catholic classical curricula in the colonies. Shows the transition to state funded public schools after the American Revolution with new emphasis on rote learning and the Lancasterian system of instruction. At this point Woolls introduces the history of the school library. Beginning with the unused books on the teachers' desk in the 1800's, the concept of informational aids beyond the textbook evolves from a separate room with a bookcase in the 1870's to the media center of today. Views downswings of funding associated with the Great Depression and World War II, as well as the depression of the 1970's to today. Corresponding surges in funding and community approval in the 1950's and 1960's are also analyzed, as well as the ongoing surge today of the microcomputer and the Internet. In conclusion, Woolls directs media specialists to take charge of curriculum development, implement appropriate technology into the media center, and to match these resources with the individual student. In addition, she exhorts media specialists to persuade administrators of the need for such technology, and to aggressively seek federal funds to put ideas into practice. Also speculates on future emergence of distance education and the impact information technology will have on it.

THE ROLE OF LIBRARY MEDIA SERVICES IN FUTURE SCHOOLING: THE FUTURE OF THE SCHOOL LIBRARY MEDIA CENTER

by Blanche Woolls

Historians suggest reviewing the past in order to understand the present. An understanding of the present provides a better basis for predicting the future. To trace the growth of school library media centers from the past through the present to a prediction for their future is the basis of this Treasure Mountain seminar. Thus, to predict the future requires a synthesis of the history of basic education; the division of church and state and public and private schools. An analysis of school libraries is related to the space occupied by the collection size in proportion to the entire facility. Growth and attention to school libraries seems to follow the pattern set by a pendulum swinging.

WHERE WE WERE

Most historians agree that schooling in the colonies was rooted in Protestant church teaching as a cure for social problems. Very soon it was modified to include preparing informed citizens. The first schools were "dames" schools and served a few students, boys and sometimes girls sent to a nearby house to learn to read, write, cipher, and honor the church and their parents. These schools were private, and any students who continued their education did so in grammar schools where they studied classical subjects, Greek and Latin, for later enrollment in higher education.

Using Protestant Bible verses and other didactic lessons as the basis for teaching reading and writing was acceptable to some but not to all. The response by the Catholic Church to this strong Protestant orthodoxy was to establish its own school system. Thus education of children was determined by the church affiliation of parents. Schooling by religious groups is still present at the end of the twentieth century and is fueled by desegregation of all public schools and the banning of Bible reading and school prayer by the U.S. Supreme Court. In addition, a current trend responds to some parents' perceptions that their children would be better schooled in the home.

As the new country grew, educators began to consider the need for an informed citizenry. Children were prepared not only to be Bible reading adults but also informed citizens. The latter, Lawrence Cremin[1] suggests, followed a Renaissance dictate to develop educated public leaders. Preparing informed citizens remains an objective of present-day schools. A recent report of progress toward meeting *Goals 2000*, Goal 7, Adult Literacy, states:

Nearly half of all American adults read and write at the two lowest levels of prose, document, and quantitative literacy[1] in English. While these adults do have some limited literacy skills, they are not likely to be able to perform the range of complex literacy tasks that the National Education Goals Panel considers important for competing successfully in a global economy and exercising fully the rights and responsibilities of citizenship.[2]

Public schools developed during our early history to offer a free education for poorer children, to prepare them for the workforce and to help them become better citizens. With the adoption of the U.S. Constitution, governance and fiscal responsibility for public education was granted to the states and local communities rather than the Federal government. Following the Constitution, church and state were separated.

In order to educate all citizens, public schools taught larger and larger numbers following the Lancasterian system of instruction. This system provided an inexpensive method of teaching children of parents unable or unwilling to pay for instruction. Spring[3] described Lancaster's method as a "factory system of education," characterized by "constant activity, regimentation, and lock-step marching . . . to imprint indelibly the virtues of orderliness and obedience on the student's mind."[4] Orderliness and obedience were considered necessities for entering the world of business and industry. With classics taught to students in private schools and rote learning offered in public schools, research and reference resources were unnecessary in either; book collections or library rooms were not required.

The pendulum begins its swing in the early 1800s with a very small library on the corner of the master's desk in the classroom. Little space was required to house these materials and little time was available to read them, had they been interesting enough to read. The ratio of space to housing for information resources showed large space assigned to seating compared to the number of resources to be housed.

The status of school libraries described in the report of 1876 does not show much progress. State reports vary from two paragraphs to describe Pennsylvania's school libraries to three pages of information from Indiana. From Indiana we learn:

> *Carroll County*--Our libraries are in rather poor condition, and poorly patronized. Many of the books are stale and people seem to take little interest in them.
> *Crawford County*--Each township has a good bookcase and the books are kept tolerably well. In some townships they are not kept as well as in others. They get weak for want of exercise.[5]

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[1]Prose literacy tasks require readers to understand and use information contained in texts such as newspapers and pamphlets. Document literacy tasks require readers to locate and use information contained in materials such as tables, charts, and maps. Quantitative literacy tasks require readers to perform arithmetic computations using numbers found in printed materials.

When books moved out of the classroom and into a larger location it was often into a large study hall with books locked behind glass doors. The ratio of materials to space continued to be heavy on the side of space. The organization of the American Library Association in 1876 provided public librarians a forum to discuss increasing library services to children. The most likely place to serve children was in the schools, and some public libraries created branch libraries in secondary schools or offered collections and personnel to schools when not operating a branch out of the school. These separate rooms with shelving for the borrowed books were usually in a secondary school with the shelving taking more space between tables and chairs in a greater ratio, but still in a small proportion of total space.

Standards were developed for high school libraries in 1919 by a committee of the National Education Association on Library Organization and Equipment. These standards disapproved of public library branches in schools:

> The library must be an integral part of the high school, housed in the school building, and should not as a rule be open to the general public.[6]

A footnote to this stated that "Local development in small towns in some instances may make it desirable to open the library to the public." The committee writing the Standards suggested a suite of rooms to house the information collection including a library classroom and committee rooms, preferably at one end of the reading room where "pupils could work in groups upon problems assigned them in English, history, civics, economics and other high school subjects."[7]
Our pendulum is about halfway up in its initial swing.

The Great Depression and World War II halted further growth of libraries in schools until the late 1950s. The post-war baby boom and the movement of rural America to the cities closed small rural schools, and many schools were consolidated into districts serving larger and larger student populations.

The major surge in the development of school library programs came with increased federal funding after Sputnik and with Great Society legislation during the Lyndon Johnson administration. After Sputnik, National Defense Education Act (NDEA) funds were offered to school districts who could match the amount from local funds. Multi-media materials to expand foreign language instruction as well as to increase interest in science and math were the first targets. This funding was later expanded to cover almost every aspect of the curriculum, and librarians in existing schools, now expanding their collections, crowded their furniture into smaller areas to provide housing for the new items.

Governmental "interference" in the education of students seemed to be at its highest point at the end of the 1960s with funding to give children a head start, funding to feed children from homes with parents earning below the poverty level, and money for the exclusive purchase of materials for libraries in both public and private schools. In fact, one of the reasons that Elementary and Secondary Education Act (ESEA) Title II funds were authorized and

appropriated was that private schools were allowed to share in the funding for school libraries.[2]

The availability of NDEA and ESEA Title II funding encouraged the creation of school libraries in small spaces in elementary schools and the expansion of secondary libraries. New buildings included libraries in the architect's drawings with spaces to house this increase in new multi-media materials and equipment, and remodeling provided additional space in existing buildings. Staff were added as well as materials. By the late 1960s, the pendulum was at its highest point; the influx of federal funding for public and private school libraries encouraged the purchase of more and more materials. Needing additional space to store new media meant the ratio of materials to other spaces in the facility began to show a balance on the side of materials. In addition, audiovisual equipment required more storage as well as more space to use. School libraries became media centers with spaces available for both housing resources and seating students.

The reductions in numbers of students and the faltering economic situation in the mid-seventies to the nineties has seen the closing of schools, the reduction of staff, and the loss of buying power. When schools were left open, library facilities also remained; but decreased spending meant collections became obsolete and, in many cases, "stale" and "weak for want of exercise." When schools were closed, students were transferred to other buildings. It was possible that the library in the existing school was reduced in size to make an additional classroom. Librarians found their library classrooms and small group discussion rooms being assigned to other teachers, guidance counselors, and any number of non-library uses. The descent of the pendulum was much faster than the swing up had been.

WHERE WE ARE

The advent of the microcomputer in the 1980s and its applications for management as well as collection development gives many media specialists the opportunity to rebuild toward the apex held in the sixties. Further, this technology offers affordable access to databases never before considered in small rural schools and at a much lower cost to larger schools in all locations. The downswing of the pendulum halts before it reaches the low level of the middle 1800s.

Current technology provides access for students in their local media center and allows transmission and communication from libraries and information centers around the world. This technology can return information access to the corner of the teacher's desk, but it is

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[2] This may have established a framework for later attempts to institute voucher systems which would allow parents to assign public funds to nonpublic schools. The movement for charter schools and other proposals to provide more tax funds for private education became a part of educational planning in the late 80s and 90s.

much more than a stack of books. It is a stack of CD-ROMs from a server and an open telecommunications line to the wealth of the world's libraries and the best of the world's teachers. FAX transmission and e-mail bring information instantly.

It remains only for media specialists to accept responsibility for making school administrators, school boards, teachers, parents, students, and the community at large aware of the opportunities for access to information beyond their textbooks. The problem to be overcome is an old one, the solution, simplistic. In 1930, Lucile F. Fargo in 1930 recommended "*Dethroning the textbook*:"

> Perhaps most significant of all to the librarian is the fact that expanding subject matter plus other influences here enumerated have brought the textbook tumbling from its solitary preeminence. Not that the text is useless. Far from it. It has merely been humbled and now assumes its proper place--a Baedeker by which the pupil finds his way; a guide to broader experience and wider reading. Or, to put the matter in another light, in the newer curriculum any book is potentially a text if it rings true and conveys knowledge tending to the enrichment of life.[8]

In the 60 years since Fargo's wrote this, little has changed in many schools and classrooms. In spite of the promises technology offers today, it is difficult to prove that the textbook has been diminished at all. Much of this lack of making it "assume its proper place" is due to yesterday's and today's media specialists. Media specialists must take a leadership role in curriculum innovation.

In the early 1960s, individualized instruction was the buzz word, and elementary teachers were to discard textbooks and teach only from library materials. The absence of elementary libraries with professional librarians to help teachers and students find materials to replace the textbook may explain some of the failure of this "innovation." That excuse is not valid today. Both media centers and media specialists exist.

WHERE WE ARE GOING

To predict the future, it is necessary to review present trends in education. Outcomes-based education, resource-based teaching, whole language, and restructuring schools for the 21st century provide incomparable opportunity for media specialists to take responsibility for teaching and learning. The challenge is for media specialists to lead the teaching team in developing the curriculum. The challenge is for media specialists to sell resources and technology applications to administrators so that the appropriate information in all formats.

Information is currently provided in many classrooms across the United States, information beamed in from beyond the local school building. It is time to encourage the expansion of funding from the federal government to provide this increased access to information for students in all elementary and secondary schools. Current legislation in Congress is proposed to return funding dedicated to media center materials if media specialists will help lobby for

this. When dedicated funding is available for media centers, all children will be provided with an equal opportunity to learn.

One direction for the future comes from the expansion of present-day distance education. Distance education in Australia allows students to live in the outback and have daily lessons in a "classroom" that is sent over air waves. Recitation is by two-way radio; daily communication flows among all members of a class, each in a different location. It is a simple step to add FAX and e-mail to allow for inexpensive transmission of papers and provide for instant feedback from instructor to pupil as well as interactive video for students to see as well as hear each other.

Does this ability to transmit both instruction and resources spell the doom of both private and public education in large school buildings and bring it back into students' homes? For the past decade, political pressure at the federal level to privatize public education has been joined by business and industry officers who suggest that their methods will be more successful than present education reforms. The voucher system has seldom been implemented; few charter schools have materialized, partially because of legal problems in meeting state regulations. Model schools proposed by entrepreneurs such as Whittle Communications, have yet to be shown to be fiscally viable; indeed they seem to be becoming even more costly than current expenditures for public education.

Turning education away from large buildings and returning to small sites has yet to be tested. Could education revert to the dame school concept with individuals teaching and learning at homes in their neighborhoods--teachers beamed from distant points with a tutor or mentor on-site? Parents who are working much of their time at home can provide their children access to information and teachers at home. Are we on the threshold of this concept of education? Could this solve the problem of violence in our schools?

The library of the future may be a communication center with the media specialist making critical judgements, choosing which information in which format to send to students wherever they are located. That information may be transmitted by a teacher who is present in the communication center or the program may be "canned" instruction. This is not a different role than the media specialist currently holds, but it will be an even more isolated situation than any of our present positions. From this setting, media specialists will ensure that information is available on all sides of issues and that as much information as possible is made available to the child at the appropriate level and format.

The challenge will be to teach children at a distance how to locate and evaluate the information being transmitted to them, a skill currently taught to groups and individuals in the media center. It will be very difficult to make sure these students are able to determine what information they need as "self-searchers." It may be even more difficult to encourage their interest in lifelong learning unless media specialists create different ways to reach and teach their students.

What is essential is that media specialists maintain a positive attitude in evaluating each new technology for its capability to support the education process of individual students. Media specialists must choose and use the best of the new technologies to their fullest advantage by applying their knowledge of learning styles and matching available resources. Media specialists will serve individuals, students and tutors or mentors, in a one-to-one communication to "send" learning resources to the corner of the master's desk and to the desk of every child in their area of responsibility. Indeed, the space the information occupies in the life of the student will be no larger than the corner of the desk, but the information will originate from all corners of the universe.

FOOTNOTES

A Leadership Role for Library Media Specialists

John Crowley

Abstract
by Mary Holm

In the last several years we have seen many changes in the existing structure and educational make-up of our school systems. Because the educational foundation has been so unstable the roles and necessity of some specialized teachers, including library media specialists (LMS), have come into question. It is often seen that the LMS doesn't play a key role in the school and is often the first one to be downgraded or eliminated when cuts are requested. Proposed in this article are several ideas that will help the library media specialist gain a respected position in the school as well as a voice in the restructured educational system.

A Leadership Role for Library Media Specialists

John Crowley

The ancient Chinese curse "May you live in interesting times" has found new relevance in the education scene of the 1990s. The decade shows every sign of being even more "interesting" than the 1980s. Schools, indeed all aspects of learning, are under constant scrutiny. Since 1983 when the National Commission on Education report *A Nation at Risk* was published, there has been a steady stream of negative evaluations of our schooling process. This protracted examination of the effectiveness of American schools has been intensified with the increases in teachers' salaries that took place in many states during the last third of the 1980s. Since the intent of the body politic in raising pay was to increase student outcomes (objective test scores), the 1990s has seen a significant disillusionment with this approach. Scores have not, for the most part, increased. Also, it becomes increasingly obvious that the "quick fixes" (e.g., computers, textbook revisions, merit pay) do not work, at least not as isolated short-term initiatives. Although education has never been more of a national concern, there does not seem to be a clear notion of what the next step should be. Changing demographics, international competition, substance abuse, and divorce, among other factors, have given us a difficult context for reform. For the first time in nearly a century, conservatives and liberals are joining forces in looking at alternatives such as school choice, vouchers, and privatization. There is even a movement to shift the policy-making role away from the traditional operatives, both locally and nationally, to more action-oriented people such as business executives (Kaplan & Usdan, 1992).

Whether from without or within, the role and efficacy of the Library Media Specialist are and will be questioned as never before. Private schools have seen this trend for some time. Even some of the more solvent schools have seen their library media specialists scramble to protect their positions from downgrading or even elimination. Although most public schools are now supporting a professional in this position, there is an alarming trend toward increasing the student-to-library media specialist ratio (Simon, 1993; Sadowski & Mayer, 1993). The reasons for this retrenchment are seemingly as numerous as school systems. However, there appear to be some tendencies or trends. The first is probably the most obvious; we library media specialists find ourselves severely outnumbered. We are easily the smallest minority in the community of professional educators. In better economic times our existence would be more secure. As the saying "When the prey is scarce, the lions quarrel" implies, the public's restiveness with paying higher taxes has forced many administrators to look at cutting in areas with the least resistance. These decisions to cut tend not to be well planned or mostly rational. They are further evidence of the turf battles that are becoming a fixture on the contemporary education scene. The second and subtler reason for making the position expendable is that it has been difficult to assess the actual impact of the library media specialist on learning outcomes. Although promising new research shows that student achievement scores are higher where there is a library media specialist, a causal relationship has been difficult to establish (Loertscher, 1993). The third and most insidious explanation is

sexism. There are few more predictably female positions in education than that of the library media specialist. Men are usually outnumbered thirty to one at state and local conferences. Since most administrators are neither female nor former Library media specialists, it is common for the library media specialist to be viewed as "other." The stereotype of the matron who is more concerned about books than people is a difficult one to shed even, if it has not been accurate for decades, if ever.

Lest I present administrators in a totally unfavorable light, one must remember that they are also a small minority within the educational community. They are under constant pressure to make do with less. All but the most unenlightened are attempting to eliminate the many barriers preventing the education system from being more effective. One of the ways to make schools more effective is to employ as many resources as possible toward improving student outcomes. Administrators need someone in their building who can keep them abreast of the research and help design a school that is electronically networked to the information sources the administration, faculty, and students need. Too few library media specialists have answered this call to help reshape our flagging school systems. Even when asked to contribute, most see their role as that of supporters, not leaders (Schon, Helmstadter & Robinson, 1991). We will always need supporters, but the need to be a catalyst for change is greater than it has been in memory. I have worked on projects with a Ms. Patricia Cox of Network, Incorporated, in Andover, Massachusetts, a researcher who has come to realize how important a library media specialist is to a school district. She was contracted to investigate the efficacy of ERIC (Educational Resources Information Clearinghouse). While doing this she discovered that when ERIC was valued by decision makers, there usually existed, as she preliminarily labeled the position, a "proactive information service provider." This person could not only search the ERIC data base, but would know the specifics of the research. In addition she would deliver it to the appropriate person in a full text format and in a timely fashion. When ERIC was not viewed favorably, such a person was not involved. Almost invariably, the proactive information service provider was a library media specialist. Since Cox is not an educator herself, she wanted to find out more about this position. However, searching the educational literature (excepting library media journals) seemed to indicate that other educators had little or no involvement with library media specialists. They appeared to be the nonpersons of the educational community (Rogers, 1993). A proactive information service provider knows her clientele, is familiar with as many information systems as would be required to meet the needs of that clientele, and establishes that she is the person to turn to when an administrator or faculty member has an information need. In providing this service the library media specialist is acting as a change agent in the process of improving education.

Although this situation has improved over the last few years through the collaboration of the American Library Association and the National Council for Accreditation of Teacher Education, little about library media specialists and their programs has been taught to future teachers or administrators in schools of education (NCATE, 1993). Consequently, too little about us is known by those who control our destiny.

These external forces and internal tendencies have coalesced to bring the profession to a critical juncture. It would not be an exaggeration to call it a crisis of identity and purpose. Is there a role for the library media specialist in a restructured educational system? If so, what should it be (Haycock, 1985)? I maintain that strategic planning is the means by which to decide what our role should be. Indeed, such planning helps all parties involved in the education of American children to define their roles. Since times of crisis are usually days of opportunity, the library media specialist can become an integral part of the future by helping to invent the school systems of tomorrow.

As we look at the criticism directed at public education both from within and without, there appears to be consensus in a few areas. Among them is the need to produce better student outcomes, the lack of consistent national leadership, and the frequent absence of a clear vision for change on the part of the local school or district. The last should be the first priority. A school and its library media specialist cannot significantly increase student performance without developing a vision of a new, more responsive school. Only when the number of schools that have renewed themselves reaches a critical mass will national goals and direction be meaningful and attainable. Student outcomes have not and probably will not improve without a strategic planning process. Specifically, this is a process oriented toward developing a vision of how the school should evolve. Additionally, it is a systematic plan for turning that vision into reality in each school. Finally, it is totally focused on significantly improving student outcomes (scores or assessments)

When we compare long-range planning in public education to that of industry or even nonprofit organizations, education is significantly behind (Conley, 1992). This is not to say that no planning has taken place. Schools have attempted to project building space needs in a growing population and have planned to scale back in a constricting situation. We have planned for bond issues and developed elaborate bureaucracies to answer real or perceived needs. Educators have also been able to plan budgets a year or two in advance. Some pundits have called this the "Four Bs" approach--buses, budgets, bricks, and butts (seating space). Factors such as powerless teachers, constrained administrators, rotating membership of boards of education, emphasis on textbooks, and curriculum coverage have tended to preserve a system that almost no one feels is adequately doing its task of preparing students for the twenty-first century. Enter strategic planning.

Strategic planning distinguishes itself by being not only long term but also visionary. It tends to focus on the big picture in the educational reform movement. It seeks to steer schools clear of interest-group pressures and reactive decision making.

Over the past five years I have been part of two national consortia sponsored by the Association for Supervision and Curriculum Development: the High School Futures Consortium and the Restructuring Consortium. Both dealt with ways of inventing the type of schools we will need. The Futures Consortium focused on what the high school of the future should look like. Since virtually every type of high school was represented, common understandings of teaching, curriculum, governance, and technology were emphasized. The

Restructuring Consortium had representatives schools from a variety of school systems and from across grade levels. In all, forty-five schools were represented by approximately three hundred educators and parents. Only a handful of library media specialists were chosen to represent their schools. When the administrators of the various schools were asked why they had omitted library media specialists from their planning teams, they typically replied that they did not think to include them.

One of the reasons researcher Patricia Cox mentioned as to why the library media specialist seem to be the nonpersons of the educational world is the attitude of teachers and administrators toward them. She surveyed these groups as to why library media specialists were not more visible. She found that they were viewed as people who have little adult-to-adult contact with other educational professionals in the building. Unless teachers or administrators can observe all the varied tasks of the library media specialist over a long time frame, most see them as being less than real teachers. Although we entered this profession to help children and most of us receive our greatest satisfaction from that interaction, we now need to assume roles that include more adult interaction. It is a simple but painful fact that those who are not seen as valuable will increasingly be seen as being expendable.

The initial task for the lbrary media specialist is to make sure he is part of the local planning team. This will not be done on the strength of running an exemplary library media program alone. Rather, it will come as a result of the library media specialist meeting with like-minded change agents in the school. This collaboration should occur on a common ground. The natural areas would be committee involvement with professional development or technology. However, writing, reading, whole language, instructional improvement or assessment offer possibilities for synergy. We cannot afford to keep the low profile we have kept.

One of the first paradigm shifts is to begin to expand our notion of a leader in the educational community. Many of us still view this as an either/or situation. Specifically, you are either an administrator/leader or a teacher/follower. Restructuring will probably cause a change in the designation of leadership roles. We are beginning to see the creation of task-specific or situational leaders. These are teachers who, while remaining essentially in the classroom, assume part-time leadership roles. They could include, among others, writing specialist, instructional peer counselor, and study group facilitator. Since few schools can afford to hire multiple consultants to bring about needed changes, people already on staff will have to assume specific roles. The library media specialist has at least a few of the strengths that should be capitalized on by a restructuring school. The library media specialist is the closest person a school has to an information specialist. Any organization that hopes to stay current must have a person who knows how to organize information and how to access it. In addition he has to know how reliable the source is and the characteristics of the clients of the information. Since we are always accessing information, we many times forget that not all people are as facile in this area as we. In many respects, education is an information-poor domain (Banathy, 1991). Local decisions are often based on outdated or poorly researched information. Administrators are often satisfied with their staffs' being knowledgeable in their

various disciplines or grade levels. However, those disciplines or grade levels will never truly be integrated until the teaching staffs understand how everything fits together. Interdisciplinary education forces all parties to take information from various areas and to turn it into a meaningful whole. The library media specialist is an essential part of this synthesis. However, this integration cannot take place until the school has a plan for doing it. To be successful, a strategic plan must be driven by accurate and timely information. If not, we will have tens of thousands of schools attempting to restructure without benefit of comparative information. A library media specialist is an invaluable aid in the process of networking with other schools to learn about reform and benefit from others' mistakes

CONGRUENCE BETWEEN PLANS

The library media specialist is responsible for writing two strategic plans. As mentioned above, the LMS is an integral part of the school's planning process, and therefore has a responsibility to see that the plan is written and acted upon. In addition, the LMS writes a plan for the library media center. Indeed, the library media center plan is one of many submitted by the various departments or grade levels of the school. It is critical that they be written with a sense of unity or congruence in mind. Even in site-based management, a balance must always be struck between the necessary autonomy of various departments or areas and the central planning process of the school (Fullan, 1993). A plan written for the library media center by the library media specialist will be composed for a greater audience than the LMS. The planning team and all other parties need to be able to recognize a centrality of vision. The most eloquent plan written in isolation may even bring the program national recognition, but it is ultimately an exercise in futility if the administration and staff of the entire school do not understand and appreciate it.

What I am proposing is not going to be simple or quick. We all have to learn how to play under new rules. Maybe it would be helpful to take a notion from industry. When you take a product and add something to it through a certain process, you call it value-added manufacturing. We, as educators, tend to recoil at the notion of being compared to the makers of goods. However, we can still borrow from that world. How would a LMS or any educator answer the question, "What value does your program add for the student during his tenure at your school?" The related question is, "How do you measure that value?" If we hide behind platitudes and excuses rather than answer these challenges, someone else will answer them for us. Since benevolence will not reign in public education over the upcoming years, can we afford to let someone else tell us our worth? Strategic planning involves a means of bringing the library media specialist into a central role in answering the above challenges to the school and the library media center. When they are properly answered, a vision will have been developed, a vision for a restructured school and library media center.

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AFFECTIVE SUPPORT FOR INTELLECTUAL ACCESS: PREVENTING ACCIDENTS ON THE ON-RAMP

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Abstract

Future students will not be limited to local resources in meeting their information needs. However, to realize the potential educational advantages of the Internet and other emerging communication technologies, they must succeed in connecting into remote resources. Assisting students in developing their abilities to select, evaluate, and use information will become even more critical as they navigate through an increasing complex range of remote sources. Yet, there are unchanging aspects of human behavior that will remain central to successful information transfer. School media specialists will need to facilitate social interaction in what could become a solitary electronic environment, to provide affective support, and to foster the development of the positive attitudes that are necessary for the learning process to succeed.

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Educators like Jim Mecklenburger recognize that new information technology can serve as the "entree to the Global Village," revolutionizing educational possibilities. However, entering the Global Village is not always easy for students. Comparing the interstate highway to the Internet has become a common analogy. Interstate highways facilitate rapid and easy travel between points that were once remote. In the same way the Internet and other current and future technological highways promise to link us to the remote corners of the global village. However, few have extended the analogy to include accidents. Automobile drivers need to be particularly alert when approaching on-ramps. Just as interstate highway access can prove challenging, so can access to the information highway.

Like the interstate traveler, students entering the information highway must find and negotiate the on-ramp before they can even begin their journey let alone reach their destination. Road maps can aid in identifying the location of on-ramps and in determining the best route to reach a destination; however, many intelligent people still get lost and rely on convenience store clerks and gas station attendants to point them in the right direction. A large and accepted body of research on information-gathering behavior demonstrates similar human information seeking patterns cross diverse socio-economic and age groups. People first tend to seek information from other people--not from books, a nineteenth century technology, nor from computers, a twentieth century technology, but from other people.

This typical behavior will continue to have major implications for the school library media specialist. As John Dewey (1938: 38) observed, "all human experience is ultimately social. . .it involves contact and communication." Users of the virtual library will continue to rely on interpersonal interactions as they attempt to meet their information needs. The variety of tools available to the information seeker will continue to expand, and increasingly the location of those tools and the information to which they lead will be physically remote. It can be argued that the physical location of information is irrelevant as long as students have access to it. However, reaching remote locations will require even clearer intellectual road maps than are needed for accessing more traditional resources.

DRIVING FORCE: MACHINE OR MISSION

The glare of technology can blind us to the fact that the basic missions and goals of the library media program will remain unchanged. Information Power (1988: 1) states, "The mission of the library media program is to ensure that students and staff are effective users of ideas and information." It further suggests ways in which this may be accomplished:

> --by providing intellectual and physical access to materials in all formats
> --by providing instruction to foster competence and stimulate interest in reading, viewing, and using information and ideas
> --by working with other educators to design learning strategies to meet the needs of individual students (1988: 1).

An understanding of technology will certainly be necessary to gain physical access to tomorrow's information resources. Even in 1920 school librarians recognized that technology was indispensable. The first ALA-sponsored guidelines published that year identified "indispensable equipment," such as "celluloid holders for handling pictures, files for lantern slides, post cards, [and] victrola records" (Standard Library Organization and Equipment for Secondary Schools of Different Sizes, 1920: 14). As technology advanced, later guidelines included specifications for such technologies as filmstrips and microforms.

However, the technology is not of primary importance nor is the information in and of itself; rather, fostering each student's ability to use information to expand and clarify his or her own ideas is the central mission of the library media program. The 1988 guidelines emphasize underlying principles of human thought and learning rather than specific technologies and relegate quantification of necessary materials and equipment to appendices. It would be a major mistake and step backward to focus, once again, on the means to a goal (technology) rather than on the desired end product (understanding and use of ideas and information).

The intellectual focus of library media center activities should not be upon specific tools but rather upon fostering students' understanding of the **process** through which information is located and used. In most school media centers today, students rely primarily upon sources physically located within the building. As access to remote information sources expands, the

processes by which students identify and select potentially useful materials will become more complex. Materials located within a building have (at least in theory) been selected with attention to the users' needs, abilities, and developmental stages. Students already need to exercise judgment in selecting and evaluating information sources within their local collections; but when technology allows students go beyond the walls of their own collection, students will require a greater understanding of effective strategies for accessing, evaluating, and using information and ideas.

The above statements are not intended to be anti-technology nor to downplay the importance of technology but rather to provide a context for the discussion of unchanging aspects of human behavior that are central to successful information transfer. Change, whether in the form of new technology or shifting social structures, is a constant that educators must always incorporate into curricula and instruction. Amid change, one element of the school environment of the twenty-first century that can be predicted with some certainty is that human beings will continue to interact with other human beings and will depend upon them for basic information as well as for affective support.

During a recent interview with the authors, a gifted high school honor student observed, "a book doesn't understand me." What is it that the printed book or electronic screen does not understand? These containers for information lack an understanding of the context from which the student is operating: Previous knowledge, past experiences, unexpressed underlying visceral needs, emotions (frustration, impatience, excitement, bewilderment, fear), time constraints, etc. A container does not know the use to which the information will be put, nor can it evaluate how effectively the information meets the needs of the student. Furthermore, it cannot suggest the full range of resources immediately available to the student, including friends, family, and neighbors, all of whom have special expertise.

AFFECTIVE ACCESS

The context of an information need emerges most clearly through interaction between human beings. School media specialists have expertise in the techniques and content of the reference interview and question negotiation. While it is true that designers of expert systems are attempting to replicate these human interactions, some aspects of communication, especially those that are affective will continue to require human interpretation for the foreseeable future. As Judy Myers (1994: 638) observed, describing a potential future, "Information has become virtual, but people haven't."

Librarians in the future will work with virtual libraries but not with virtual information seekers. Students will begin their information seeking from some physical location and will need assistance in connecting with the information from that location. Research studies have shown that people prefer to connect with information through other individuals rather than inanimate sources. Indeed, an individual's success in gathering needed information is often correlated to the size of the human network into which he or she can tap. Elfreda Chatman's study (1990) of the information poor revealed that they had relatively few people whom they trusted as information sources. On the other hand, interviews by the authors indicated that

the typical honors high school student was well integrated into interpersonal networks that provided multiple alternatives for gaining needed information.

Chatman used alienation theory to explain the limited information resources of the custodial workers whom she studied. Lack of trust can isolate individuals from potentially useful information resources. Conversely, individuals or communities can rely upon trusted community members as gatekeepers to a wider spectrum of information. Cheryl Metoyer-Duran's analysis (1990) of ethnolinguistic communities suggests that community members' access to information is facilitated or impeded by the attitudes of those whom they consider trustworthy. Trust is crucial to information access. For example, Alisa Whitt's (1993) study of the information needs of lesbians illustrates that real or perceived discrimination will inhibit use of information sources as will violation of privacy.

Studies, such as Chatman's, Metoyer-Duran's, and Whitt's, remind us of the importance of providing a positive affective environment if students are going to become effective information users. In guiding students to the information on-ramp of the future, our skills in providing affective support will be challenged in the future even more than they are today. School media specialists will still need to understand the complex nature of interpersonal communication and to employ effective communication techniques. Research has already identified communication techniques that can provide both affective and cognitive support for information-seeking students. Techniques that will continue to be critical in successfully meeting student needs include nonverbal communication (smiling, making eye contact, using positive body language, moving with the student), listening skills (paraphrasing, appropriate use of open and closed questions, pausing, clarifying/verifying student's need), and other supportive behaviors (providing friendly greeting, giving full attention, being nonjudgmental, asking follow-up questions) (Dyson, 1992; Mathews, 1983).

As Joan Durrance (1989) and others have documented, students and other information seekers are often reluctant to approach library personnel. It is, therefore, vitally important to be sure all interactions are positive. Moreover, personnel cannot passively assume that students will initiate such interactions. Public relations activities will be more important than ever. Such activities not only promote positive attitudes but also provide an awareness of the wide-range of information that can be accessed through the Internet and other sources. School media personnel must be proactive in promoting information channels among students and in assisting students in accessing, using, and evaluating both electronic and more traditional sources (Mancall, Aaron, & Walker, 1986; Eisenberg, 1990). Such assistance should draw upon documented research such as that by Carol Kuhlthau (1991). Kuhlthau has identified predictable information-seeking patterns of behavior and accompanying emotional responses. School media personnel need to assure students that reactions like frustration are normal and to help students to understand and evaluate their own information-seeking behavior.

A great deal of research has been devoted to physical ergonomics, but we also need to understand affective ergonomics. Attitudes toward information, technology, and information

personnel will either promote or impede successful use of information and ideas. Dewey observed that collateral learning is a constant; attitudes are formed at the same time that cognitive learning takes place. Often these attitudes have a more enduring influence on future behavior than do any facts that are learned.

Positive interactions with others are central to the formation of positive attitudes. Therefore, technological interaction should not be perceived as a solitary activity performed by a student alone at a computer. The social interaction provided by human facilitation of students' use of technology can ease the frustrations students encounter on the on-ramp and promote positive attitudes toward future learning.

Moreover, the global links made possible by the Internet and other communications technology hold the potential for socializing students to a broader world than is possible in today's school environment. International student networks like that sponsored by the National Geographic Society are beginning to demonstrate how young people entering the Global Village can interact directly with each other. Media specialists need to participate in the development and provision of chat modes, listserves, and other interactive mechanisms that permit students to interact with each other as well as with teachers and media specialists. Such interactions will allow students to learn from a broader, more culturally diverse set of peers than is possible in the traditional school setting. Even young people in less traditional settings, such as home schooling, will have opportunities for expanded interactions.

However, for these opportunities to be realized, students must succeed in making these initial connections. Nurturing school media specialists will need to guide students to the information on-ramp before either educational or socialization opportunities can be realized. The range of information sources available through global networks is so vast that proper selection and evaluation of information is even more crucial than it has been in the past. Future students will need to select, evaluate and use information to meet their learning needs. Facilitating the acquisition of these skills within a supportive environment will continue to be a central role of the school media specialist.

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BUILDING BRIDGES TO THE INTERNET: OPPORTUNITIES FOR MEDIA/LIBRARIANS IN SELF-RENEWING SCHOOLS

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Abstract

During a time when educational institutions face revolutionary change, schools need expertise and leadership to anticipate such a change and to control the nature of their response. School library media professionals (media librarians) are in a position to provide this leadership in the emerging, information-centered schools of the future. These educators, trained in the information sciences and the helping arts, must seize the opportunity to lead by participating fully in the development of facilities, networks, curricula, teaching and learning, and new interpersonal relationships.

The library/media role can and should be viewed as "added value" to the information-centered school environment. By education and disposition, library media specialists are uniquely placed to be their schools' Internet "tour guides." They know that the vastness of the Internet resource base is more to be celebrated than feared and can help their students and their less informationally inclined colleagues to make useful sense of the informational ocean at their fingertips.

There is much to consider when developing Internet leadership in the school. The library media specialist's transformation into school leader and chief cyberspace navigator is a challenging and complex process that can be successfully undertaken.

BUILDING BRIDGES TO THE INTERNET: OPPORTUNITIES FOR MEDIA/LIBRARIANS IN SELF-RENEWING SCHOOLS

. . . How did [our] country come to this?
Why, when it's so much cheaper to educate somebody than to keep them in prison, can you get a better library in a prison than in a school. . . ?

President Clinton
February 22, 1994

A Scenario: Colleen's Challenges, Circa 2020

Eleventh grader Colleen Boxton winds up an exhausting two hours of research in biotechnology using her personal digital assistant (PDA) connected to the school's information network center. She has been jointly analyzing electronic microscopic images of damaged nerve cells with her mentor lab technologist at the nearby medical center. Through this hand-held PDA, connected to any one of several school access nodes, she directly communicates with her mentor in a live video conference related to her research project on Alzheimer's disease prevention.

Several years ago, Colleen and many of her schoolmates stopped attending school every day. It just wasn't necessary. Sometimes (such as the present moment), she went to the Town's public data center (formerly called "The Library"), the medical center, or some other school-negotiated worksite.

Colleen's PDA is new and has no keyboard. Every PDA function is launched either by mouse, by voice, by electronic penpad, by graphic image, or by video source. Earlier in the day, working in the video studio, Colleen conducted a live "video-huddle" with Toshiro, Olga, Jean-Claude and Samidh, all members of an international work cluster on comparative government approaches to civil rights. Language was no problem because the systemwide translation protocol provided clear, gender-specific voice and text in the language of each user.

As she folds up her PDA and places it in her coat pocket, Colleen's thoughts turn to the evening's activity. Using her own home entertainment device (HED -- basically a consumer-equipped version of her PDA), Colleen decides to "go" to a virtual music-video event. Sure, she knows that virtuality is no substitute for the real thing, but through a virtual experience simulator, Colleen can sample a musical repertoire that she could never afford in live concert.

Just as Colleen is plugging in her HED to access a commercial "virtual entertainment experience base," an incoming message alert overrides her network start-up. It turns out to be her Mom, telling her that she'll be home late from work, and wondering if Colleen would prepare the evening meal. Colleen's hopes for her virtual evening fade. This is the real world. Her HED may provide full immersion in musical virtuality, but it will not dice the carrots.

PREPARING SCHOOLS TO PARTICIPATE IN GLOBAL NETWORKS: A CRITICAL MEDIA/LIBRARIAN ROLE

Colleen Boxton's future life in cyber school may not emerge as depicted above, but the notion that current educational institutions face revolutionary change (either by internal leadership or by outside market forces) is hard to dispute. The technologies driving Colleen's scenario are mostly available at this moment. Contemporary school organization, however, may not survive the juggernaut of technological change. Either schools will respond more nimbly to change than history suggests, or they will be cast aside, unneeded and unsupported, as Lewis Perelman so harshly predicted in 1992. Schools need expertise and leadership to anticipate change and to control the nature of their response.

Educational improvement can occur through strong, contemporary library/media development. It is driven by the proposition that new, global computing networks require, more than ever, the skills possessed uniquely by educators trained in the information sciences and the helping arts. It asserts that school library media professionals (media librarians) are essential leaders in emerging, information-centered schools. They must seize the opportunity to lead by participating fully in the development of facilities, networks, curricula, teaching and learning, and new interpersonal relationships in schools.

The library/media role can and should be viewed as essential "added value" to the information-centered school environment. By education and disposition, library media specialists are uniquely placed to be their schools' Internet "tour guides." They know that the vastness of the Internet resource base is more to be celebrated than feared and can therefore help their students and their less informationally inclined colleagues overcome their reticence and make useful sense of the informational ocean at their fingertips.

More than many other professional communities, library media specialists are familiar with electronic information networking, and the fundamental principles behind Internet access and use. Possessing prior experience with electronic information networks (automated catalogs, Dialog, BRS), library media specialists are not intimidated by networked computers or by massive volumes of information. They accept that it makes no more sense for a user to know everything about the Internet than it is to know the author and title of every book currently in print. They can raise the school's comfort level about the global resource at its doorstep and perform the role of information cyber-pilot.

The library media specialist can play an essential role in developing cost-benefits analyses, articulated in educational terms, to assist network decision-making and to support the arguments made in favor of network development. This is where questions of school structure and pedagogical philosophy are so important. Traditional schools (featuring lecture based teaching, subject-specific study, professional isolation, self-contained classrooms, and textbook-centered curricula), will be hard pressed to argue persuasively for network development and Internet access. Scarce resources will already be over committed to paraphernalia that support more traditional practice (such as texts, workbooks, integrated computer learning -- or ILS -- systems).

SCHOOL PHILOSOPHY: A DRIVER OF NETWORK DECISION-MAKING

Huntley's (1993) distinction between the "constructivist" versus the "instructional" model of schooling (hence, network development) is useful. Constructivists value pedagogical strategies that promote the construction of knowledge by students through interaction with peers and under the guidance of tutors (teacher teams, community members, cultural resources, and a rich array of selectively evaluated information sources). "Instructionists", on the other hand, would be more partial to the notion of teacher-as-expert/student-as-vessel defined by a dynamic of teacher-to-student flow of knowledge.

A constructivist pedagogical foundation would favor distributed computer networks, where files are easily exchanged among all workstations , and made available to outside networks as readily as they are within the LAN. In such a model, software applications and data are shared and used when and where they are needed, and the network is set up to access a rich array of resources about which judgments are made according to the local dynamics of learning rather than by the pre-conceived values of a systemic software package. This kind of environment suggests a distribution of workstations across the areas where teachers and children work (classrooms, the library/media center, counseling areas and, yes, maybe a computer lab or two).

GIVE-AND TAKE: PUTTING THE RESOURCE ALLOCATION ARGUMENT ABOUT SCHOOL NETWORK DEVELOPMENT IN CONTEXT

> The cost of school network development is often argued from a very narrow perspective. Conflicts about investment in "technology versus teachers" or "computers versus books" has been debated *ad nauseam*. Clearly, choices must be made when resources are scarce. A school contemplating the acquisition of a full-scale, networked ILS system faces an investment of tens--even hundreds--of thousands of dollars that might be saved by a reallocation of resources.
>
> Without the ILS, a school could afford full LAN access to the Internet , and infinitely greater access to resources than an ILS. Unlike the pre-determined pedagogies characterized by ILS systems, such flexibility requires independent decision-making

on the part of local teachers. Independent thinking, though, is germane to the American way of doing things and is good behavior for students to model.

The driving forces behind network design and development are the educational visions and missions of the school. A constructivist approach features built-in risk-taking. While risk-taking carries danger, the dangers are reduced by operation from a well-grounded philosophical base. Moreover, in today's world the dangers of risk-taking are far less than the dangers of inertia. Skilled, pedagogically-aware library media specialists are particularly well-suited to sorting through the pedagogical and professional arguments that feed network development, for they know not only about pedagogy, but also about the information resources that support it. They know how to find things, and they can help others find things, too.

Increased emphasis will be placed on a model of learning that is predicated on the information resources of the real world and is based on a learning style in which the student is active, involved, and integrated, rather than passive and fragmented. Education is facing the challenge of how to prepare students to use the multitude of information that is available, and as education changes, there is a push toward resource-based learning, as opposed to the traditional and nonflexible textbook-based learning of previous years (Haycock, 1991). The library media center is the center of the school and a classroom in its own right, and the library media specialist has a unique opportunity to help schools meet the educational challenge of the information age.

If students are going to learn how to access, evaluate, and use information, the emphasis must be on the learning process, rather than on the learning outcome.
As the amount of available information expands exponentially, the process becomes overwhelmingly important (Eisenberg & Brown, 1992). The library media specialist can become a key player by assisting students in the development of strategies that will enable the students to gain insight into the research process and to successfully structure approaches that will result in the ability to solve information needs (Kuhlthau, 1989).

A CULTURE OF INNOVATION AND EQUITY: HOW THE MEDIA LIBRARIAN SUPPORTS AND FEEDS IT

Several kinds of opportunity for library media leadership have been discussed, but there are several more that bear listing. The library media program, perhaps as no other school function, can:

- structure community access to networks,
- design electronic bulletin boards and discussion areas for key school constituencies,

- develop training and awareness-building strategies for parents and taxpayers,

- organize in-school professional development activities based on known needs,
- serve as an information clearinghouse for teachers, administrators, policy-makers, parents and community members,
- import, organize and re-distribute information from national or international sources (e.g., color images of meteors colliding with Jupiter).

Henry Jay Becker writes about a culture of innovation within certain schools. Technology-using educators feed and draw nourishment from that culture. In order for it to survive, however, it needs a critical mass, and it needs to grow. Therefore, the library media program must identify with the school's technology "pioneers". By the same token, it must also serve as a bridge to the "settlers", providing information, training, encouragement and support

By themselves, schools cannot remedy the unequal distribution of resources that are ingrained in the inequities of a larger society, but the library media program can pursue initiatives to promote access to technology, and the Internet, for groups otherwise reluctant to do so. This can be done by monitoring the volume and nature of network use within the school, and developing resource banks, curriculum ideas, and in-service opportunities that specifically target underserved audiences, whether by gender, race, behavioral disorder, or disability. The Internet itself is a goldmine of information for developing programs related to equity needs.

COMMENTARY ON NETWORKING AND STUDENT EQUITY BY DENNIS NEWMAN AND SUSAN BERNSTEIN, BOLT, BERANEK AND NEWMAN, INC., 1992

> Existing school infrastructures [typically one computer connected to a wide area network with a single modem] will favor the students who are already privileged. The limited access to network projects will likely favor students who are assigned to enrichment activities. In addition, inner city schools are likely to acquire local network systems providing basic skills lessons rather than communications or data sharing capabilities.

SUMMARY

As you, your colleagues and your students become Internet empowered, you will develop a desire to post locally developed resources and information on the Internet. Your school may set up a Gopher server, or a WWW "home page". These things are not only possible but, in their proper contexts, to be encouraged. There seems to be much to consider when developing Internet leadership in the school. As you become more familiar, new territory becomes second nature, and your halting progress soon grows into a swift, easily gliding

bicycle ride, during which you never think about how you are doing and soon find yourself serving as chief navigator for your students and peers.

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The Future School Library Media Center

by
David V. Loertscher

Not long ago, I was talking with a master teacher in one of the largest of the Denver metropolitan area school districts. The teachers of the district have been leaders in school reform and have made an honest effort to ascertain what national organizations have to say about school improvement. Workshop after workshop, seminar after seminar has been held discussing educational theories, ideas for reform, and local initiatives. My teacher friend is in a muddle - no, that's not strong enough. Disillusioned is a better word. He spends so much time in meetings, hears so many conflicting ideas, challenges so many state and national mandates as unworkable, that he wonders where his strength to teach will come from.

We all try to be positive, but it is becoming obvious that we are on the verge of a revolution, not a reform. When I look 20 years into the future, I see that there will be a great deal of diversity in American education - yet, much will remain the same, particularly in the smaller communities of the nation. Some of that diversity is already appearing and I suspect there will be other scenarios. Consider:

Specialty schools (magnet schools) - many great ones already exist.
Charter schools that use vouchers - Colorado has them.
Home schoolers - an exploding phenomenon.

With all the changes ahead, library media programs need to change. New national guidelines will need to reflect a sense that there will be a greater diversity of library media programs. The fictional scenarios that follow are just a few examples.

#1
The Academic School

Filbert, Ohio is a suburban community of 45,000. There are six elementary schools, two middle schools, and one high school. After the fifth bond issue failed a couple of years ago, a citizens' committee drew a different plan for the school board to consider and it passed. Under the current tax structure, schools teaching the basics can be funded adequately, but these schools have no frills. All extracurricular and enrichment activities have been transferred to the Parks and Recreation Dept. of Filbert and to Filbert Community College. Art, music, P.E., band, orchestra, sports, and vocational classes are taught on a community enrollment basis with fees attached sufficient to support each of these activities. K-12 students have blocks of basic subjects and then are released to fee-based activities as the parents have scheduled for them. Some grant money is available to assist children of poorer parents add enrichment to the basics. Many parents have taken advantage of choice to see that their children are in school or activities all the time they are at work instead of the latchkey arrangement so common under the old system.

The library media center has been centralized at the public library. A mega-warehouse of K-12 materials is housed. The district library media specialist provides electronic access to every classroom in the district for a wide variety of data sources, audio sources, video sources, and telecommunications access. Every classroom has rotating collections of other materials, that are brought to the class as needed based on the topics under study. At the building level, a library media specialist helps teachers create resource-based learning

experiences, reading motivational strategies, and information literacy experiences. The building-level person has no warehouse to manage.

#2
The Entrepreneurial Educational Consultant

Sheila Feinstein lost her job as a school library media specialist last year as did most of the school librarians in her community. Because she had a family to support, Sheila talked to the public librarian and rented space from the library and took the title of "education consultant." Parents and granting organizations were solicited to buy "tickets" to be used by individual children, groups of children, parents, and teachers for 30 minute blocks of uninterrupted time from Sheila. She soon found more business than she could handle, because her reputation for finding, helping, boosting, teaching, and connecting became legendary. Sheila found that even summers were busy and that the public library collection began to respond to the needs of her clients.

#3
The Teacher-Librarian
(with apologies to Canada)

The Basics Charter School in Dove, Colorado, is looking for school library media specialists; in fact, they have contracted with a distant library school to offer a complete master's degree in one calendar year for 100 teachers. Having spent $50 million on technology in the past five years, the district now has 100 high-tech teaching stations built around full resource centers, something like an octopus on four different campuses. There are 25 teaching stations in each building which house "families" of 45 students each. The plan is to have one teacher and one teacher-librarian for each family and one teaching assistant/technologist. A cadre of specialists hired at the district level stand ready to integrate their expertise (music, art, economics, P.E., literature) as the family instructional teams deem them necessary.

Jody Smith, the district library media director, has promised the school board that by matching one master teacher and one master materials specialist/technologist/resource-based teaching and learning specialist, an increase in test scores will be achieved. The library school, realizing the potential, has modified its curriculum to provide intensive study in curriculum analysis and design, analysis of high technology, learning strategies, materials in every format, assessment, information systems and networks, information literacy strategies, and human relations/leadership. Jody is about to plan her in-service training for the week before school begins. She faces 100 teachers and 100 teacher librarians.

She outlines the curriculum for the year as follows:

1. The entire curriculum has been divided into topical explorations. Some of these explorations have been written by literature specialists, some by scientists, some by artists, etc. For example, the colonial period of American history will be looked at from a science perspective rather than the traditional political/economic view.

2. A single exploration consists of:

    a. a fascinating problem or quest.

b. a brief overview of the topic written for the students (an amplified outline, but not as much as an encyclopedia article) - certainly not a text.

c. a series of required experiences including reading, doing, studying, solving, etc. Each of these required items provides the basic overview of the topic or common learnings. These common experiences cross the traditional curriculum (science, math, social studies, language arts, etc.). Materials come from a wide variety of print, audiovisual, and high technology sources.

d. a series of experiences that may be done by individuals, small groups, or large groups designed to provide depth.

e. culminating activities that draw together both common learnings and in-depth probes.

f. assistance in carrying out the various projects including readings, read-alouds, people to investigate, help for problem solving, experts to consult, etc. Extra credit is given for creativity and nontraditional approaches by the students. Grants are available for sophisticated equipment or experts to assist students as they develop their projects.

3. There are no textbooks. There is only the library media center with all its attendant connections to the community, the nation, and the world.

4. Assessment instruments are a mix of traditional survey knowledge tests and ascertainment of performance and in-depth learning.

5. The teacher and the teacher-librarian are guides on the side, not sages on the stage. Previous experience dictates that each topical exploration will come out differently each time it is taught depending on the directions the students pursue.

#4
The Community of Readers

Don Whaley is the library media specialist in an elementary school where parents, teachers, and administrators have decided to combine the best of the past with the idea of hands-on. They decide to create a community of readers with a difference. Students will explore topics vicariously through reading and then through actual experience or by simulation. Each grade level chooses a year-long theme and subdivides that theme into six topical studies. Traditional disciplines are to be integrated into each of the topical explorations.

Each topical unit begins with a major dose of reading as follows:

1. Topic-related fiction is selected for read-alouds, individual reading, and group reading. Numerous choices are provided. The emphasis of this section is to build enjoyment and build background knowledge of the topic almost painlessly. The fiction is enjoyed - not dissected.

2. Bridge literature is introduced. These are materials that are quasi-fiction, quasi-nonfiction. One or several titles are read-aloud, read by everyone, or several

titles read by cooperating groups. The emphasis here is to pique interest in pursuing in-depth knowledge of the topic.

3. Literary nonfiction is introduced. Numerous titles are presented for in-depth knowledge preparation. Some are read by everyone, others by individuals, and still others by small groups. The emphasis here is to build depth of knowledge and prepare to meet the real world.

4. Skills needed by the children to accomplish the upcoming realistic experience are taught.

5. A real experience or a simulated experience with the topical unit is done. This experience might be a visit to a train museum for a two-week study, behind-the-scenes work with a symphony orchestra, a probing of the ocean depths vicariously through a science network, an actual cooperative science experiment with a local university team of biologists that will be carried out on the next space shuttle flight, or a 2-week archeological dig.

6. Results of the real exploration are shared with the rest of the school and the community.

#5
The Data Center

Tammy Sigler was hired last year by a science magnet high school. In looking at the curriculum, she noted a major emphasis on experimentation on the frontiers of scientific questions. The students in the school are far above average but as the principal explained, the students are not good at combining published and original data in any meaningful way. The principal desires that their competencies increase exponentially. Tammy has a master's degree in information science and a master's in biology.

In doing some research to lay out her program goals, Tammy runs across a problem-solving scheme chart from various disciplines created by Edward Lumsdaine and Monika Lumsdaine *Creative Problem Solving: Thinking Skills for a Changing World.* (McGraw-Hill, 1994, p. 16). To this chart, she adds Michael Eisenberg's "Big Six Model" and studies them carefully.

SCIENTIFIC METHOD SCIENCE	CREATIVE THINKING PSYCHOLOGY	POLYA'S METHOD MATH	ANALYTICAL THINKING ENGINEERING	8-D METHOD INDUSTRY	CREATIVE PROBLEM SOLVING MANY PROBLEMS	EISENBERG BIG SIX MODEL
Inductive data analysis and hypothesis.	Exploration of resources.	What is the problem?	Define and sketch system. Identify unknowns.	1. Use a team approach. 2. Define the problem.	Problem definition: data collection and analysis/exploration of trends and context.	1. Task Definition: •Define the problem •Identify the information needed.
Deduction of possible solutions.	Incubation - possibilities.	Plan the solution.	Model the problem.	3. Deal with the emergency. 4. Find root causes.	Idea generation --many ideas. Creative idea evaluation --better ideas.	2. Information Seeking Strategies: •Brainstorm all possible sources •Select the best sources. 3. Location and Access: •Locate sources (intellectually/ physically) •Find information within sources.
Test alternate solutions.	Illumination--definite decision on solution.	Look at alternatives.	Conduct analysis and experiments.	5. Test corrective action and devise best action plan.	Idea judgment and decision making --best solution	4. Use of Information: •Engage (e.g., read, hear, view) •Extract relevant information.
Implement best solution.	Verification and modifications.	Carry out the plan. Check the results.	Evaluate the final results.	6. Implement plan. 7. Prevent problem recurrence. 8. Congratulate team.	Solution implementation and follow-up. What was learned?	5. Synthesis: organize info. from multiple sources. •Present the result 6. Evaluation: •Judge the result (effectiveness) •Judge the process (efficiency).

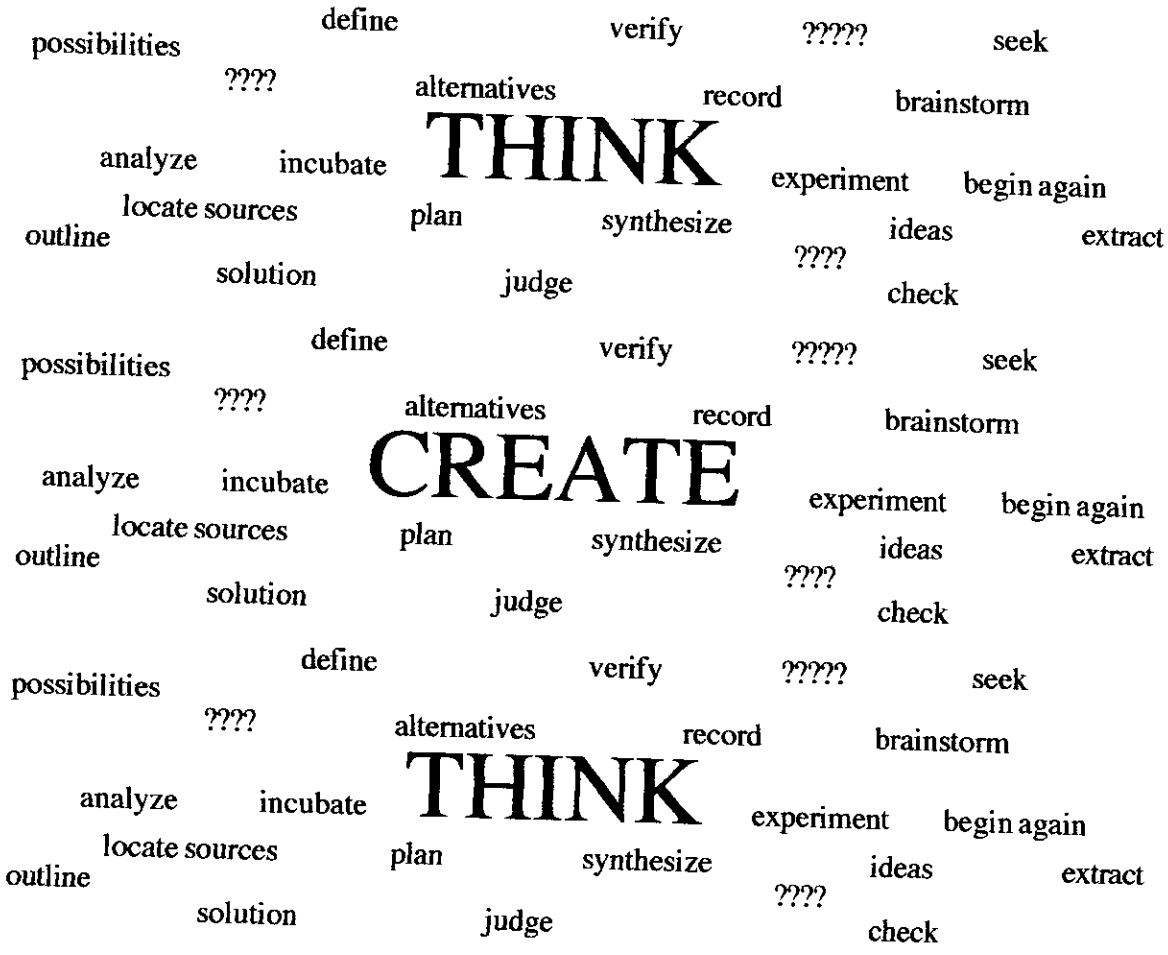
Although many might adopt the scientific model, Tammy chooses instead to concentrate on a combination of the creative thinking model and the science models, knowing that her budding scientist students must see the possibilities of changing the world early in their lives rather than concentrating solely on reporting on what scientists think they know. She recalls the story of the Australian doctor who suspected that a bacteria causes ulcers rather than stress and excess acid. She knows that this doctor had to overcome the total negative reaction from fellow scientists and battle a billion-dollar drug industry to get his theory accepted. She knows that some young person, perhaps many young people, will observe unique data in high school and she wants to help them be prepared.

Tammy adopts a quasi-integrated approach to data analysis for her information literacy program - teaching early units with dummy data gathered from the teen pop-culture and then hooking onto units jointly planned with teachers to extend the original instruction. She develops the following model that she calls "The LMC as Data Laboratory."

THE LMC AS DATA LABORATORY

LOCATION AND COMPARISON	ANALYSIS AND EXTENSION
Beginning Research • We find facts from a single preselected source and report them. • We compare facts from a single preselected source. • We find facts from several preselected sources and report them. • We compare facts from several preselected sources.	• We collect original data (observation, survey, experimentation). • We combine published and collected data to draw conclusions, try new analyses, gain new insights. • We question data: rejecting poor, incomplete, inaccurate, and inconsequential facts as they flow into our analysis. • We pursue new or unique ways of representing data in graphical form.
Advanced Research • We learn information location attack skills for a variety of fact sources: reference books, nonfiction, databases, high tech sources, data collection instruments. • We find facts from a variety of sources and report them. • We compare facts from a variety of sources.	
Original Research • We manipulate data from a variety of sources to draw conclusions, try new analyses, gain new insights.	

Tammy is a good teacher but as she begins to teach her model, she notices that most students are following it slavishly 1, 2, 3.... She is not pleased. Knowing that scientists who have excelled rarely get the Aha! feeling at a prescribed point in a research continuum, she decides to first introduce the students to a step-by-step process but then let it flow into a messy configuration that may seem chaotic and random at first, but produces results. She creates debriefing sessions with her students at selected points during their research process and shows them the following chart for discussion:



At various points during the research process, Tammy provides the students with little reminders on bookmarks. Here are just a few:

Do your facts add up?

☹ 2 2 ☺
+2 +2
5 4

Do you use varying perspectives?

☹ ☺

Did you think about currency?

☹ 1962 1994 ☺

Do you use good sources?

Slowly, Tammy begins to get results as her students begin using both structure and seeming unstructure to achieve their results. The students begin to understand that science is often as messy as it is orderly.

After a few more months of teaching, Tammy is still unsatisfied. She is evaluating some of the assigned research papers with the teacher and finds that her best hopes have yet to be realized. She decides that she needs a little bigger stick to show in addition to the carrots she has extended. In conference with her teachers, the group decides to provide two scores for every paper, one for content and presentation, and the other for information handling. Tammy promises to come up with a technique for evaluation, which she will present to the teachers before introducing it to the students. She researches the literature again and runs across a four-step strategy for evaluation of the research process presented by Carol Kuhlthau (*Assessment and the School Library Media Center*, Libraries Unlimited, 1994, p. 63-64) using the following techniques:

1. Students create a time line of the research process to track their progress.
2. Students flow chart the entire research process.
3. Students hold conferences with teachers and librarians to assess progress.
4. Students write a summary statement of their focus during the assignment.

She also discovers in the same publication, suggestions by Barbara Stripling on possible assessment techniques (p. 106-14):

- personal contact with students through observations and interviews,
- student performances and exhibitions,
- portfolios, and
- authentic tests.

Barbara also suggests having students practice reflection through:

- learning logs
- process logs
- progress logs
- recalling
- explaining
- analyzing
- challenging
- transforming
- synthesizing

Using these suggestions, Tammy creates a simple evaluative log and portfolio tracking guide for students, which she and the teachers put into practice. She finds that students begin to respond positively. Slowly, the task for which she was hired comes about.

Implications for Collections

No matter which scenario is selected, those above or others, there seem to be some important implications for collection building as high technology continues to provide library media specialists with new opportunities to deliver information and resources.

I have written elsewhere (*Computerized Collection Development for School Library Media Centers*, Hi Willow Research and Publishing, 1986) of a collection development scheme which creates two essential elements of school library media collections. These have been described as:

1. A basic or core collection that provides diversity of formats and topics.

2. Emphasis collections of varying sizes that are built according to faculty input and provide depth as required by the focus of the curriculum.

I have also suggested that the emphasis collections be coordinated in a network area so that various libraries can draw upon one another's strengths and have the potential to contribute to network participation.

It would seem that now, another matrix must be superimposed upon the above scheme. In the emerging library media world, there might be three levels of materials and information provision:

1. Instant access at the point of need.

This level would include techniques as simple as rotating classroom collections of materials from a central repository (something that has been doable for many years but not generally taken advantage of).

Instant electronic access in classrooms and homes to basic information sources would be another important feature. For example, at every computer station, a tool such as Microsoft Office should be present and users would have instant recall of databases, video, audio, electronic mail, help hotlines, network connections to remote resources, etc. Library media specialists choose instant resources appropriate for age and developmental level such as Kids Catalog rather than First Search (OCLC).

2. Access from the warehouse.

At this level, the library media center will help students and faculty retrieve quickly materials from the school library media collection, other classrooms, district or regional collections, public libraries, and academic libraries, through interlibrary loan.

3. Referral beyond the warehouse.

At this level, the library media specialist will assist users in finding where materials are located so that they might go to that place. There might be corporate databases accessible only across town at the corporate library, or a special collection at a nearby university library, or a plan to visit the Library of Congress.

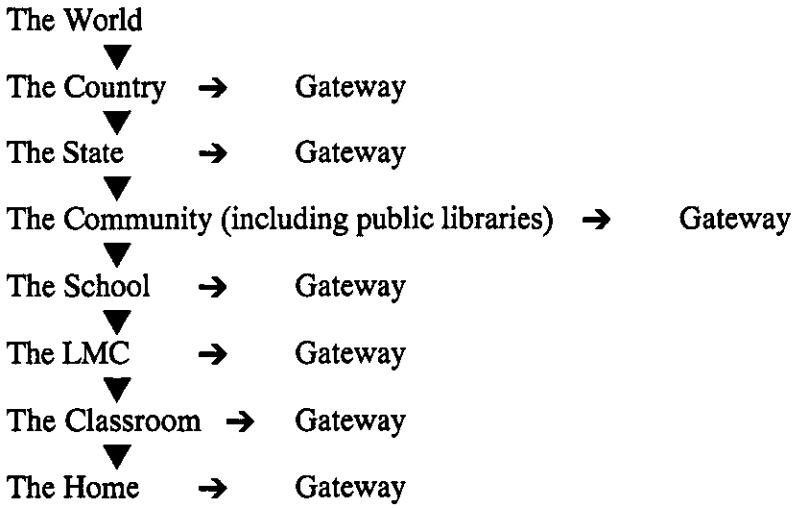
Superimposing these three levels over the basic collections building strategy provides numerous possibilities for creating collection-building goals, designing facilities, forecasting budgets, and implementing evaluation systems designed with user needs in mind.

To view this process another way, in the past, we have created a centralized LMC which tries to be a switching center:

All classrooms → The LMC → Gateway to the World

There is nothing wrong with the LMC as a switching center as long as the technology employed is simple and the number of users is relatively small, but when the LMC really becomes the "heart of the school," it is easy for the switching center to become overloaded and break down. This phenomenon is currently the case in Texas where the state-wide access to Internet (Tenet) is a centralized computer system providing a gateway to the world. The system is overloaded and at some point it becomes irrelevant to all except the most persistent users.

A better tactic is to provide numerous switching centers at the lowest level possible nearest the user, providing a safety net at the next level up to insure the democracy of information access:



At first, the library media specialist might react with a defensiveness because so many users may seem to bypass the LMC collection and its gateway. However, the above model is already a reality and the challenge is to learn how to compliment not compete.

Implications for Automation

In the past, early adopters of automated systems have generally been concerned with quantity, not quality. The rush to get a system up and running, has often led to incomplete systems (circulation only) or OPACs with incomplete or poor quality cataloging data. Downloading records from every available data source has resulted in the mixing of authority files for names, subjects, classification numbers, with few cross references. Confusion reigns in many OPACs and the children (novices) are not presented with an indexing tool any better than the previous card catalogs.

The smaller the collection, the more need for the OPAC to provide complete and detailed analysis of the collection. Where is the exact poem I need? The play? That biographical sketch? Every book, database, periodical held in a small collection must pay its way and provide, through the OPAC, instant access to its content.

I dream of a day when quality and in-depth indexing is the by-word of school library OPACs - when instant access is provided to all the resources of the LMC before moving concentricity out to other collections of the community, region, state, nation, and the world. Smarter systems designed with children in mind, better databases designed with children's information needs in mind, far beyond a few electronic encyclopedias, will appear.

Implications for Materials

Publishers respond to money in the marketplace. If schools and libraries can afford little, both the quantity and the quality of the materials to lodge on fancy technological systems will be limited.

Just as Project Gutenburg is making the classics available to the world, so should quality resources be available for children to download free of charge into their computers at home or at school. Information systems designed for kids will appear - Kids Catalog being just one small move in that direction. Look for:

1. Pop culture databases designed with young people in mind where kids can ask questions in kid language, and the computer will tutor them through to answers lead them elsewhere or direct them to human helpers.
2. Curriculum files with instant access to materials needed in school subjects, materials to help create projects, helpful tutorials that will teach tough processes or skills. Children will have accounts paid by taxpayers that allow them access to copyrighted materials.
3. A kids Internet for free discussion and exploration by the kids of the world.
4. Better reviewing tools that provide critical analyses of materials from kids' points of view - summarizing the usefulness and quality of the materials in accomplishing instructional tasks rather than emphasis on literary merit. "Try before you buy" will become so easy that few errors in collection building will occur.
5. Continued development of realistic worlds in interactive format from history to science, art to business - bringing virtual but controllable experiences where interventions and consequences of interventions are the norm.

Implications for Personnel

The young people and the teachers of this nation deserve library media specialists who have the qualities essential for designing effective journeys through the technology maze to quality educational experiences. I see the time coming when the majority of library media specialists (or whatever they are called), rather than the minority of these professionals, possess both the human qualities and the expertise to be essential in the instructional process rather then being peripheral to it.

I can see the time when the mediocre and poor quality staff in the profession are released to find jobs more suited to their talents and abilities.

I can see the time when the audiences at AASL conventions are seas of multicultural persons of both sexes engaged in moving the field along and where the leadership of AASL reflects the cultural background of the country as a whole.

Implications for Facilities

The decentralization of the resources of the library media center into the classroom and into the home will continue and must be pushed. There is no sense in providing access to a printed dictionary 500 feet down the hall in the LMC when the student should have a print copy right in the classroom or have it instantly available on the learning station computer.

Learning stations at home and school will provide access to a wide variety of tools and materials needed in learning experiences. These learning stations will be simple and portable so that they might be carried around in the pocket or purse much as the current palmtop computers can be carried. No cords forming tether lines will obstruct these tools. They will be electronic reference centers designed with the child in mind.

At each new level of sophistication, library media specialists will breath a sigh of relief at the prospect of **not** having to warehouse that material anymore. Some measure of victory over the warehouse will be achieved.

Implications for Services

Looking into the future, the basic elements of library media services ring as true as ever:

- a warm and caring individual who promotes the love of reading,
- stands as advocate for youth,
- promotes learning through materials and technology,
- inspires excellence,
- provides the best learning tools,
- joins teachers in the creation of exciting learning experiences,
- guides individual students as they venture into the world of information and technology.

It will be as true in 2020 as it is in 1994: The tools of learning, the best technology, the finest books, and the best sources of information don't jump out at students and automatically make a difference without an intermediary, the library media specialist.

THE QUIET REVOLUTION: THE NEW ROLE OF THE LEARNING RESOURCE GENERALIST

Marsha Rakestraw
Susan G. Fowler

Abstract

The current state of public schools in America has caused dissatisfaction among parents and students alike. Financing, student equity, qualifications of educators, methods of teaching, and distribution and use of technology are a few components which cause parents to seek new methods of education. Alternative methods of education, such as magnet schools, have enjoyed some success. However, a method is needed to ensure educational success for our children. This method must have allow the student to develop responsibility for self-paced learning and experience positive social growth. Homeschooling is such a method, and parents are discovering it in record numbers.

An estimated 500,000 children will be homeschooled in 1994. This trend is expected to grow, particularly in light of current societal changes based on technology. Families increasingly have access to devices which allow the world into their living room: televisions, VCRs, PC telecommunications and satellite dishes all contribute to the decreased need to go outside of the home for information and education. Through the use of technology, careers are becoming more flexible, as is evidenced by more employees performing many of their tasks at home.

The combination of the current trend of homeschooling with the technology of the future has many implications for the Library Media Specialist (LMS). To effectively serve the needs of their clientele, LMS's must shift their thinking about who their clients are, and where and how they will serve them. They must be willing to adopt a new role that will fit these needs. This role is the Learning Resource Generalist (LRG). Whereas the clients of the LMS were schoolchildren in an artificial environment, the clients of the LRG will be schoolchildren and their parents, in a natural environment--their home--within their community. The LRG will know his/her clients as: a community, which may be a particular neighborhood; a family within the community; and each individual in the family. By having this close relationship with his/her clients, the LRG can deliver customized information services for his/her clients' educational and informational needs in the 21st century.

THE QUIET REVOLUTION: THE NEW ROLE OF THE LEARNING RESOURCE GENERALIST

> "If learning is in everything, everywhere, how do we confine learning to the box of a classroom? We can't. Then what's the point of having schools at all? There isn't any." --Lewis Perelman, *School's Out*

Just as having a degree or certain credentials doesn't guarantee that someone is qualified for a particular job, so having a 4.0 GPA or walking across a public school stage and being handed a diploma doesn't assure that our children have received a quality education.

Since the release of *A Nation at Risk* in 1983, the quality of America's public schools and their relevance in today's information-saturated society has been seriously questioned. Controversy abounds over financing, student equity, proper use of funds, qualifications of educators, methods of teaching, and most recently, accountability, and distribution and use of technology. Nearly everyone seems dissatisfied with one aspect or another of public education, and few agree about how best to improve the situation. Certainly many have a theory regarding the most beneficial way to restructure America's schools, and hundreds of new programs and philosophies have been and are being implemented with varying degrees of success. However, when overall effectiveness is considered, very little has changed. Schools still are lacking in quality and quantity of technology, methodologies, strategies and resources; kids still aren't learning very much; educators are still struggling to prove their worth--the library media specialist being one at the very forefront of this battle--and society as a whole is still dissatisfied with the school's ability to properly educate and prepare its young people for success in society.

The truth regarding the status of public education has been evident for years; however, most people--educators, parents, legislators--have ignored or avoided it. The truth is that, although there are some very successful programs and school districts out there that are accomplishing wonderful feats, overall kids aren't learning as they should, and schools aren't changing quickly enough to meet the rapidly changing needs of children in a global society. As Perelman says, "The design of existing school and college systems in the U.S. and most of the rest of the world has been virtually unchanged since the 19th century" (Perelman, 1992, p. 55). In other words, schools as we know them are obsolete.

Many researchers, parents, educators, and especially kids have known this truth for quite some time. A number of respected individuals have made statements which would indicate a significant amount of unity on the subject:

> We are continuing to support an educational system that perpetuates models that are ignorant of both technological advances and the fact that our world is growing increasingly complex - David Thornburg, 1991.

> School has a inherent tendency to infantilize children by placing them in a position of having to do as they are told, to occupy themselves with work dictated by someone else, and that, moreover, has no intrinsic value --Seymour Papert, 1993, p. 24

> In reality, the vast majority and most productive share of human learning takes place in real-world settings outside of school.
> --Lewis Perelman, p. 126

> A child can make better sense of the world on her own than we can do for her through adult produced curricula.
> --Agnes Leistico, 1990, p. 33

> School censors more than it reveals. . .Learning is not the product of teaching; learning is the product of the activity of the learners. . .Not only does your actual time in school block out learning, but it also prevents you from learning outside of school --Grace Llewellyn, 1991, pp. 35-38

Finally, Lewis Perelman sums up the very basic nature of school (albeit an unintentional nature) in this statement:

> The teaching model of traditional education consciously serves the needs of machine age, industrial economy. In practice, it maximizes failure. Its criteria . . . are based on finding a norm to measure against . . .. Time is structured, scheduled, and fixed uniformly to meet the requirements of the school. Students are forced to compete to achieve as much as they can within the periods of time allotted. . ..This design requires that most students fail or do less well most of the time so that a minority can be labeled "excellent". . ..Thus the main functional focus of the system is not learning, it is screening out. (Perelman, p. 72)

ALTERNATIVE LEARNING ENVIRONMENTS

Unfortunately, a great many people seem to believe that keeping bored and "at-risk" youngsters in school is one of education's most pressing challenges, and thus spend a great deal of time, money, and effort creating programs and services that focus on what are considered to be their needs, often with little success, and to the exclusion of the major student population. What these schools inadvertently accomplish with this band-aid approach is doing young people a major disservice, and, many say, is ruining their abilities to learn. "Learning has become too essential to the modern economy to be left to the schools" says Perelman (1992, p. 22). Perelman also says that the essence of education is instruction--something people do to other people, usually with required discipline. Conversely, the essence of the coming integrated, universal, multimedia, digital network, he says, is discovery; the empowerment of human minds to learn spontaneously, without coercion, both independently and cooperatively (Perelman, p. 23). In addition, within the context of the hyperlearning enterprise, where people utilize all available technologies and resources when and where and how it best suits their needs, "learning is by doing, the roles of apprentice and expert are continually shifting with the demands of the problem at hand, learning is self-paced and custom styled by the individual learner, and passionate--sometimes spectacular--learning is motivated by the natural drive of the human brain freed of the fear of failure" (Perelman, p. 167). These elements that Perelman describes cannot exist within the boundaries of traditional public school education, and parents and children are increasingly beginning to notice what they are missing. "Children are the best judges of what should be learned, when it should be learned, and how it should be learned", says Agnes Leistico, mother of several homeschooled children (1990, p. 10). She says, "The well-motivated or interested student usually needs no more assistance than that someone demonstrates on demand how to do what the students wants to learn to do. Students learn when they are interested in the subject" (Leistico, p. 10).

In response to public education's continued failure to meet the needs of the majority of young people, where, as Ted Kolderie says, "A district's success does not depend on whether its students learn," (1994, p. 36) there has been a significant increase in the number and kinds of alternative educational environments. Some of these environments have been quite successful in providing a quality education and an environment where children do learn and are able to apply their knowledge and skills within the real world. For example, at Michigan's award-winning Oasis High School, where the student population consists of those at high risk of future unemployment or incarceration, the staff--which totals 11, including the secretary and custodian--rejoices in the fact that of all their 1987-1992 graduates, only 3% are unemployed (Meixner, 1994, p. 32). Additionally, the enrollment at Gardendale Elementary's four-theme magnet school in Merrit Island, Florida, has more than doubled since its inception two years ago (Narvaez, 1994, p. 9). And, the very popular traveling school, or Global Youth Academy, has completed 38 program tours in 25 states, 8 Canadian provinces, and 28 foreign countries since 1972 (Alschuler and Myers, 1994, p. 20).

Certainly these innovative, everchanging educational programs, and others like them, have given many children an exceptional education. And, they have their place. However, these programs only reach a certain number of chldren, and most are still under some form of bureaucratic control which forces them to retain many of the aspects of a traditional education that are so detrimental to young people. Fortunately, a form of education, available to nearly everyone, which utilizes and expands upon innovative aspects of alternative schools without retaining the detrimental elements, does exist. It allows for a great deal of flexibility and self-paced learning; it provides nearly unlimited opportunities; it exposes children to social growth with much less exposure to its negative elements, such as drugs, sex, violence, and peer pressure; it demands self-motivation, independence, and responsibility from the child; it features individualized instruction; and it fosters student-centered learning. This form of education is home schooling.

HOME SCHOOLING

Many preconceived notions exist regarding homeschooling and quite a few of them are unfavorable. Certainly a decade ago the majority of homeschooled youngsters were taken out of public institutions because of a family's religious convictions. However, as the number of home schooled children has increased, so have the reasons for seeking this alternative method of education. According to Chris Jeub, an English teacher and home schooling parent, parents generally choose to home school their kids for either social, academic, family, and/or religious reasons (Jeub, 1994, p. 50).[9] Regardless of the rationale, the fact remains that homeschooling is becoming an increasingly popular means to education children. According to Holt Associates, which publishes the magazine *Growing without Schooling*, the estimate is over 500,000 for 1994 (Holt Associates, 1994, p. 1). Because it is a highly effective method of education[10] which promotes child-directed, hands-on, real-world learning and values the family as a positive, indispensable entity, we believe the number of home schooling families will continue to increase significantly. These families will play a generous role in the continuing development of American education and society.

COMMUNITY CHANGE

Not only has society's attitude toward public education changed, but so have its definitions of home, work, and community. Society is changing in the way it functions, much because the technology exists which allows flexibility in living and in earning a living. Family is again becoming the major driving force. Many people are starting home-based businesses so that they can spend more time as a family; other parents are telecommuting from their homes. Employers demonstrate gradual support of these changes through flex-time, parental leave, childcare facilities, and other benefits. Additionally, with the latest in technologies, it's easier to stay at home for pleasure. Most homes already have telephones, televisions, and VCRs. Not far behind are PCs, faxes, modems, telecommunications and satellite dishes bringing the world to one's living room. Even the structure of the community itself is changing; society is seeing a trend toward microcommunities that gather together people with similar interests, lifestyles, and philosophies. These are best described as communities within communities.

For example, San Francisco has a large gay community; southern Florida has a large Cuban population; and an group of vegans in Santa Cruz, California, have started a co-housing project which combines private housing with shared facilities for eating and community activities (Krizmanic, 1994, p. 22). Comparable groups exist on a smaller scale as well, such as home schooling support groups. In the midst of this quiet revolution, more families are considering alternatives to public schools. We believe this revolution will only make resources and services for home schoolers easier to come by[11] and thus make the option of home schooling that much more attractive.

LMS NEW ROLE: THE LEARNING RESOURCE GENERALIST

The new role we are suggesting builds on the current framework for service. *Information Power* provided library media specialists (LMS's) with guidelines to help them increase their potential to become efficient, effective, and indispensable. LMS's all over the country are developing their roles as teachers, information specialists, and instructional consultants. They are establishing themselves and the Library Media Center as the central hub of the school. Yet with the prevalence of technology, the global village, and the information age, American society has continued to change rapidly, and neither public schools nor LMS's have kept up.

Library media specialists have an extraordinary opportunity amidst these oncoming changes. They, who have had great difficulty justifying their continued existence in the current outdated system, can lead the way toward change and innovation, recognizing and anticipating the rapidly changing needs of America's learners. They can fulfill those needs equally for all, thus severing themselves from the stumbling behemoth of current public education. Information professionals who want to continue to serve the population that has been part of public education, yet also want to break away from the slow-to-change bureaucratic institution must be willing to think about education in a new way. For the last hundred and fifty years, American society has considered the cadre of public education as the best way to educate the masses. And since the inception of that conviction, little has been done to change the basic foundation of where and how and by whom young people are taught, because few have questioned or considered that there are better ways to learning outside the walls of a school. We know that there are better ways, and home schooling is one of the most effective.

It is essential for LMS's to make a change from school library media **specialist** to that of a **generalist**, broadening their visions of what school, learning, and the learner mean. The specialist considers the learner as a child in the context of the four walls of the school and makes a decision about the needs of that child based on information gathered in an artificial environment that requires children to behave and learn in ways unnatural to them. In this model, the LMS has little contact with the child's family. The learning resource generalist (LRG) will consider and serve the needs and interests of the child based on his/her true-life environment, which includes the child's family. In other words, both the child and his/her family are clients, and they are served in their context. With freedom from the four walls,

the generalist can become quite familiar with the real child: how s/he behaves, learns, and interacts with family members, strangers and friends; and his/her interests, needs, and motivations for thinking and acting. It greatly benefits all concerned when the layers that separate the school life and real life of a child can be peeled away to expose the true child.

Another important element to consider in creating this new role is that the entire family is served, rather than just the individual student in a specific education setting. It is a fact of life that adults are requiring and desiring more education. As job descriptions include more technological elements, people are having to continue their educations to remain qualified[12]. Job cuts and organizational restructuring are requiring experienced workers to reeducate themselves for new and different employment. In addition, more older people are returning to college to pursue their interests or to make a career change. Still, some maintain the desire to learn throughout their lifetime. Whether it is the worker facing a job-related change or her 10 year-old daughter who wants to explore the universe, the LRG can be the educational facilitator. The following paragraphs provide an example of an LRG in the future.

A DAY IN THE LIFE OF FUTURE CLIENTS

The year is 2014. Meet Sarah, the 35 year-old mother of 9-year-old Jonathan and 6 year-old Anne Jones. Sarah is an architect who specializes in customizing corporate office space to the work patterns of her clients. Her husband, Nick, owns an international information consulting business which provides services to small corporations. Both enjoy a high degree of flex-time which is supported by their home office, an area of their home which is fully equipped for all levels of telecommunications, including full-screen virtual reality/video conferencing. Because of their work schedules, they are able to share equally in homeschooling their children.

The Joneses live in a reclaimed neighborhood in a large midwestern city. The neighborhood has seen many changes in its 150-year lifespan. Originally built for the affluent, it fell into decay for most of the 20th century. As companies began to return to the city's downtown area, the area experienced a revitalization which saw the restoration of many beautiful old buildings. Now a comfortable, ethnically and culturally diverse middle-class neighborhood exists where there were once gang wars and drug houses.

The Joneses are close to many of their neighbors, some of whom also have children the same age as Jonathan and Anne. Many of these parents also homeschool. Sometimes the Jones children join their neighborhood classmates for special field trips and educational projects.

Although the neighborhood community shares a high degree of formal education and is enriched with diverse cultural resources, the idea of obtaining professional information

instruction received a great deal of consideration from the homeschooling families. After working out details regarding service expectations, salary and benefits, the Joneses joined their neighbors in the selection and hiring of a learning resource generalist, Jane Smith. The homeschooling parents felt this was a wise investment to make not only for their children's education, but for their own continuing education.

When Jane studied for her teaching degree from Midwestern University, she was trained to teach developmental stages rather than the standard grade levels of the 20th century. Upon receiving her degree in 2004, Jane was licensed to teach stages birth through adult. This education combined with six years' teaching experience formed the basis for a post-graduate degree in Information Management and a license in Learning Resources. Because of her broad background and excellent recommendations from previous homeschooling clients, the Joneses and their neighbors felt she would be a valuable addition to their community.

Jane spent the first few weeks in her new position by observing each homeschooling family in the course of a normal day. She observed her clients in order to determine their various roles, learning styles, and interests. Through observations and interviews she quickly became acquainted with the neighborhood and her individual clients. She also assembled a profile of each client family. The profile allows her to anticipate information needs of each member, and design and deliver customized instructional units for each family member. Her clients can be described in several ways: the neighborhood who hired her; each family within the neighborhood; and each member of each family in the neighborhood.

Because Jane is trained in developmental stages rather than grade- or age-level instruction, she is able to design stage-appropriate instruction. This allows a higher level of customization for her clients. Even more importantly, it does not preclude the precocious 7-year-old from participating with 10-year-olds in a science activity, or a slow-developing 8-year-old from working with similarly talented 6-year-olds. Finally, because she is trained to provide information instruction to adult developmental stages, she is capable of helping any of the adults with continuing education projects or even research related to their area of employment.

Each month the neighborhood meets with Jane to set the appointment calendar. This allows flexibility while ensuring that no client is overlooked in the course of a busy educational schedule. Jane also has on-call hours each week for those times when clients face unforeseen information needs. On this particular day, Jane has two calls to make. One of these is with the Joneses.

Jane's assignment today will be to integrate information resources with the geography unit the Joneses have been working on. To supplement the home curriculum, Jane will guide the Jones on a virtual-reality tour of a small country in the Pacific which has only recently become a contributor to the global economy. They will visit various parts of the country: its museum, which contains exhibits on its history, government and economy; its prinicipal recreational areas; and a major shopping center. The trip will supplement the children's current curriculum on geography, people of the world, and languages. It will also be an educational experience for Sarah and Nick. Sarah will be able to walk through buildings and observe people in their customary daily routines, a useful experience for a modern architect. Nick will be able to better understand the culture and politics of this country, a necessary element for future business contracts. As a family the Joneses learn from a situation designed according to their educational and informational needs.

CONCLUSION

We have seen how the future will change--in fact, is changing--who our clients will be, and in what circumstances. That our clientele will be broadened rather than narrowed by societal reorganization and ever-increasing use of technology should be a sign of hope for our profession. To meet this new challenge, we must be willing to build on our existing professional framework.

We must take the best *Information Power* gave us in regard to developing our potential to become efficient and effective. We must continue to develop our roles as teachers, information specialists, and instructional consultants. Instead of establishing ourselves and a Library Media Center as the central hub of the school, we must establish ourselves and our information services as the central hub of our chosen communities. We must change our ideas about who our clients are and how we can best serve them. This involves going to where they are, taking the resources they need with us and presenting them in a format which will enable our clients to gain the greatest educational benefit possible. We must look at our clients as parts of a larger whole, i.e., their family within a community. In order to be most effective, we must serve the whole as well as the parts.

John Holt, one of the founders of the homeschooling movement, says that what adults can do for children is to make more and more of the world around us and the people in it accessible and transparent to them. He believes that access is the key word. Access to people, places, experiences, the places where we work, other places we go (Holt, 1989, p. 127). We would agree, but with a caveat: access is merely the beginning. The LRG can use his/her skills as an information professional to guide the learner in his/her environment beyond access and to information use. By doing so, our clients become people who experience *Information Power*.

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RESTRUCTURING PRESERVICE EDUCATION

Daniel Callison

Abstract
by Mary Holm

The existing educational curriculum for library media specialists is not fully meeting the professional and practical requirements that will be needed when new professionals enter the work force. Because of the rigid formidable structure of these types of programs, personal growth and inventive ideas are pushed aside and replaced with established schedules, methods and standards. Perservice library students don't receive the theory and technologically based information that will be needed. They are put into the library and asked to "watch and learn." Cooperating library media specialists are encouraged to take the time to communicate the vision of the school to the preservice student and to model positive leadership. Also, practitioners should involve the student in curriculum and policy development.

RESTRUCTURING PRESERVICE EDUCATION

Daniel Callison

In a review of nine recent major teacher preparation reform reports, Gratch (1992) concludes that the following recommendations are common to each and do not differ substantially for reform reports over the past fifty years. Solutions are stated in these terms:

* Extend the length of teacher education programs.
* Broaden and make more rigorous the liberal arts component of the teacher education curriculum.
* Increase collaboration between the faculties of the liberal arts and teacher education, as well as between the teacher education faculty and educators in the schools.
* Recruit academically talented persons into teaching, especially those from minority groups.
* Improve the professional studies courses, connecting theory and research to practice.
* Improve the nature and process of field and practice teaching experiences by such experiences as a one-year internship or induction program for new teachers.
* Regulate teacher preparation more rigorously, and support alternative and experimental certification programs.

Such proposed solutions are reactions to a cluster of problem areas which have been associated with teacher education programs for many years. These problems are relevant to the practice or internship programs for training of school library media specialists. Beginning teachers and library media specialists (especially those without teaching experience) seem to experience more instructional problems than experienced teachers do and they experience them more profoundly.

Behavioral Aspects

Four critical problems have been identified by Valli (1992): **imitation**, **isolation**, **transfer**, and **technique**. Teacher education and school library media training programs can contribute to these problems because of their structure of sequenced coursework, followed by fieldwork which may have little content emphasis and minimal supervision of practice (Goodlad, 1991). Even when innovative instructional processes are introduced through the college classroom, and in rare instances where such inquiry-based or resource-based methods might take hold, they are often pushed aside during the practice work or internship. Established teaching schedules, methods, and required student assessment standards prevent application of the more inventive ideas.

Behaviors which might be the basis for changing the teaching profession in a new age of open learning and multiple assessment styles are suggested without example in the university, prevented during preservice practice, and stymied during the early inservice years. Behavioral aspects which might allow teachers and library media specialists to take hold of technology in ways that would revolutionize education are moved to the side and left without the nurturing which is critical for true change to occur.

Human behavior aspects are so critical that education programs responsible for preservice school library media specialist should concentrate on the media person more than the media program. The concept of a collection of organized learning resources and access to a vast variety of material formats is generally accepted and valued. The concept of the multi-skilled professional who co-teaches, leads planning, and practices critical analysis of information technology environments is not understood nor generally accepted as essential behavioral aspects of the school library media specialist. **Training** leads to skills for practice of individual components of a specific program. **Education** leads to development of the critical management behaviors (of the person) which will endure in the entry level stages of the professional and allow for refinement through almost any change in the system we might be able to envision.

Imitation. It is not unusual for beginning teachers to state that the most valuable part of their teacher preparation was the practice experience and that they learned more from the cooperating teacher than from their academic courses (Feiman-Nemser and Buchmann, 1985). Students who complete practice work or internship experiences as a portion of their preparation for school media librarianship frequently report the same conclusion. It is not until the actual "hands-on" experience with processing, automated circulation, online searching, storytelling and booktalking, reference work, and bibliographic instruction that the practice student sees the application of many skills which were only discussed or simulated through the university classroom. Too often, however, the tasks dominate the experience without the practicing library media specialist experiencing the benefits of long range planning and considering a vision or mission for the library media program.

Preservice teachers and library media specialists continue to model teacher-centered approaches which place the teacher as the controller of knowledge and information. The American Library Association Presidential Committee on Information Literacy (1989) made several recommendations which, if implemented, could lead to stronger role models for future teachers and media specialists who must facilitate a student-centered learning environment:

> * School library media specialist need to view the instructional goals of their schools as an integral part of their own concern and responsibilities...;

* Exit requirements from teacher education programs should include [demonstration of] each candidate's [successful] ability to use selected databases, networks, reference materials...;

* A portion of the [preservice teacher's] practicum should be spent with library media specialists...[who] promote an understanding of resources available...and emphasize the concepts and skills necessary to become a learning facilitator.

Isolation. Once most of their coursework is complete, student teachers are often sent out alone to a school they know little about and with which the university has little contact (Valli, 1992). Rarely are students incorporated into the social organization of the school (Goodlad, 1991). Those who enter practice work for school media librarianship may be more on their own than any practicing classroom teacher. In almost all cases, the media specialist student enters the cooperative school as the only person who will practice in the library media center.

The reality for the school library media profession presently is that most school boards fail to employ the number of professionals needed to meet basic information services and to create a community of information resource professionals. There is a critical threshold at all levels, but is most evident to be lacking in elementary schools. Exemplary services and curricular involvement tend to occur when the media center staff is composed of a full-time professional and at least one full-time clerical person (Loertscher, Ho, and Bowie, 1987). Clerical support releases the professional for the interaction, communication, and planning necessary to dissolve the isolation barrier. Full staffing allows for the critical social behavior so necessary for the library media specialist to become a part of teaching teams.

Too often the student seeking teacher certification in school library media services becomes isolated from the very content areas he or she will be expected to support. Too many college programs isolate the future school library media specialist in two ways. First, many programs allow the library media student to move away for a rich liberal arts background. A wide liberal arts program is more likely to provide a broad spectrum of academic disciplines and open more opportunities for instructional content discussions between the teacher and the media specialist (Armour and Fuhrmann, 1993). Such opportunity for establishing such collegiality becomes less likely for those who experience a narrow academic experience centered on teaching methods and library science. Second, teachers in training are not encouraged to explore the specialties of the library media world side-by-side with the preservice library media specialist. The basic information research skills fundamental to driving the information highway are often missing as required experiences for future teachers.

Transfer. One reason why student teachers fail to implement the type of teaching encouraged by the university is that neither university professors nor cooperating teachers are consistent models of quality teaching techniques, especially those promoted as innovative (Ginsberg and

Clift, 1990). The lecture format dominates the college classroom in both education and library science.

The virtues and excitement of multimedia resources, cooperative learning, inquiry and discourse through resource-based activities are more often described than practiced. All too often the practicing student for media librarianship gains experience in teaching the "how to search" aspect without the more demanding opportunity to converse with others and to collaboratively plan a full unit. The preservice media specialist does not practice the full process from planning, co-presentation with the classroom teacher, close information guidance with individual students, and seldom play a critical role in the evaluation of the student's performance (Callison, 1993). The importance of such full involvement is often described in the literature and the university classroom, but seldom practiced by either the library science professor or the cooperating library media specialist who is supervising the practice student

Classroom teachers set goals of developing pupils' decision-making skills while regularly conducting recitation or drill-and-practice instruction (Goodlad, 1984). School library media specialists are more likely to deliver "routine" library skills instruction at the request of the classroom teacher than invest the time on curriculum planning so as to integrate library and information literacy throughout the academic program (Callison, 1994). Thus, no matter how much technology the library media practice student may encounter during the practice experience, it is seldom taken in as a whole system. It is often experienced as in fragments. Immediate satisfaction may come from mastering a new CD-ROM formatted index, or answering a reference question, or recommending a book to a student, or delivering that first booktalk to thirty kids. We fail, both at the university level and at the cooperating school level, to encourage the practicing student to reflect on how the practice pieces fit into the whole system.

Browne and Hoover (1990) identified the extent to which preservice teachers failed to employ powerful teaching methods. Several of these methods are directly relevant to the mission of the school library media program, but are often viewed, in practice, as too demanding or too difficult to manage. Security is usually sought in a specifically stated curriculum and the structure of the textbook. A vast majority of practicing teachers do not employ powerful information/organizing strategies stressed in their methods coursework. Few transfer composition techniques such as semantic mapping, anticipation guides, or the cloze techniques which require students to think in terms of classifying, predicting, and making choices from ques given in a surrounding context are practiced by preservice teachers as they lack modeling from supervising teachers.

Overall student teachers do not integrate children and young adult literature into subject-area instruction. When literature is introduced it is often presented as an option for reading pleasure and the concentration is usually on fiction. Nonfiction reading materials, the very foundation of resource-based learning, are seldom promoted widely even though children and young adults constantly turn to such materials as a stimulant to their self-directed learning

(Carter and Abrahamson, 1990). Few experienced classroom teachers respond to the resource-based learning (Haycock, 1991) strategies, and even fewer model such techniques for practicing teachers.

Inquiry learning is not a new concept. Associated terms include "inductive logic," "discovery learning," "critical decision-making," "Socratic questioning" and other descriptors which have a direct relation to creating a learning environment with the library media center as the learning laboratory (Callison, 1986). Techniques which can move inquiry to extremely powerful levels through "student-centered discussion," "cooperative learning," and "a social curriculum" have been documented at every instructional level from kindergarten to college in an exciting variety of recent publications (Johnson, Johnson, and Holubec, 1994; Penrose and Sitko, 1993; Pitts, 1994; Short and Burke, 1991; Rubin and Dodd, 1987; Vandergrift, 1994). Although powerful in the hands of effective facilitating teachers, these methods are difficult to master and create a large number of frustrations for teachers, media specialists, and students.

According to Joyce and Showers (1988), teachers intending to teach inductively, that is to help students process information, generate the development of concepts, and foster causal thinking, require intensive training. "Teachers need to study the substance of a lesson...and develop a rich array of instructional materials that can be explored by children. They have to guide concept formation activities and help the students become more sophisticated in the making of categories and inferences. The flow of instruction emerges, depending upon the thinking of the students, and the environment has to be adjusted to the development of the lesson. (p.39)" Knowledge of both substance and process are critical, and this holds true in the library research projects (Kuhlthau, 1994).

Little (1982) found that effective schools are characterized by norms of collegiality and experimentation. Simply put, teachers are more likely to persist in using new behaviors in schools where collaboration and professional risk taking are encouraged (Houston, 1990). Fullan (1982) reports that the degree of changes is strongly related to the extent to which teachers interact with each other and provide technical help to one another. "Teachers need to participate in skill-training workshops," Fullan writes, "but they also need to have one-to-one and group opportunities to receive and give help, and more simply to converse about the meaning of change" (p. 121).

Technique. When preservice students are asked what kinds of questions they think are important to consider about teaching, they overwhelmingly respond with technical questions, with questions about how to do something (Valli, 1992). Preservice school library media specialists often what to be trained in the essential skills for acquiring books and software and for circulation of such materials. The broader questions become too intangible. Time invested in talking with teachers about instructional activities and resource options seem not to be essential. Resource selection often becomes something that can be accomplished easily during the last few days before ordering materials. Conversations with teachers concerning thematic units which could be initiated in one or two years seems to be a waste of energy,

even though identification and acquisition of materials to make such units reality require extensive time, reflection, and revision. Purchases are heavily determined by what is listed in the latest review guides and media specialists often describe "the opportunity to go shopping" through the professional catalogs as their experience in collection development or becoming acquainted with the lasted circulation system as their experience in long range planning for technology.

Technique comes with practice, practice over time and learning from the results. Too often the preservice media specialist is given only the opportunity to practice on the fragments and risks missing the full application of these fragments to a program mission. The cooperating library media specialist who supervises the practice work must provide time to converse with the practice student as to the vision the teachers and the administrators (including the library media specialist) have for the media program. If such a vision can not be presented and discussed, the supervising library media specialist does not has not experienced the essential techniques necessary to create the connections to the whole system. Without the vision, practiced techniques become only the ways one manages to make due with what you have and never expect things to get better.

Too often in the literature and in practice the role of the school library media specialist is described as a "helping profession" only. The term "support" of the curriculum appears too often and too high on the job descriptions of the media/technology educator who should be providing leadership for change. While these support efforts certainly have value in establishing working relationships with teachers and administrators, few preservice library media specialists observe their supervising specialist at the highest levels of curriculum and policy development. It has been over a decade since Loertscher (1982) presented his popular taxonomy and placed curriculum development highest on the agenda. Collaborative teacher planning and lesson enhancement are important roles of the library media specialist, but creation of new units and inquiry experiences which extend the curriculum are important for achieving professional acceptance and recognition. Such learning units push beyond library skills and into information literacy across all disciplines, beyond the basic academic routine of finding information for the traditional essay and more toward the critical application of information skills in real workplace settings (Eisenberg and Berkowitz, 1990). Such units are strong enough to inspire independent study and inquiry beyond the classroom. Library media specialists who have been successful in such efforts create new areas of study which draw in other teachers like a magnet. The end result goes beyond an attempt to add on to established curriculum. The media specialist initiated curriculum will draw teachers into a new learning adventure and the teachers' and students' expertise become the "add-on" to the information inquiry media center project (Goheen and Printz, 1989). In the "ideal" relationship, teacher and media specialist become interchangeable parts, each responding to the other with ideas as to learning goals, resource options, new student assessment possibilities (Callison, 1993).

Strong interpersonal communication skills are essential for the success of the school library media specialist. Herrin, Pointon, and Russell (1985) observed constructive extraverted behavior in "model" library media specialists and included in their recommendations:

> ...[model] school library media specialists spend approximately three quarters of their time in oral communication -- a strong mandate for schools of library and information management to have as a part of their required curriculum the teaching of interpersonal communication skills. (Such a statement assumes that even students who are relatively proficient in communicating can improve those abilities with practice.) Changing one's communication style requires time and practice. Would the establishment of conversation/interaction groups to foster practice and change be effective in library schools? (p. 88)

Note only do constructive conversation efforts increase the amount of involvement in curriculum, policy development, and working relationships with faculty, such efforts also are related to higher budgets. Preservice library media specialists should observe and take part in such conversations modeled by supervising specialists who negotiate a fair share portion of the school's materials budget, federal funding, and additional state capital support. In a recent survey of school library media programs in Indiana, Callison (1994a) found a strong relationship between the frequency of conversations between the library media specialist and the principal concerning the budget and the number of dollars per pupil invested in library media materials.

Table 1.
The average dollar amount, per pupil, invested from the general fund in books for the school library media center, compared by grade level and the frequency of conversations between the library media specialist and principal concerning the library budget, for Indiana public schools in 1993.

Frequency of Conversation

Grade Level	State Average	None	Annual	Monthly	Weekly
Elementary	$5.91	$5.53	$5.92	$6.79	$9.45
Junior High	$5.85	$5.60	$5.94	$6.21	$6.75
Senior High	$5.43	$4.65	$6.03	$6.57	$6.51

As shown in Table 1, at each grade level the average per pupil investment in books is below the 1993 state average as reported by programs in which the school library media specialist and the principal did not discuss in any manner, nor at any time during the year, the current

status or future expansion of the library media center's budget. In schools where the school library media specialist reported very frequent discussions (on a weekly or monthly basis) there were greater average per pupil investments; up to 60% higher in elementary schools; 15% higher in junior high schools; and 20% higher in senior high schools. The survey also showed that library media specialists involved in discussions for planning the use of federal title funding and state capital projects funding tended to gather in over twice the dollars compared to situations in which the library media specialist did not take part in such planning. School library media specialists who converse regularly about the trends, issues, opportunities, risks, and demands involved in change are more likely to be leaders to make such change happen -- from updating the print collection to the adoption of electronic information networks. These are the models we should seek as cooperating and supervising educators for preservice students to experience a rich field experience.

Technological Aspects

The emerging technologies are and will continue to be fabulous. Preservice, inservice, and "postservice" (including those who attempt to keep pace from university positions) must all seek every opportunity to touch and experience the delivery and interactiveness in new instructional materials, informational networks, and video channels. A growing portion of instruction at all levels is being mediated by electricity, some by telephone, quite a bit by E-Mail, and an expanding use of two-way audio/video distance education (Frick, 1991). In many cases, this means that a growing portion of educational interactions do not take place in a formal classroom. A growing number of informational transactions do not take place face-to-face in the library.

In 1991, Aaron sketched a description of a learner-centered, futuristic, electronic school. The very title of her article delivered the critical message, the shift is away from the teacher-centered approach. However, it must be added that shift is also away from the media-centered facility approach. The learner (each of us, not just the student in the elementary school) moves through many centers and we access knowledge by helping each other through the maze of electronic connections. There is not a single, central location of resources in the building as we have struggled to provide over the past decades. There are new centers or clusters of resources and discussion groups at a variety of electronic and physical points. Navigating through physical, social, and electronic connections learners maneuver to find support groups which fit our abilities, our questions, our ambitions. Some of the responsibilities Aaron identified for the media specialist who facilitates the educational and information environment of the very near future are:

* obtain the technical knowledge necessary to manage collections containing a variety of electronic formats;

* relate traditional and new information structures and packages into a coordinated, responsive collection;

* provide staff development opportunities to promote the use of emerging technologies and enhance active learning.

The technology experiences at this level should be a "given." This is not to say that all preservice library media specialists come on board with the technical skills they need, but it is obvious that they will need training environments which are rich in access to the technologies which open new options for self-, group-, and interactive learning and information retrieval. We have always assumed the preservice library media specialist to have the ability to read and write and that these skills, basic to all students, would be key to working through the new volumes of resources made available through library schools. Emerging Schools of Library and Information Science-Technology-Management must provide access to the latest electronic volumes (database content and formats), including those in experimental development stages. Such technological contact is an assumed need of any training system. The human efforts which correct the problems related to imitation, isolation, transfer, and technique can not be assumed, but must be addressed with new vigor. Teaching the effective management of these human behavior factors shifts isolated training experiences to the higher level, education. It is only after that shift has taken place that the emerging technologies become effective tools for inquiry and discovery.

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RESEARCH IMPERATIVES FOR INFORMATION PROFESSIONALS: DEVELOPING FOUNDATIONS FOR EFFECTIVENESS

Ken Haycock

Not so long ago a sage noted that those who predict the future do not generally die of natural causes. To express research needs then for an unknown future appears even more problematic, as the paradigmatic futures of schools and libraries are common yet conflicting. Indeed, while social, political, economic, cultural and technological changes are endemic in our personal and professional lives, our major public institutions have proven immutable and impervious to fundamental change; this is not necessarily a negative reflection on educators, however, as efforts to reform, restructure and renew the public schools have been thwarted primarily by those very same publics so critical of current organizational arrangements and performance.

For information professionals in schools, whether called library media specialists or teacher-librarians (TLs), one would hope that research informs practice, if only to encourage decision-making based on best evidence rather than opinion. For this to happen, of course, that same research must be rooted in problems of interest to practitioners and support efforts to improve. Research results that conflict with individual and group belief systems, that unnecessarily complicate busy professional lives and that do not find their way into programs that educate information professionals, do not influence practice.

The common complaint that there is little research in teacher-librarianship is clearly not true. There may not be enough, it may be too dated, it may have been conducted in a geographic location other than our own, or it may not address the questions we would pose. There is, however, sufficient research to provide a base for further investigation and growth. At the same time, findings need to be disseminated in a way that makes them useful for those administrators and decision-makers who are still making decisions about programs, priorities and funding based on dated perceptions, single experiences and intuition.

In terms of the future, Snyder (1992) outlines societal trends that will impact libraries and schooling; Perelman (1992) speaks to the need for radical change; Mecklenburger (1994) notes current factors largely ignored by the schools, essentially at their peril, and Craver (1994, July) provides immediate application of newer technologies to existing organizational arrangements. While exciting and useful possibilities abound it is worth noting that only half

of the schools nation-wide have networks and modems and only ten percent of classrooms have telephone service (Carter, 1994, September).

In order to provide a foundation for future research needs, at least a brief summary of reasonable generalizations from the past seems necessary. (This summary provides citations which are illustrative of research findings rather than comprehensive.) There have been many analyses of research in teacher-librarianship prepared by authorities in the field (see, for example, Haycock, 1992, pp. 84-86 for a bibliography of 40 such summaries) and from at least the time of Heaps (1940) to Fitzgibbons and Callison (1991) we have been told that it is limited (usually to surveys of current status and perceptions), fragmentary (not building on prior research), isolated (oblivious to the context in which the teacher-librarian operates), and addresses too much the "why" and the "what", but too little the "how".

In examining future research needs, Woodworth reported in 1968 that leaders and practitioners did not agree on areas for research and their relative importance, although five areas were of high priority: instruction, services, publicity, access and use, and budget—no doubt similar today, 25 years later. Peritz (1978) found few studies of children and students as users and few of the educational activities of libraries generally; recently, more attention has been paid to the student research process (see, for example, Kuhlthau, 1984) but we still need to focus on student questions and their implications for the design of information systems and services (Johnson, 1989; Pitts, 1994, June). Jetter in 1973 reported that greater emphasis would be needed in the future on the role of the teacher-librarian as instructional development specialist and that new programs to educate TLs would be required as would more supportive environments for implementation, yet studies linking school culture and library programs are only now appearing (see, for example, Bell, 1991). Wood (1977) noted that teachers will not use resources and services when they lack the necessary skills; one wonders how student competence in computing and teacher lack of competence in this area will affect schooling; one also wonders whether the confusion of computing skills and information problem-solving will be clarified by teachers and administrators. Held (1987) found significant differences between district coordinators and their supervisors about what the future holds for the coordinator in role, function and necessary competencies. One has to ask whether this is part of the reason for the dramatic decline in the number of coordinators throughout the world in the past five years.

Current research summaries provide a basis for further inquiry: Krashen (1993) makes a compelling case for the impact of libraries and teacher-librarians on reading; Haycock (1992) documents doctoral research and draws preliminary conclusions; regarding effectiveness Lance (1993) reviews research and applies it to a study of the impact on student achievement. Haycock (1994, July) also reviews the implications of research in curriculum implementation and staff development for the implementation of effective school library programs.

There is substantive evidence that students in schools with well-equipped resource centers and professional teacher-librarians will perform better on academic achievement tests (Didier,

1982; Greve, 1975; Lance, 1993; Lowe, 1984; McMillen, 1966; Yarling, 1969). We know that student competence in the skills and strategies for handling and using information effectively is best developed when integrated with classroom instruction through cooperative program planning and team teaching by two equal teaching partners—the classroom teacher and the teacher-librarian (Becker, 1970; Callison, 1980; Gengler, 1965; Hodson, 1978; Nolan, 1990; Smith, 1979; Van Deusen, 1992). In fact, teachers with experience in cooperative program planning and teaching with a teacher-librarian have a more positive view of the role of the teacher-librarian and welcome closer collaboration (Bell, 1991; Bishop, 1990; Brackstone, 1982; Callison, 1980; Corr, 1979; McGiffin, 1991; Montgomery, 1990; Royal, 1982; Ruffin, 1990). However, teacher-librarians are not as involved in cooperative program planning and teaching with classroom colleagues to the extent that principals, teachers and even teacher-librarians themselves believe that they should be (Corr, 1979; Hartley, 1981; Scott, 1982). Surely, this is the first, and most compelling, research question: why, with more than two decades of solid research behind us, are so few teacher-librarians actively engaged with teaching colleagues? This requires further study (Stoddard, 1992). How might the profession move forward in this area? We need to focus less on what should be done and why, and more on how to overcome current impediments, whatever they might be. It is unlikely that educational decision-makers will fund programs based on what they might be, rather than on individual and group perceptions of the program's contribution now, and research in our field has generally not provided guidance for more effective implementation.

Improvement of programs necessitates clarification of the role of the teacher-librarian inasmuch as many misconceptions still exist (Bechtel, 1975; Bocachica-Mills, 1982; Gast, 1984; Markle, 1982; Olson, 1966; Pichette, 1976; Wilson, 1973). Teacher-librarians with classroom experience accept the preferred curricular role more readily than those without classroom experience (Ervin, 1990). Teacher-librarians do require, however, more extensive training in cooperative program planning and teaching which builds on prior successful classroom teaching experience (Beatty, 1974; Royal, 1982; Rupert, 1970; Van Dreser, 1971; Wert, 1970) as well as in social interaction skills (Adams, 1973; Johnson, 1975; Kerr, 1976; Urbanik, 1985). Teacher-librarians who are less cautious and more extroverted than their colleagues tend to be more successful (Charter, 1982; Hambleton, 1980; Madaus, 1975) while exemplary TLs tend to reflect the same attributes as exemplary teachers (Alexander, 1992).

Given this evidence, why is the need for prior successful classroom teaching experience still an issue in our profession? Teachers work more closely with teacher-librarians who have classroom experience; principals support more strongly teacher-librarians with classroom teaching experience; school superintendents believe that school libraries may not have realized their potential because of the limited classroom experience of the teacher-librarian: so, why do our educational programs still admit candidates without this background? The research evidence supports working more closely with teachers through a framework of cooperative program planning and team teaching, yet our educational programs still do not given adequate attention to this foundation for the profession. Surely this needs investigation.

Although much of the focus of recent research has linked the development of student information literacy with organizational arrangements such as flexible scheduling and course-integrated instruction, the same criteria for success apply to literature-based reading programs (Barlup, 1992; Bishop, 1993). How have teacher-librarians advocated literature-based reading programs? How have they influenced successful school and classroom programs? With the implementation of whole language programs and the resurgence of classroom libraries have teacher-librarians been consequently marginalized? Does a possible pattern of marginalization of TLs in this area have implications for school library programs when digital information is accessed through classrooms?

Students prefer information searches using computer technology to print searching even though they experience difficulty performing this form of information retrieval (Craver, 1988; Edyburn, 1988; Hindes, 1991; Lathrop, 1989; Washington, 1989). Instruction and available resources have generally most affected information-seeking behaviors (Durand, 1986); is this likely to continue or will students avoid instruction which might prove helpful due to a preference for "default-searching"? How will programs deal with the phenomenon of "download, cut and paste" assignments? What are the implications of findings that information literacy also affects content mastery (Barrilleaux, 1966; Pitts, 1994, June)? With increasing documentation that neither students nor teachers understand the implications of information problem-solving strategies for achievement how might teacher-librarians and their associations provide leadership in this area? Should the teacher-librarian be working to increase autonomy and independence in teachers and students? Will be need for the unique expertise of the teacher-librarian continue? What are the effects of school and district information technology infrastructures centering on the school library and teacher-librarian compared to those that don't? Will this decision regarding locus make a difference to teaching and learning in the school now or in the future?

What role might teacher-librarians play in home schooling in their districts? With the development of the "electronic bus" for parents and students, how can teacher-librarians make a contribution to this sector of the school system? This may be a place to provide district level leadership and to start to experiment with the gradual introduction of changes in teaching and learning configurations likely to occur in the school.

With greater technological emphasis what is the effect of gender on information programs? Differences in attitude toward computer-based systems have been observed in teacher-librarianship (Dell, 1990) and elsewhere: how might these differences be overcome? Is there an educational and political effect of (stereotyped) female librarians controlling (stereotyped) male technology? Is this why (male) computer teachers appear to be replacing (female) teacher-librarians? Is gender an issue not only in student access and use but also in educational and political control?

Is there a difference in performance between library media technicians and a professional teacher-librarian? Does that difference at all influence teachers and decision-makers? Earlier studies (Graff, 1987; Williams, 1969; Zsiray, 1987) provided conflicting results of

perceptions and efficacy yet there has been a growing trend to replace professionals with technicians. What has been the result? Longitudinal comparative studies in this area would be helpful for funders and decision-makers.

The role of the principal is the key factor in the development of an effective school library program (Anderson, 1971; Charter, 1982; Corr, 1979; Guise, 1972; Hellene, 1974; Shields, 1977; Walker, 1983) and elementary school principals generally have a broader conception of the role of the teacher-librarian than do teacher-librarians themselves (Bias, 1980; Blair, 1968; Burcham, 1990; Gustafson, 1983; Hambleton, 1980; Kissick, 1986; Scott, 1987; Sullivan, 1979). With limited experience through education or experience with teacher-librarians, however, it is little wonder that the ideal role and the current role appear similar to them. Indeed, school administrators find it difficult to articulate how teacher-librarians might become better (Canarie, 1981). How do school administrators then make their decisions about staff deployment and the allocation of resources? What influences their decision-making? How does this affect the role and responsibilities of the teacher-librarian in an increasingly collaborative work environment? Answers to these questions will make strategies to gain support for school library media programs more feasible for practitioners.

District library media coordinators do make a difference (White, 1980) and do have high expectations for themselves but are not as involved in curriculum and public relations activities as they might be and as they should be (Andwood, 1984; Coleman, 1983; Coulter, 1991; Eberhard, 1975; McCulley, 1990; Nelson, 1989; Newcomb, 1969); they seldom assume increased district responsibilities to any great extent (Otzman, 1978); indeed, little has changed in their level of work in thirty years (Abeles, 1988). Teacher-librarians are also seldom involved on district committees (Leung, 1983; Stanwich, 1982) or in district planning (Barron, 1977); they are seldom involved in contract negotiations at the district level (Mosley, 1981) even though they see the importance of this work. In a word: why? If these district level activities are one key to continued effectiveness and even simple survival, why are they not assumed by teacher-librarians? What can be done to alter this situation?

It is perhaps interesting to note that school superintendents support the need for professional teacher-librarians and generally understand the potential impact of a TL, but they nevertheless often set other priorities (Bucher, 1976; Connors, 1984; Culver, 1988; Lowden, 1980; Payne, 1968; Young, 1979). Gillespie (1971) noted that senior education officials are the agents of change across a system, but they do not encounter teacher-librarians on district committees, on planning groups, in contract negotiations: where does education as to the leadership role of the teacher-librarian take place if it is not being modeled? How can this be changed? Is this lack of district involvement linked to declining budget support? Is this seeming inability or disinterest in working with decision-makers why targeted funding is so appealing to teacher-librarians?

It is now an article of faith that increased funding for school resource centers affects teaching and learning in the school (Burns, 1986; Fleming, 1983; Graham, 1970; Huang, 1970; Little, 1973; Ward, 1969) yet school libraries and teacher-librarians remain "beauty spots on the

body politic." How are district and school budget decisions made? Why have some jurisdictions maintained school libraries while others have cut them, given similar levels of funding, contractual obligations and perceived quality of program? How do teacher-librarians impact senior education officials, how do they impact school board members, to influence budget decisions? What has been the experience in other educational sectors? Is collaborative research possible here?

The personal convictions of the teacher-librarian about what should or should not be made available to students have been found to be more influential in the censorship of library materials than external pressures to censor, whether real or imagined, from school and community members (Bump, 1981; Farley, 1965; Pope; 1973; Torke, 1976; White, 1989). What are the implications for student access to remote databases and online searching? What "controls" do teacher-librarians see implementing to limit student access to material they consider inappropriate? Will this be done through policy, through administrative support or simply through personal jurisdiction? What impact will this have on relations with students and the community?

With increased emphasis on cooperation among all types of libraries and information agencies, it is perhaps instructive to recall that there are definite benefits to students when school and public libraries cooperate (Doll, 1981; Dyer, 1978; Edmonds, 1984; Ekechukwu, 1973; Grunau, 1966; Jones, 1964; Woolls, 1973), yet they don't. It's as simple as that. Why not? We need research to determine those factors that might reasonably be employed to encourage cooperation. How might cooperation be configured differently in the wall-less library? What evidence might be provided to senior administrators and trustees that obviate territorial issues?

Professional associations for teacher-librarians can play an active role in improving the standard of services of school resource centers (Buckingham, 1979; Burr, 1982; Cox, 1976; Koch, 1976; Rankin, 1977). How can they raise the profile of the teacher-librarian and highlight professional expertise? What marketing research should be conducted by associations? How does this influence the establishment of priorities and allocation of resources? What evidence or motivation leads to revisions of existing standards and guidelines before previous versions enter the consciousness of decision-makers, let alone are implemented?

What is the relative status of different terms for the person and the place with decision-makers? Should the person be defined by the place, e.g. library media specialist? Should associations and their preferred terminology be congruent, e.g. American Association of School Library Media Specialists? How can we communicate with a unified voice if we don't even have research to specify terms for person and place? What do current terms signify to decision-makers? Is there a hierarchy of influence in terminology? How can associations better harness public support for school libraries and teacher-librarians? How do other professional associations make a difference for their members?

We know that teacher-librarians need to assume more responsibility for writing about teacher-librarianship and school resource center programs for professional journals read by teachers and administrators (Holzberlein, 1972; Mack, 1958; Van Orden, 1971). This accepted means of communication with colleagues is not occurring. Is it more likely to happen where training has been provided? Or is it attitudinal? Does the teacher-librarian who writes also provide leadership in other areas? Is collaboration between and among colleagues a feasible alternative to individual publication, perhaps through continuing education or university courses? Again, we know the "what" and the "why" but not the "how".

Research to support the information professional for an unknown future is difficult to articulate. The obvious components will continue: focus on the user, determine needs, develop strategies to address those needs, determine the degree of attainment through assessment instruments and monitor and adjust programs as a result. In all likelihood, we will continue to study the relative status of programs and the perceptions of others as well. However, our history suggests that our research does not become practice easily; indeed, even researchers do not act on the results of research or our programs of educational preparation would be quite different today. Surely, research in the implementation of successful and well-supported programs, how they might be replicated, in the political environment, in the culture of teacher-librarians, in the school and the school district, is essential if there are to be any information specialists, at least as a library-related occupational group, in the schools of the future.

These issues and concerns are not unique to teacher-librarians and we would do well to connect with colleagues in related educational areas to determine how decisions are made and how they might best be influenced. How does one enter the mainstream of educational thinking and decision-making? How can decisions concerning teacher-librarians reflect knowledge of their unique expertise? How can teacher-librarians best demonstrate this expertise? How can administrators and school board members be educated to accept a standard and definition of effectiveness in personnel and service?

More and better research is being conducted and reported to the profession but unless that research connects with others in the school and influences practice, teacher-librarians will be lost from the educational loop and teachers and students will be the poorer for it.

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WHAT KINDS OF NURTURING WILL BE REQUIRED FOR INFORMATION PROFESSIONALS IN THE FUTURE?

POSSIBILITIES AND PRINCIPLES--OR *Alice Through the Looking Glass*

Barbara Herrin

INTRODUCTION

The theme for the Seventh National Conference & Exhibition of the American Association of School Librarians--*SHAPE THE VISION: Focus on Learning*--urges educators and library media specialists to look at the "restructuring" movements in vogue as vehicles for projecting a learning environment of the future. In that future, learning is focused on students who are "learning how to learn," i.e. developing their abilities to:

- articulate their own problems and identify their information needs;
- find, evaluate and organize information; and
- use it effectively to address their problems or issues. (ALA, 1989)

This learning environment is one in which individuals are encouraged and assisted by learning facilitators to "construct" their own knowledge as well as add to the cumulative knowledge of mankind. The role of "teacher" is changed from the didactic "dispenser of information" to "coach," or "facilitator." The task of the learning coach or facilitator is to create an environment--physical, social, and emotional--in which the learner feels free to question, to explore, to take risks, and most importantly, to fail. Failure is viewed as an essential part of exploring alternatives and of creating meaning.

Such a process-oriented, constructivist approach to education requires not just "rethinking" of educational structures, but "thinking differently"--changing our ideas and assumptions about learning and its place in the lives of individuals in the Information Age.

Michael Fullan, in an address to the Association for Supervision and Curriculum Development in March, noted that "there is nothing so practical as good theory"--and what is commonly known as "Chaos Theory" may be the most appropriate descriptor of the Information Age. A basic assumption of Chaos Theory is that change is non-linear. A derivative of that assumption emphasizes the importance of learning theory: Those who succeed are those who are poised to learn; i.e. learners are those who can do things differently and in non-sequential, sometimes illogical ways. (Fullan, 1994)

We who "envision" the future must constantly be aware that the problems of social change (such as nurturing and reculturing education and the information professions) not only involve a myriad of small changes, but that those details change as they occur. This

"dynamic complexity" forms the fluid foundation of what Senge describes as the learning organization (Senge:1990:7). If schools are to function effectively as society's basic learning organizations, educators and information professionals must become change agents (or in the vernacular--"change junkies"). In the learning organization, the "change junkies" always poised to question the present, to let go of irrelevant parts of the past when new information supplants it, and to use new information--i.e. to learn and to relearn.

The query posed by a math colleague recently underscores the importance of information professionals as change agents/change junkies: "In 1975 the 'life-span' or usefulness of a piece of information was approximately 10 years; in 1995 it will be ten months; in the year 2005, the 'life-span' of most information will be only 10 days! If the librarians who are trained to organize and work with information and knowledge can't help us to develop coping strategies for dealing with the overload and all this change--then who can?"(Edwards, 1994)

Certainly it is evident that nurturing the library media specialist/information professional for this change agent role will require many and constant changes--in the structure of training, in subject matters, and in delivery systems. How then can we possibly plan for the support of these individuals in the schools or learning communities of the future? One answer may lie in developing "future scenarios" and identifying from them "guiding principles" for nuturing information professionals. Even then, it must be recognized that these guiding principles can only be based on our limited understandings of the emerging research about the needs and learning styles of adults working in the educational arena today.

SCENARIO 1: Alice Dreams . . .

The year is 2005 and Alice, a junior at a well-known university, is attempting to "see through the looking-glass" at a career for herself. Because she has attended a middle school and high school based on Sizer's "restructured" model, Alice's experiences with interdisciplinary curriculum and the use of information age technologies such as Internet or hypercard to organize and make connections between her new learnings, began early. She especially enjoyed the high school interdisciplinary team projects which focused on the emerging global economic system and call for a global currency. (Coates, 1994:6) It is, however, through her rather traditional studies in history and economics at the college level, that she is aware that the ultimate effect of the techno-economic restructuring of the last portion of the twentieth century was to "increase the information content of every job in America--from shop floor to top floor." She knows that like the majority of her classmates, her careers will most likely lie in the area of knowledge production. (Snyder, Edwards, 1992:18) Alice--like most other students of the worldwide popular culture--also realizes that the major problem of how to measure the economic value of information and knowledge is yet to be solved. (Coates, 1994:3) Perhaps, she dreams, she could be the Nobel Prize-winning economist who develops an effective theory of the economics of information. . . .

It is during an interdisciplinary study of the economics of developing a drug to enhance learning that Alice meets Joyce, an Information Specialist at the University Medical Library.

During the reference interview and the ensuing search process, Joyce notices Alice's ability to articulate her problem, to identify possible avenues to explore, to use a variety of search strategies, and to change directions. That no "definitive answer" to Alice's "problem" appears does not seem to bother her; it simply suggests more areas for exploration. Joyce immediately thinks "Here's a candidate for teaching and the information professions!"

Joyce encourages Alice to explore how the brain functions through a "virtual reality" simulation available in the resource center. (Coates, 1994:___) She also suggests that Alice speak with several educators about career possibilities combining economics and education and shares with her the several "mini-careers" she herself has had. Joyce offers the names of a couple of local businessmen who have developed significant programs to retrain the workforce in the area.

As a result of Joyce's encouragement, Alice decides that she wants to share the excitement of learning and discovery--perhaps even developing that Nobel-prize-winning theory of the economics of information--with young people. To prepare for facilitating the learning of others, Alice enrolls in a teacher preparation program--one that is accredited by the National Council for the Accreditation of Teacher Education. Because the guidelines for the preparation of teachers and information professionals are developed by the learned societies and "enforced" through NCATE, Alice--and her future employers--can be assured that her preservice training meets the standards of "best practice" of the time. Furthermore, the quality assurance provided by NCATE is just the first step in a continuum of teacher preparation which includes state licensing for the extended clinical preparation and assessment period and the continuing professional development provided through the National Board for Professional Teaching Standards and through the advanced certification programs of the professional associations. (Sanders, 1994)

During her preparation for teaching, a variety of technologies assist Alice in observation and assessment of her own performance. Indeed, during the period of clinical practice, Alice identifies several videos of her teaching performance and examples of multimedia instructional design for inclusion in her portfolio on her "smart" card--a combination education, medical, and personal history the size of a 1990's credit card. (Coates, 1994) She also makes uses of technologies similar to the 1990's MOSAIC to review and participate in curriculum design with experienced teachers in three disparate communities throughout the United States. Though "virtual reality" is used to provide some experiential skills--particularly in the area of communication, the nature of teaching/facilitating learning demands that the "high-tech" continue to be "high-touch"and dominated by experience with real learners--children and adults.

The folling "Guiding Principles" for nurturing information professionals emerge from this scenario:

- PLAN FOR CHANGE.

Recruit young people who can become change agents--young people who are not afraid of risk-taking nor of ambiguity. To create lifetime learners and learning organizations, developing and exploring innovations--as well as disruption of the *status quo*--must become acceptable norms both at the individual and organizational level. (Drucker, 1992)

As guides for learning and change, information professionals must be:
a) cognizant of steps in the change process for humans;
b) able to coach and encourage learners to "let go of the past," take risks, make new connections or "leaps of faith"; and most importantly,
c) able to remember "what it was like not to know" (Wurman, 1989) and comfortable with the abiguity of "not knowing."

Furthermore, recruits to the information professions must expect several careers during their worklife and must continually "scan the environment" for clues and ideas about how to make themselves "marketable" to the increasing numbers of companies and institutions--including schools--which hire only a few core employees and depend upon supplemental employees and outsourced functions for much of their operation. (Barner, 1994)

- PLAN TO NURTURE WITH AND FOR A NEW MINDSET--"LEARNING IS A LIFETIME ACTIVITY."

Change agents adopt the stance that "learning is everything," and because their "careers" will be lengthier due to improved health, nurturing will also need to occur over the lifespan. (Coates, 1994; Nowak, 1994) The information professional--as an organizer, filterer, and facilitator of information use--can only grow and develop as he or she continuously improves in capacity to make more and more connections between and among people and resources, ideas and information. (Fullan, 1994) The successful information professional must be ever ready to "think differently," to make new "connections," and to start changing--irrespective of those around him.

- VIEW NURTURING AS THE RESPONSIBILITY OF A COALITION WHICH INCLUDES THE INDIVIDUAL, EDUCATIONAL INSTITUTIONS, EMPLOYERS, AND PROFESSIONAL ASSOCIATIONS.

Nurturing the "change junkies" called information professionals will require that all elements of the professional community work together, for the task of nurturing can be all-consuming and should not be left to one individual or institution. Only through coalitions can the professional community provide both the impetus and the variety of forums necessary for the preservice preparation and the continuing growth, skill development, retraining, and networking support that these change agents will need. (Miller, 1994; Sanders, 1994) Universities, technical schools, government agencies, professional associations, publishers, and businesses will need to form new relationships, new ways of funding and cost sharing, new delivery systems (both

face-to-face and distance alternatives), new ways of providing support for reliable technical assistance, and even differentiated staffing alternatives in order to reach the learner. (Miller, 1994)

Yet, above all, it is the **individual** who must take responsibility for developing--and revising--a lifelong learning plan. (Miller, 1994; MLA, 1991) Those who sustain inquiry into their own learning are invaluable resources for their colleagues in the knowledge society. (Miller, 1994:161)

- USE TECHNOLOGY AS A TOOL TO ENHANCE COMMUNICATION AND LEARNING/RELEARNING.

The fusion of telecommunications and computation will enable learners to work together in new ways--and will require new interpersonal skills or "netiquette." (Coates, 1994:5) Though newer technologies spawned by the internet and multimedia will greatly enhance the learning process and enable learners to make connections easier, teachers/facilitators/coaches will remain primary factors in the learning equation.

SCENARIO 2: Alice Experiences . . .

The year is 2025 and Alice is a mid-career information professional. She has worked as a teacher/facilitator/coach in several environments--health services, business retraining programs, and developmental programs for young children. During the last twenty years, the career advice offered by Barner on environmental scanning, developing portable skills, self-management, and perfecting communication skills has paid off. Though jobs were easy to find at the time of her initial licensure as a learning facilitator, Alice quickly discovered that entrepreneurial skills were a necessity as most employers continued to outsource the education/retraining function of organizations. (Barner, 1994)

In her jobs, Alice has been a resource specialist, a master teacher, a consultant/entrepreneur, a learner, a mentor, a coach, a facilitator of integrated learning, and a collaborator. All of these roles have demanded superior communication skills--both face-to-face and written. At several times Alice has been a part of instructional design teams that have been geographically dispersed and culturally diverse. The ability to communicate clearly and consistently within high-stress, time-limited situations has been critical. (Barner, 1994)

The benefits of the improved techno-economic revolution at the end of the 20th century are now--almost half a century later--becoming evident. (Snyder & Edwards, 1992) *While Alice enjoys a relatively high middle class standard of living, she is contemplating dropping out of the workforce to raise children. This natural midlife shift from work priorities to personal agendas may be somewhat easier because of the possibilities of telelearning and flexplace work. (Coates, 1994)*

In fact, Alice has been offered a job-share position as coach at the new Learning Center attached to the Physical Fitness Center in the neighborhood. The Learning Center, fashioned in many ways like the Lyceums of the Great Immigration Period in America in the 1880's-1920's or the Communiversities of the 1960's-70's, offers learners of all ages the opportunity to explore, learn, unlearn, or retrain in a wide variety of ways--for a monthly fee (family rates available of course). For example, Alice and her colleague Jim will serve as resource persons and group leaders for an inquiry group of learning facilitators developing a "virtual reality" product; she'll also use the old "training" model for a group of businessmen needing demonstrations and information about a new product; with a learning facilitator (teacher) preparing for the National Board for Professional Teaching Standards certification, Alice will provide assistance with observation and assessment tools; in addition, she will also work individually with several senior citizens who have hired her to help them revise their own learning plans, then identify appropriate learning technologies and resources.

The Learning Center concept has "taken hold" in society because at last social leaders recognize that "time" is one of the most precious of resources. Time for learning--either in groups or individually--is built into the workday for many employees. The Learning Centers are open twenty-four hours a day so that individual entreprenuers--ever conscious of the need to refine skills or retrain--can take advantage of the high-end tehcnology available for learning. Learning coaches--many of them information professionals--are available for hire much like personal trainers were in the 1990's. These coaches or information professionals are licensed to diagnose information problems, to filter and repackage information, to prescribe learning plans or even biomedical drugs to enhance learning of some skills, and to evaluate learning results for assessment portfolios and resumes.

Alice is especially pleased with the Learning Center position because it will also offer her the opportunity to identify an online learning support group for her newest interest--parenthood.

What guidelines might this scenario offer in terms for the nurturing of professionals?

- NURTURE THE DEVELOPMENT OF A VARIETY OF RELATIONSHIPS--BETWEEN EMPLOYER/EMPLOYEE, BETWEEN INDIVIDUALS, BETWEEN INDIVIDUALS AND GROUPS.

As employers rely more heavily on supplemental employees to provide services, new employer/employee relationships will emerge. In the short term, employers may need to provide special incentives to encourage the loyalty of key information professionals in high demand. Information professionals will also need to hone their entreprenuerial skills, constantly scanning the environment to benchmark their skills, to prevent technological obsolescence, to gauge the current market value of their skills, and to identify potential employers and fast-breaking employment opportunities (Barner, 1994:14) Mobility of the workforce will impact the relationships of both employer and employee.

Though the society is one based on information and knowledge, it is in many ways still dominated by the disciplines. Information professionals may continue to feel somewhat isolated and in need of the support of colleagues--both to help them access sufficient resources and to help them sustain the energy for change that is demanded of them. (Miller, 1994) Therefore, networking--face-to-face and online--will continue to be one of the most important ways of nurturing information workers. This networking can take place in meetings--needed to provide the "high-touch" element necessary for developing the trust factor required in collaborative work--or through support groups, discussion/study/inquiry groups, online crackerbarrels, subject area associations, and in mentoring programs. "All developing individuals must be connected to a wider world in order to be able to deal with multiple points of view internally." (Fullan, 1994)

Group relationships will probably continue to change as well. The individualistic approach to problem-solving is likely to be supplanted by teamwork. (Drucker, 1992) Experience with site-based management and local education councils shows that acquiring the basic decision-making skills for group work is requires significant training. Yet even more difficult is the collaborative model which relies more heavily on trust and the development of negotiation and conflict resolution skills. (Fullan, 1990; Miller, 1994) However, it is the collaborative model which which provides the additional support needed for change agents. (Miller, 1994)

- PLAN NURTURING EXPERIENCES WHICH RESPOND TO THE MULTIPLICITY OF ROLES THE INFORMATION PROFESSIONAL PLAYS.

While all of the roles the information professional plays require superior communication skills, each also requires some specific abilities and ways of approaching the problem-solving process. The essential questions will vary, depending upon role. Therefore, when planning for learning and nurturing these information professionals one must ask: "In what role is he functioning?" Role analysis becomes not only an important skill for the information professional, but also for the nurturer.

The demands and intensity of many of the roles the information professional/learning facilitator often make it difficult for them to remain engaged in their work. (Miller, 1994) To keep "burnout" at bay, it is important to nurture and support information professionals by introducing techniques for:

a) relieving stress,
b) "rethinking" of time and of roles and relationships, and
c) "connecting" to other learners to break the norms of privacy that are prevalent in the educational realm. (Miller, 1994)

- NUTURE EDUCATORS AND INFORMATION PROFESSIONALS USING A VARIETY OF MODELS.

While the prevalence of the commercial Learning Center is just one possibility for the future, "it is a safe prediction that in the next 50 years, schools and universities will

change more drastically than they have since they assumed their present form more than 300 years ago when they reorganized themselves around the printed book." (Drucker, 1992) The changes forced by new techonologies, the demands of a knowledge-based society, and new theories about how human beings learn may take a variety of forms. The models suggested in the scenario (inquiry, involvement in a development process, training, observation/assessment, and individually-guided processes) are the best we know today. (Sparks, Loucks-Horsley, 1990). What we do know about the future is that the variety of models for encouraging change agents and information professionals will, of necessity, be broader and more complex.

- VIEW NURTURING THE INFORMATION PROFESSIONAL AS DEVELOPING "LIFE SKILLS" RATHER THAN AS PROVIDING SPECIFIC TRAINING/SUPPORT.

Alice will probably find that in her practice as an information professional that the technologies change rapidly and frequently. but the basic learning and search skills change far more slowly and infrequently. (Drucker, 1992) Even then, in the Information Age it is safe to assume that anyone with any knowledge will have to acquire new knowledge every four or five years or become obsolete. (Drucker, 1992) Life or coping skills such as problem-solving, self-management, organization, dealing with ambiguity, risk-taking, and communication become all-important to the change-agent. The focus of much of the nurturing of information professionals in the future must be on improving such life and communication skills--the ability to speak assertively and proactively, to use questioning, reflective listening and interpersonal skills, to negotiate, to facilitate group process, and to effectively use conflict resolution skills.

- CONSIDER "TIME" THE MOST PRECIOUS OF RESOURCES.

Learning is a long-term investment--for the individual and eventually for the institution/employer. (Miller, 1994) Though technologies can provide quicker access to information, learning--i.e. constructing personal knowledge--takes time. Time is necessary for experimentation, practice and reflection. (Miller, 1994:18) As a learning strategy, collaboration offers learners more engagement and ultimately more learning; however, collaboration also takes more time, energy, and resources. (Miller, 1994:18)

Information professionals--like other professionals--must be trusted to use time wisely to exercise their professional judgment, take time to plan, meet with colleagues, and to be engaged as learners themselves if they are to be trusted to assist other learners in new ways. (Miller, 1994:24)

Scenario 3: Alice Reflects . . .

The year is 2075 and at 90, Alice marvels (as she "reads" a virtual biography of Benjamin Franklin) that she is considered by many to be one of the Post Information Age Sages. She admits that she--like Franklin--has continued to explore new ideas, to seek alternative

approaches to problems, and to learn throughout life. Indeed, she still has a plan for her own lifetime of learning--though it is an oft-revised plan!

Alice's memory is not as agile as it was when she was younger. However, because she has effectively "exercised her mind" as well as her body, the multiplicity of neural "connections" in her brain is phenomenal and still well-beyond the capabilities of the most advanced of expert systems of the day.

As those her age often do, Alice reflects upon her lifetime of learning. She and a group of learners whom she was mentoring did capture the dream of her youth--the Nobel Prize for defining an economic theory of information. Now, in the Post Information Age, Alice's primary work draws upon the variety of experiences and "connections" she has made throughout life as models for constructing "virtual reality" experiences through which others may explore problem-solving possibilities.

Alice continues to ask the hard questions about the "nature of mankind," the place of conflict in learning and in society, and man's capacity for conflict resolution. She is an international--and intergalactic--expert on the human coping strategies in response to information overload and to change. Though her contacts are many and her circle of influence is great, Alice continues to rely upon the small discussion group that began while she was facilitator at the Learning Center for emotional support and encouragement. It was a member of this group who, though not an economist, had spurred the "different thinking" that led to the Nobel Prize. This valuing of persons and thinkers outside her field Alice considers one of her main defenses against burnout, boredom, and "old age."

Alice also considers "time" to be among her most important resources. Therefore, while she spends a great deal of time assisting others in developing personal research agendas, she also builds into her daily schedule an extended period of time for her own exploration of ideas, experimentation with the new-fangled technologies, and reflection. Alice firmly intends to continue learning until death provides her with a different way of knowing.

What are the implied principles for nurturing of information professionals at Alice's advanced stage of life? While perhaps not different from those identified at earlier stages, the need for continued emphasis on the following guidelines remains:

- PLAN TO NURTURE WITH AND FOR A NEW MINDSET--"LEARNING IS A LIFETIME ACTIVITY."

Research on the brain currently advances the "use it or lose it" approach. While age brings on some physical degeneration of neural pathways in the brain, it is thought that those who have developed extensive "connections" via life experiences need not decline significantly in ability to make use of those connections. Indeed, the breadth of "connections" serves to maintain the healthy mind and perhaps delay the aging process. Thus, the connections information professionals develop during their

lifetimes can be nurtured through recall, reflection, and application (as in Alice's development of virtual reality alternatives). (The Brain, 1994)

- USE TECHNOLOGY AS A TOOL TO ENHANCE COMMUNICATION AND LEARNING/RELEARNING.

While it is hoped that the learning technologies of the twenty-first century are considerably advanced, it is essential to remember that these technologies are only tools to enhance learning. Tools change over time: the pencil becomes the wordprocessor; the index card becomes the hypercard stack; the simulation becomes "virtual reality." (Eisenberg, 1994) However, the purpose of the tools--to record, to organize, to "experience"--remains the same and may be expected to do in the foreseeable future. It is the human mind's use of these tools which is unique and which can be called "learning."

- VIEW NURTURING THE INFORMATION PROFESSIONAL AS DEVELOPING "LIFE SKILLS" RATHER THAN AS PROVIDING SPECIFIC TRAINING/SUPPORT.

Communication--as a both a professional and "life" skill--continues to be of paramount importance throughout the lifespan. Articulation, listening, and questioning skills are particularly important to learning facilitators. Reflective listening, paraphrasing and negotiation are essential to conflict-resolution. Whether at an interpersonal level, between systems, or at the policy level for an organization, community, or nation, improvement of communication skill is one of the keys to learning and growth. One can only assume that advances in technology and understanding of the human brain will bring about possibilities for continued expansion of our abilities to understand and communicate with each other throughout the lifespan. Older adults as well as young people will need assistance in expanding their communications repertoires.

- NURTURE THE DEVELOPMENT OF A VARIETY OF RELATIONSHIPS--BETWEEN EMPLOYER/EMPLOYEE, BETWEEN INDIVIDUALS, BETWEEN INDIVIDUALS AND GROUPS.

The value of a broad network of relationships continues to lie in the multiplicity of stimuli it offers, the depth of the resources which can be drawn upon, and the support which such a network supplies to the individual. As the individual grows older and gains mastery of skills and recognition for performance, the "experience of success" tends to wane. This loss can significantly damage the individual's morale and consequently reduce flexibility and openness. To nurture individuals at this stage requires understanding of their vulnerability to stress and their sensitivity to criticism. The differing kinds of stimuli, resources, and support offered by a variety of relationships are key to the prevention of "burnout" for change agents.

- CONSIDER "TIME" THE MOST PRECIOUS OF RESOURCES.

We do not yet have adequate data about the "drive" of change agents to continue exploring and learning late in life. However, anecdotal study of "change junkies" shows that some begin to feel a "time pressure" to finish their work. Time for experimentation and growth must continue to be a part of the life of the aged--and indeed may be a key to longevity.

The guiding principles drawn from the scenarios outlined above are not new, nor are they technologically "flashy." They do, however, represent some significant changes in our current approaches to nurturing school library media specialists. Instead of focusing on technologies and short-term training, the approaches focus on long-term support for the roles, relationships, and life/ communication skills of the information professional as change agent. The guidelines suggested are achieveable, but they will require rather dramatic shifts in mindset for many people within the field of school librarianship.

Systems theory suggests, however, that if educational leaders, institutions and associations use this changed mindset to shape their vision of the future, **the emphasis upon support for the individual information professional as change agent is likely to lead to changes in the whole system of nurturing learners--both children and adults.** The focus on the individual--as learner and change agent--reinforces the belief that "the answer is not really out there; the answer is inside of us." (Fullan, 1994) This is as it should be; for, ultimately, it is the individual in the Information Age who must determine for himself that "change is mandatory; growth is optional."
(Lang as quoted by Fullan, 1994)

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WHAT RESEARCH WILL BE REQUIRED TO LEAD AND SUPPORT THE FUTURE INFORMATION PROFESSIONAL?

Ross J. Todd

Abstract

This paper identifies some research directions that will be required to support future information professionals, particularly in the context of school education. Particular emphasis is given to two fundamental directions that have long-term ramifications for information practice in educational context, namely information literacy and developments in multimedia. These directions are first posited in terms of a number of key assumptions about the future of schooling, and the role of information professionals in schooling. Based on some recent research examining the impact of information literacy instruction, the paper highlights research directions such as developing effective measures of information literacy outcomes, documentation of effective instructional design, and exploring social justice and equity issues. The paper identifies trends in the development of interactive multimedia, and presents a range of research directions that focus on the nature of interactivity, appropriateness of interface metaphors, information seeking patterns in electronic environments, identification of user-centered evaluation criteria, retrieval of nontextual information, impact of multimedia on learning, and design of multimedia from a framework of learning theory.

INTRODUCTION AND ASSUMPTIONS

This paper examines some research directions for future information professionals in the context of school education, particularly in relation to information literacy and multimedia. A number of important assumptions have shaped these directions. Firstly, there is the widely accepted assumption, almost a truism, that the context of education in the next 10 to 20 years will be that of an information intensive economy, a global information society and a learning society.

Secondly, notwithstanding historical and contemporary claims to the contrary, schools will still matter within the next two decades. Despite scepticism engendered by the deschoolers, and while futurists might envision concepts and structures of schooling radically different to those of the present, schooling in general will matter for many years hence, at least for the reason that the political and economic machinery of educational reform is slow. Educational themes such as the following will shape and drive educational processes in a learning society, whatever the nature and structure of schooling:

- a view of education which recognises the worth of the individual;
- an approach to education which values the cognitive, cultural, social, affective and technological development of the individual;
- the recognition that the process of learning is as important as the knowledge gained and as any tangible outcome;
- an emphasis on the importance of personalised learning;
- a view of learning which is dynamic;
- the development of learners who are aware of the range of options on what to learn, how to learn and from whom or what to learn;
- the sharing of knowledge at local, regional, national and international levels;
- the need for learners to have access to information appropriate to their abilities, interests and needs;
- competency based-education and the blurring of the boundaries between formal schooling and workplace education. (1)

Thirdly, information professionals will continue to play a role in the educative process, but they may not necessarily be the principal players. Today, all educators and not just information professionals are being asked to rethink and restructure education processes within an information framework in order to provide students with the knowledge, skills and attitudes they will use and apply as members of an information society. Traditionally this has been the domain of information professionals. The boundaries between the roles and functions of all in the information cycle are considerably overlapping. An important feature will be the dominant role played by information technology.

Within this context, this paper deals with two research directions that will contribute to the role of the information professional in school education - that of information literacy and multimedia. These directions are embedded in the assumptions described above, and are considered to be two major grassroots issues that will shape practices and policies of information professionals in the educational context for many years hence.

INFORMATION LITERACY

A considerable body of literature exists in the educational arena on the part played by information literacy in learning. Current practices of school library media specialists are based on the assumption that information skills instruction that underpins development of information literacy is a valuable and essential part of the educational process. There has been little testing

of these assumptions. Statements on the value of information literacy are largely based on intuition and informal reporting rather than on any systematic research. Available research is somewhat piecemeal and not sufficiently cumulative to build up a strong picture of the impact of information literacy programs on student learning. At the same time, the active marketing of information literacy programs by school library media specialists has brought about a demand by classroom teachers for the research evidence. The absence of such research evidence has been posited as one reason for the slow takeup of information literacy programs integrated into curriculums by classroom teachers.

A recent study undertaken by the author highlights some important future directions for research focusing on information literacy. A full research report is currently in publication, and a brief report will be given here. In a formal and systematic way, this research sought to answer the following questions:

> (a) Is there a difference between a conventional content-approach and an integrated content-information skills approach to Year 7 science education in terms of level of mastery of science content and information handling skills?
>
> (b) Is there an interaction between level of ability of students and the type of approach?
>
> (c) Is there any impact of the integrated content-integrated information skills approach on attitudes to schooling, such as motivation for and attitudes to learning, academic self-concept, self-esteem, and sense of control over learning performance?

A comparison group experimental design was set up in a secondary school in Sydney, Australia in 1993. A control group consisting of two Year 7 Science classes received science instruction according to the prescribed Science Syllabus using teaching-learning strategies that did not involve any formal attempt to integrate information skills into the content. Teachers assigned to these classes had not been involved in any co-operative efforts to integrate information skills. A treatment group consisting of another two Year 7 Science classes received science instruction using teaching-learning strategies that include information instruction in information skills according to the steps and skills of the information process, as defined in *Information Skills in the School* (2). This instruction took place over three terms. A standardised academic ability test showed no significant differences academically between each group. Students were randomly assigned to each class, and teachers were assigned to classes on the basis of criteria designed to control for a number of alternative extraneous variables. Differences were measured in terms of the students' mastery of science content and skills; their competence with using information skills strategies, and in terms of a range of attitudes about schooling.

Mastery of science content and skills was based on marks of the mid-year and end-of-year science exams. The mean scores for each of these classes show that while there is was difference between the two classes receiving the information skills instruction, and no

difference between the two classes receiving the traditional instruction, there were statistically significant differences between classes in the control and treatment groups. (Treatment mean=71.35; Control mean=62.20; df=3,76; F=3.76; p=0.014) Given the controls placed on the selection of teachers and the recognition of their effectiveness as experienced teachers, it would appear that the variable method of instruction has made a significant impact on mastery of science content and skills.

Given the absence of information skills measurement instruments, the entry and final information skills scores were derived from a measure developed by the researcher. The analysis of variance of this data showed no significant difference in the entry information scores between the control and treatment groups. (Treatment group mean [stages identified out of 6] of 2.48; control group mean of 2.43 stages; df=3,76; F=0.37; p=0.778). In terms of final information skills score, the treatment group, as would be expected, showed an increase in the number of stages identified in the content analysis of the information problem solving task given to them, with a mean score of 3.75 stages identified, representing an average increase of 1.275 stages. In contrast, the control group showed a marginal improvement with a mean of 2.7 stages. The differences were statistically significant. (df=3, 76; F=4.56; p=0.005). An analysis of the interaction between different levels of academic ability and the two types of instruction does not indicate that the information skills instruction had a greater impact on students of a particular level of academic ability. (group type * ability: F=1.4, p=0.250).

Students were also compared in terms of their attitudes and perceptions of school life, motivation for schooling, feelings about school performance and confidence in their academic ability, their sense of instructional mastery, and satisfaction with school. Two standardised tests were used. While there were no statistically different findings between the groups in these categories, the scores for the treatment group were higher than the control group.

For the school in question, there is some evidence to suggest that an integrated information skills program does have a positive impact on students' academic mastery, the development of information problem solving strategies using a range of information skills, and may have an impact on their attitudes to school life, their self-esteem, and their own confidence to take charge of their learning. At this point in time, however, the absence of a cumulative body of findings makes it difficult to generalise beyond the immediate research environment. While the findings are encouraging, the study highlights some vital research directions:

- how can information literacy outcomes be measured; development of reliable and valid information skills measures so that cumulative knowledge can be built up;

- soundly conceptualised action research that enables documentation of teaching learning principles and broad strategies to implement information literacy programs; elucidation of principles of instructional design as they pertain to information literacy;

- longitudinal studies of the impact of integrated information literacy programs on attitudes to schooling, to examine impact of time and explore transferability of generic information skills;

- particular attention needs to be given to understanding information seeking patterns of students in electronic environments, and how this understanding can inform the development of information literacy programs; the changing face of information literacy within the changing context of information technology;

- action research focusing on incorporating information literacy as part of the common agreed culture of the workplace / organisation;

- research into needs of teachers, and particularly for those who were not themselves educated in the context of education literacy;

- identifying approaches to diagnosing learning needs in relation to information literacy;

- research into how people continue to be information seekers beyond their time as students, and how this might inform information literacy developments in school education;

- establishing networks for the accumulation of information about information literacy: who, what, why, how of information literacy programs;

- further exploration of the nature of co-operative teaching and learning;

- action research on the nature of investigative learning;

- exploration of information literacy competencies in terms of learning outcomes, assessment and performance;

- exploration of the role of information literacy in open and flexible learning;

- greater understanding of what students can learn for themselves;

- Examination of social justice and equity issues in the context of information literacy.

MULTIMEDIA

Interactive multimedia has been posited as one the most important factors that will shape learning, teaching, collaborative research and professional practice into the 21st century. Current predictions of growth rates in the design and development of multimedia packages as

a means of information provision to end users (largely directed to students in primary and secondary education) highlight this importance. Feldman shows that in the USA and UK, the annual growth rate of books from 1978 - 1991 has been about 8%, while electronic information in the same period has grown at a rate of 20%. On these trends, electronic information will overtake books by about 2000, ending the dominance of the printed word.(3) No longer will the printed word, the Biblionian Captivity so to speak, be unquestionably the natural information platform.

Today multimedia is being regarded as a technology whose time has come, given the growing concerns throughout the world about performance and cost of existing educational systems, and the growth in the development of flexible learning pathways, distance and open learning, and the integration of workplace and off-the-job training. While the potential is recognised, there is also concern that this potential will be assumed to be reality without careful systematic investigation.

Recently I had opportunity to visit a number of multimedia research and development environments. There is a recognition of the importance of developing fundamental perceptual, cognitive, and motor theories and models based on principles of human behaviour that provide a foundation for interactive system designers. The development of adequate models of the behaviour and experiences of people who use interactive systems which accommodate the complexities of human learning, memory, problem solving and information seeking required in these applications is seen as a major gaping need. However, as is the character of much of human endeavour, research and development trails the development of applications.

Multimedia certainly has the potential to make a strong impact on teaching, curriculum design, learning processes and structuring the learning environment. However, there appears to be considerable disparity between the claims of commercial developers and advertisers of multimedia packages and evidence available from limited research into the impact of multimedia on learning. Claims include: reduced learning time, instructional consistency, facilitates mastery learning, permits intensive and relevant engagement with subject content, individualised control and pacing of learning, increased content retention over time, reduced behaviour problems, increased motivation, greater and more equal access to quality instruction. There are counter claims that multimedia in education is imperialistic and reduces human interaction in the learning process. While multimedia has the potential to provide access to information and expertise beyond the traditional places of learning and to provide an enhanced range of learning opportunities and environments beyond the traditional classroom, the disparate evidence and questionable research methodologies that underpin such claims and counter claims provide a rich starting point for collaborative research. In addition, quite a number of the multimedia products I examined seem to be poorly conceived and designed, and based on assumptions of users as passive, robotic recipients of information. There appears to be an absence of systematic research into useability of such products from an end user perspective where user-centred criteria such as ease of use, navigation, cognitive load, mapping, screen design, knowledge space compatibility, information presentation,

media integration, aesthetics, and overall functionality have been tested. While there is a considerable body of literature evaluating multimedia products from its technical aspects eg. colour pixel density, and what operations such as rotation, flip etc that can be performed on graphic objects, there is urgent need to focus on the elucidation and testing of user-centred evaluative criteria.

Educators and researchers tend to make the intuitive assumption that each media type makes a unique contribution to learning. There is the additive assumption that instruction presented in two mediums produce more learning than instruction in one medium, and the multiplicative assumption that instruction integrating a range of mediums such as using multimedia packages produce even more learning. In this context, Sims (4) identifies five central assumptions that should form the basis of any debate and research on the application of multimedia to teaching and learning:

- interactive instruction is better;
- new technologies will make interactive instruction more effective;
- traditional teacher-student interactions can be mapped directly to interactive media;
- computer assisted learning can cater for individual differences and learning styles;
- design and development methodologies will improve courseware quality.

Within a strong educational framework, the challenge of multimedia lies in building applications that actively engage the learner; that make the applications active rather than merely a page-turning exercise of pressing buttons to present a page of text, graphics or video in a stream of continuous information; that reject rote memorisation and empower learning by doing and learning by reflection. My evaluation of an extensive range of multimedia packages indicate that most appear to focus on memorisation, drill, and short term memory recall rather than providing opportunities for critical analysis, synthesis and evaluation, and opportunities for reflective guidance and feedback particularly in relation to errors and misconceptions. Many show a lack of understanding of the principles of instructional design, learning, information behaviour and information design. Many packages also make the inappropriate assumption that teachers and learners have an automatic predisposition to computer based systems. In essence there is urgent need to explore what the medium can do to facilitate the learning process. The starting point is the learning process and its desired outcomes, not the technology and its applications as appears to be the case. I am of the firm belief that any approach to multimedia for learning must recognise this notion as its fundamental principle. Some of the issues relevant to multimedia products worthy of further exploration include:

- the interrelationship of learning environments, approaches to learning, and learning outcomes and how this can contribute to developing multimedia based learning. For

instance, what is the optimum mix, if any, of degree of interactivity, individualisation of instruction, amount of learner control, feedback to the learner, monitoring of student progress for effective learning with multimedia?

- role of multimedia in teaching and learning: appropriateness and limitations; its role in augmentation of personal experiences; role in shaping the learning experience; role in enhancing discovery learning; role in individuality of learning; how multisensory learning shapes development of meaning and understanding; role of multisensory techniques in multimedia in emotional development.

- understanding of information seeking behaviours of users in an electronic multimedia environment - browsing, navigation and searching patterns, and how these relate to the learners' tasks.

- understanding of representation of domain knowledge of targeted groups of learners and how this is translated into system representation of knowledge in order to create an appropriate semantic organisation relevant to learners' tasks; making inferences about learner's state of knowledge in relation to an 'expert' model of knowledge to be learned, and the effects of prior knowledge

- conceptual understanding of the nature and dimensions of interactivity: types, methods and goals of interaction, and how understanding of these inform the design process.

- information skills requirements: skills of defining, locating, selecting, organising and presenting information, reasoning skills such as comparison, contrast, analysis, synthesis, and metacognitive abilities such as assessment, discrimination, classification, judgement of information;

- appropriateness of design metaphors: how do you characterise the beginning of an interactive experience and range of user interactions, and what is the utility of design metaphors such as desktop, task-oriented metaphors, spatial metaphors, book metaphor, cinematic metaphors, research tool metaphor, construction kit metaphor, flow line metaphor, stack of cards metaphor.

- catering for individual differences and optimising the interface to enable this; extent to which learners can choose their own strategies and learning activities; degree to which learner rather than the system controls exposure to learning materials, the particular learning activity or strategy.

- retrieval of nontextual information: little appears to be known about the personal manipulation of sound and image information, and current approach to intellectual access to images is a text search to retrieve images.

- elucidation of measurable "quality" criteria rather than vague and misleading notions under the umbrella of "user friendliness".

Futurists present challenging and enticing descriptions of life in the 21st century. Visions of technology and science revolutionising home life, business, education and the environment, such as robots doing household chores, three-dimensional interactive television, and genetically engineered products, abound. Such descriptions often imply that being there has little to do with getting there, that the future will just arrive in its fullest glory. It is decisions now that will shape the future, that will enable educators to construct a future that is indeed the preferred future. Addressing the challenges identified in this paper are an important starting point in getting from here to there, liberating the past and capturing the future.

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7. *Ibid.*, p. 15.

8. Lucile F. Fargo. *The Library in the School.* Chicago: American Library Association, 1930. p. 10.

9. Regarding academic reasons for home schooling, *Newsweek* ran a story in its January 10, 1994 issue which dealt with gifted children being taught at home due to gifted programs being cut by public schools. One conclusion was that highly-motivated, bright children do very well in an environment which encourages self-directed study in their areas of interest. (Kantrowitz, 1994, p 58).

10. The authors found several articles which document the academic success of home schooling. The primary source quoted in this paper is by Joan Hatton, "The Home-Schooling Explosion," *Alberta Report*, 14 June, 1993, pp 36-40. This article reports that researchers in the U.S. have found that home-educated chldren perform very well on standardized test compared to public, Catholic and private school children. A survey by the Home School Legal Defence Association found that on average home schoolers perform better than 80% of all other students in all subject areas on standardized achievement tests.

Another study was reported by Mark Tipton in 1990, which involved CTBS results of 81 West Virginia homeschooled children in grades 3, 6, 9, and 11. "Results indicated that third-grade homeschooled chldren scored significantly higher than the public school means in vocabulary, reading comprehension, mathematics concepts, science, and total mathematics; significantly lower in spelling; and similarly in other areas. Sixth-grade homeschooled chldren scored significantly higher in composite, vocabulary, reading comprehension, and total language means, and similarly in other areas. Ninth-grade homeschooling means were significantly higher in reading, lower in mathematics, and similar in other areas. Eleventh-grade homeschooling means were significantly higher in reading and similar in the rest." *An Analysis of Home-Schooled Children's Comprehensive Test of Basic Skills Results and Demographic Characteristics of Their Families*. Master's thesis, 1990. Antioch University. EDRS document ED336208.

Further evidence of the effectiveness of home schooling was a report by Robert Calvery, et. al., in 1992 which concerned home- and public-schooled children in Arkansas. Children in grades 4, 7, and 10 were compared for reading, mathematics, language, total basic battery, science, and social studies skills. Homeschooled students in grades 4 and 7 scored above public school means in reading, mathematics, language, total basic battery, science, and social studies. Homeschooled students in grade 10 also scored significantly above public school means in reading, mathematics,

total basic battery, science, and social studies, but significantly lower in language. *The Difference in Achievement Between Home Schooled and Public Schooled Students for Grades Four, Seven, and Ten in Arkansas*. Paper presented at the Annual Meeting of the Mid-South Educational Research Association (21st, Knoxville, TN, November 11-13, 1992).

11. The Software Publishers Association reports that home education software is the second-fastest growing category of software (databases are first). *Technology and Learning*, April 1994, p 14.

For other examples, see "The Ultimate in School Choice: No School at All," *Forbes*, October, 1993. The article describes various technologies that home schoolers have been able to utilize, such as CompuServe, Internet, Academy One, and a virtual clasroom, sponsored by the National Public Telecomputing Network.

12. Ryan's article discusses Hampden Papers in Holyoke, Massachusetts. Established 114 years ago, technology has increased demands on its employees in the last 20 years. Rather than firing underschooled and non-English speaking employees in order to hire high-tech trained workers, the company's president, Robert Fowler, started an education program for his employees. Many of the employees have received their GED; others are in college. The potential pay-off for the company is big. As Fowler says, "The success or failure of this company depends on the quality of the decisions made by every employee here, every day."
Michael Ryan, "Go to School, and I'll Pay for It." *Parade Magazine*, September 18, 1994.