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SCHOOL LIBRARIES For A Knowledge Society

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School Libraries For A Knowledge Society

Proceedings of the

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and the

Sixth International Forum on Research in School Librarianship

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edited by
Diljit Singh, Abrizah Abdullah
Suscelah Fonseka and Brian de Rozario

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Building Knowledge-Rich Environments for Youth: A World-wide Challenge for Schools and School Librarians

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Abstract

This paper outlines the development of a digital school library intranet as an information-rich and technology-rich environment designed to provide a nurturing and safe environment for both students and teachers throughout the school and extending into the home. Emphasis is given to the creation of individualized views of the intranet by both students and teachers complete with academic, career/professional, and personal information spaces. Built upon this environment, the author proposes strategies designed to stimulate the rise of a knowledge-rich environment or learning community using concepts of collaboration, information literacy, user control, and the phenomenon of small world networks.

Knowledge-rich environments, the amalgamation of information-rich spaces with technology and active learners, are emerging very rapidly in the early 21st century. They have the potential to nurture every learner in a world fraught with division and widening disparity.

For the past five years, this author has been mulling over the major shift in technology, the Internet, and the role of the school library. Trends in these three fronts have been both exciting and troubling.

In this paper, the author will outline an emerging view for the creation of a digital school library intranet which will, in turn, be the foundation of a knowledge-rich environment. In doing that, he recognizes that a world-wide audience of readers will have to do some translation to compensate for his lack of experience and he begs the reader to do that as a different perspective is proposed.

Information Environments: A Background

The information environment for millions of children around the globe consists of a family and social structure interpreting the environment surrounding it. Such cultures are generally under-appreciated in the modern world because the shrinking global community is uncertain how to coexist with the strengths those cultures bring.

The Hmong people, for example, had a very difficult time trying to adapt to the American society after the Vietnam War. In Denver, Colorado, where I lived at that time, Hmong men, transferred from a rich mountain experience and suddenly were shifted to a modern, highly competitive and capitalist society, were dying for no apparent reason other

than cultural shock. Of all the difficulties experienced, the change in cultural information systems to academic information environments was just as shocking as the change in food, terrain, and value systems. One could not succeed in American life using previous knowledge systems because a family's survival depended on quite a different set of rules. The traditional information systems were not robust enough to adapt when the immediate need was to provide a living for one's family using almost none of the previously-known skills.

Millions of other children in the world, in addition to their cultural knowledge-based systems, have the minds of their teachers. They may have no books, computers, or even paper and pencils, but in addition to their family and environmental knowledge system, they have the experience of teachers with knowledge systems beyond their local culture. In American newspapers, many stories of the reopening of schools for Afghanistan children have been circulated in a celebration of children and teachers who want to grow and develop and be able to seize opportunity.

Still other millions of children may draw not only upon their culture and their teacher, but have the advantage of a textbook as an added information system. Textbooks have been wonderful inventions because they combine the expertise of many subject specialists coalesced through the eyes of a textbook author into a very versatile data storage mechanism. These information packages are very convenient and available for use both in school and out of school depending on the circumstances and affluence of the school.

Added to this culture-teacher-textbook environment may be a library – ranging around the world from simple to complex, and varying both in size and contents from exclusively print to multimedia materials. Costs of these information environments for materials, information, and the various technologies to make them viable, include a human component known as the librarian. At first, the role of the librarian was to create a knowledge system though known storage and retrieval principles developed by inventive library professionals – Ranganathan of India and Dewey of the United States, to name two examples.

In the later part of the 20th century, the school library community has been working on a broader picture of the library or information system as it interfaces with students and teachers. Not content to continue only with storage and retrieval roles, school librarians have stepped into a collaborative partnership role for teachers in the creation of exciting learning experiences. They excel at using whatever resources and technologies are available to make a positive impact on teaching and learning. This interface and collaborative role change has been a difficult transition, not just for the librarian who had to adapt to a role shift, but also for students and teachers who also had to shift focus. Users now could expect not just storage and retrieval, but a dynamic learning environment.

In selected locations around the world, a few teachers and students are experiencing this collaborative information environment. In these educational communities, the information is plentiful, the staff of the library large, and the collaborative environment rich. But this model ebbs and grows based on the affluence of the community, the vision of educational leaders, and the competence of the librarian.

Numerous research studies show that the strong collaborative model of school libraries stimulates "achievement" or learner outcomes. Key factors in raising achievement include size of collection, size of professional and support staff, and amount of teacher-

librarian collaboration. (Lance and Loertscher, 2001) These factors or variables seem to work in concert particularly when comparing high achieving schools to low achieving schools.

Efforts to spread this collaborative school library model have received mixed results even in the United States from which the research emanates. Collaborative model information systems are expensive, require leadership, vision, support, and expertise – ingredients that may not be in abundant supply in an individual local jurisdiction. The results seem to be a patchwork quilt of success, not only in the United States, but also in Canada, the United Kingdom, Sweden, Australia, and New Zealand – countries with which the author is familiar. The building of collaborative information systems in schools has not paralleled electrification, the spread of communications technology, or global business systems because the impact has not been valued highly enough to be considered as essential. Where it is regarded, the investment has not been sufficient to come even close to its theoretical potential.

Enter the Internet. Everything changes, or at least, needs to be re-examined.

The purpose of this paper is to rethink the information environment of children, young adults, and teachers as high-tech becomes ubiquitous throughout the world. The information system which I will describe is very close to being operational in a few locations in North America and with some capital for development and refinement could serve as a model easily implemented almost anywhere.

The Expanding Knowledge Base.

In the eighteenth century, Dennis Diderot felt that the universe contained a finite amount of knowledge and that almost all of what could be known was known. Thus, he created an *Encyclopèdie*, feeling that all knowledge could be captured and summarized in a single set of volumes. Melville Dewy also felt in the late 19th century that his classification system would go through only a few editions before it could classify the sum total of all knowledge.

Looking back from today's vantage point, we have seen an explosion of knowledge, and while encyclopedias are still a valuable asset, they summarize only the barest of essentials. To be sure, Stephen Hawking postulates: "Will we succeed in our quest for a complete unified theory that will govern the universe and everything that it contains? . . ." We may have already identified the Theory of Everything (ToE) as M-theory." (Hawking, 2001, p. 175) Hawking wrote his popular book: *A Brief History of Time* in 1988 and noted in the introduction of his latest work how much more is known in 2001 than in 1988. He and other scholars see much left to learn before a Diderot or M-theory sense of euphoria overtakes us.

A group of well-meaning educational and governmental leaders in the United State have been trying to solve the ever-expanding curriculum with a system known as standards-based education. Instead of allowing a rapidly expanding content model, they have opted to define a central core of knowledge that every young person should know and be able to apply. Standardized testing across the grade levels has been created to measure how well this core has been internalized. The spectacular progress expected, dictated, and pressure has not yet occurred according to the NAEP reports regularly issued by the U.S. Government. (NAEP, 2000) If we look across educational practice for the past 50 years, the current model is likely to be superceded in a fairly short period of time since the pressure of expanding knowledge quickly renders even core knowledge obsolete.

The rapidly expanding knowledge base plays havoc with libraries as well as educators, because the high cost of keeping pace is beyond many normal budgets, at least at the funding levels of the past and particularly during times of economic decline. It seems that every time the Hubble telescope is pointed in a new direction, entire library shelves are rendered hopelessly out-of-date. The quandary for every librarian has been weeding criteria: What percent of inaccuracy should I allow before the harm done by this book surpasses its benefit?

In the Age of the Internet

The Internet as an information environment for children and young adults has created a fascinating competitor to libraries of all types. Search engines such as Google are so easy and immediate that many young people, faced with a research assignment, just "google" their way through the Internet rather than struggle through the hoops of a more traditional library environment.

To be sure, the Internet is:

- Overwhelmingly large.
- Mostly irrelevant and largely unreliable.
- Full of advertising, pornography, and other entities designed to lure young people into becoming paying customers or in other unwholesome activities.
- Getting outdated as many sites age without funding or time for volunteers to update them.
- Becoming less and less "free" as corporate entities try to recover costs or make a profit.
- In some danger of collapsing as its size overwhelms capacity.

Yet in spite of these drawbacks, youth are attracted in such large percentages that library collections, even though superior in content, are ignored. Users gravitate to information systems and technology that suit their needs, whether or not those systems are superior. Handheld devices may rule in the marketplace, not because of screen size or quality of graphics, but because portability overwhelms the negative factors.

Librarians need to realize that to stay relevant, they must embrace the information needs of children and young people on their own terms, not those of well-meaning adults. Many school libraries are rarely accessible at the times when information needs are critical. They are down the hall, filled with classes already, closed in the evenings, and often their most valuable information resources, the reference collections, are chained to their shelves. Google, on the other hand, is always there as long as the connection is working. And in the age of wireless, it is ubiquitous as well as available 24 hours a day, seven days a week.

What sort of school library information system would young people be attracted to? What system would be so valuable and so convenient that students and their teachers would want to start there first before venturing forth into the information smog of the Internet?

The Library as the Digital Hub of the School

In the United States, many school administrators understand that when they give a speech about the library, they should refer to their library as "the hub of the school." In the age of digital information systems, that phrase can be truer than ever before. I would propose that every school library in the world that is able, construct a portal/web page that constitutes the central hub of information essential to every student and teacher. This portal would be the

home page of every student's and teacher's computing device as it is turned on. The school library would be every student's and teacher's essential information system. To these users, "It all begins at the school library," since it is the gateway to the world. It is *the* place to start: *A safe and nurturing information environment.*

In the next few sections of this paper, three views of the total digital school library intranet are provided. Three major components are explored:

- The academic environment
- Career and personal space
- Personal space

The academic environment will receive the most attention. At the conclusion of this exploration, observations will be given concerning the transformation of these spaces into a knowledge-rich environment.

THE ACADEMIC ENVIRONMENT

A Safe, Nurturing Environment

The first essential element of an information environment that would truly nurture every student and teacher is a closed system with a firewall of protection from the outside world, an intranet rather than an Internet. For hundreds of years, libraries have built collections of materials, information, and technology selected for a particular group of users. It never contained everything, but it did contain the highest quality materials targeted at users in a specific community. It was as large as the librarian could influence the community to purchase.

School librarians have not sought to build libraries containing all that is known. Such collections would not be desirable in any elementary or secondary school. Even in the digital age, librarians would build a smaller (a relative term) system, yet it would be "enough," to challenge every learner.

The digital information system would also be a safe environment from a number of elements that have become so common on the Internet: advertising, pornography, hackers, and push elements from persons or groups trying to gain access to youth for a variety of nefarious reasons. Just as we might protect our homes or school grounds from harmful elements in the community, the digital information system would also be protected from destructive forces. Such a protective environment has nothing to do with the issue of intellectual freedom or with filtering as it is known currently. And this protection extends not just within the library walls, but into the classrooms of the school and into the homes of students and teachers who are accessing this school library intranet.

The intranet envisioned here is no different than many created for professionals in corporate and research environments around the world. Many organizations have intranets protected from the outside world. Within these systems, email and instant messaging can take place, but only within the internal environment. Students might have additional email and instant messaging as a part of independent accounts from home. Figure one shows this protected information environment or the walls of the digital school library.

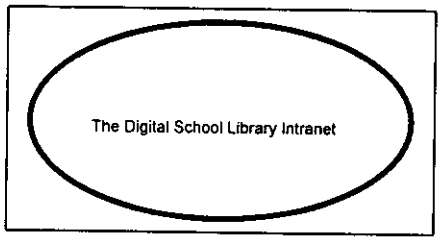


Fig. 1: The Digital School Library Intranet

Customization for every user.

Librarians are accustomed to building "one-size-fits-all" information systems. They build catalogs using search mechanisms and search terminology that all users, adult or child, sophisticated or novice must use to find materials successfully. A number of libraries targeted at children have subscribed to automation programs that provide simpler and more appealing interfaces. However, even with these specialized catalogs, the interface is still one-size-fits-all at the child level.

A much more optimal interface would allow each user to create and build their own view of the information space within the school library intranet. A child at a certain grade level might wish to view information targeted at their grade level, assignments from only their teachers, e-textbooks for their classes, plus access to information suited to personal interests. This interface could expand or contract within the intranet at the discretion of the user under the guidance of the librarian and the teacher.

Close to the beginning of the school year, students would enter the main school library intranet and after some exploration of that environment, would design their own home page within that space, gaining access codes/authority at that time which then could be used on whatever electronic device they were using either at home or within the school.

For example, students would identify teachers, courses, needed tools, areas of interest, topics for which they want to be notified regularly, languages spoken, cultural and religious preferences, level of ability; and they would set up email/instant messaging accounts inside the protected information space. At any time during the year, students, perhaps in consultation with teachers and librarians, could reset their parameters, or they might just choose to see the entire intranet.

The same features could be constructed by teachers who would want to be in contact only with their own students, their classes, their e-textbooks, and resources for their classes. If they were collaborating with teachers outside their own discipline, other spaces could be opened up temporarily as needed. Following a common pattern already known in the larger library world, these personalized information spaces might be termed "my school library" as shown in figure two.

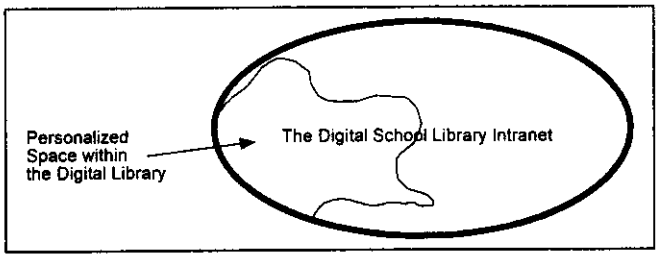


Fig. 2: Personalized Space Within the Digital Library

BUILDING THE DIGITAL CONTENTS OF THE ACADEMIC INFORMATION SPACE

An information-rich environment.

Building a digital information-rich environment for teachers and students draws upon long-known principles of selection: a solid match with the curriculum, appropriate difficulty level, authority, high quality, among others. Publishers and jobbers are still learning how to support the needs of young learners in the digital world and provide affordable resources.

Digital resources for school library collections might contain three levels within the intranet. These are the core collection, the curriculum collection, and the elastic collection.

The core collection. Similar to the reference collection of traditional libraries, the core collection contains materials meeting the longstanding Bradford distribution principal that 20% of the collection can usually account for 80% of the inquiries. Thus, encyclopedias, dictionaries, atlases, core databases, and captured web sites spanning common curricular topics would be selected. In the United States, school districts and even states have licensed many of these core works not only for the schools, but for every citizen within their state. By doing so, these core works cost much less per capita, and when carefully selected, can provide a rich starter collection available equitably across whole populations. Individual school librarians might create such a core collection, take advantage of core works created by larger entities for use by school students, or add to core collections as needed until the Bradford phenomenon appears to be operational. Figure three shows this concept.

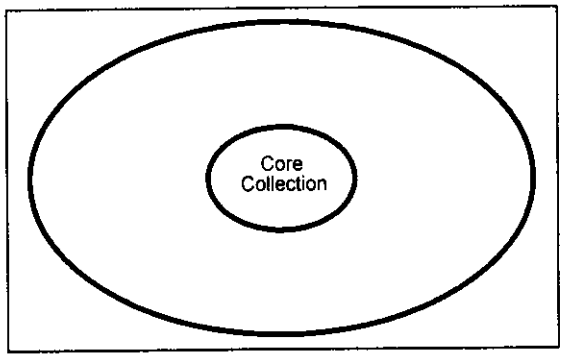


Fig. 3: The Core Collection

The curriculum collection. Using well-known collection development principles, a school librarian would then add resources to the core collection designed to serve a particular

curriculum. These might include e-textbooks, collections to support reading initiatives, science and social studies materials, original sources, graphical sources, and curricular information in a variety of languages and difficulty levels. From major projects, such as Access Pennsylvania done in the United States a number of years ago when school library catalogs were joined to form a single online catalog, we learned an important principle about school librarians. They choose collections matching their curriculums that are as different as they are alike across schools.

Some may presume that a school district might build a digital collection that would serve the needs of every elementary school. Not so. With professionals as "chief information officers" at the building level, digital collections would be as diverse and unique as required by the needs of a particular school's curriculum, and student population as shown in figure four.

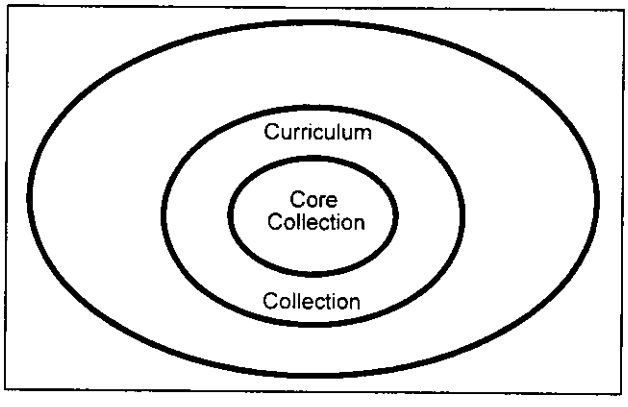


Fig. 4: The Curriculum Collection

The elastic collection. Information vendors often pitch their information databases to schools and libraries based on a subscription lasting for an entire school year. The idea of the elastic collection would be to open, on the basis of need. but on a short term basis, certain information channels to serve short-term information needs. For example, an advanced high school chemistry class might need access to *Chemical Abstracts* but could never afford to subscribe to such a sophisticated data repository for a year. The librarian might contract with the company to open that database for three hours at an appropriate time when the students and teachers were doing high-level research. Access would then be ended. For some companies, the librarian might buy a "phone card" in advance that would allow access to a variety of specialized databases based on the minutes used or queries made.

Such access to specialized resources would be termed "elastic" since the school library collection would vary in size from day to day depending on the requirements of teachers and the needs of students at any given moment. (see figure five) This concept follows the well-known principle that in the digital age, there is a great deal of difference between what a library "owns" as opposed to what it "provides access to."

The elastic concept would work in the world of fiction as easily as in the advanced database arena. For example. As *Harry Potter* books are released, the school librarian might lease 300 digital copies for two weeks, dropping to ten copies thereafter. Or, one could imagine that as holidays are observed or popular topics become fads, the digital collection would swell or contract as required by the users. Students and teachers might indeed control the size of the collection at any given moment as they clicked on the *Harry Potter* book collection. Instead of contracting for a certain number of copies, the users would govern the

number of copies required as they clicked their way through the system. A teacher having all students read the same novel would "order" the number of e-copies needed for a short period of time.

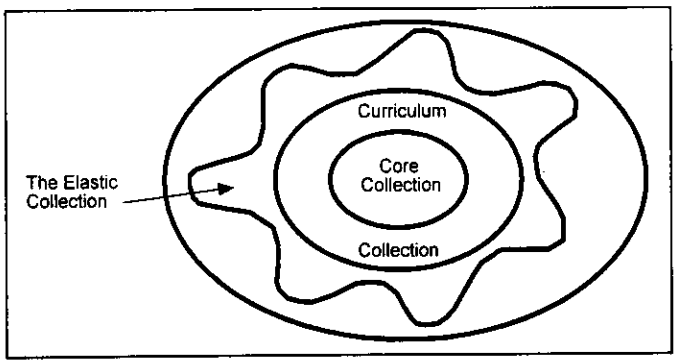


Fig. 5: The Elastic Collection

The Internet and the Intranet

No matter how large the school library intranet is, students and teachers can benefit greatly from access to the Internet. In the view posited here, access to the Internet would be a feature that each student would have to "turn on" as their own customized web page was created. However, rather than lodge the responsibility of Internet access on to the shoulders of the school librarian or the teacher, the parent would have full control.

Various levels of access to the Internet might be authorized by a parent or caregiver depending on the technology available:

Level one Internet access. Level one access of "white-listed sites" (those URLs that could be accessed from the intranet but not further) would consist of selected web sites using normal library selection criteria for authority, usefulness, and appropriateness. At least one commercial vendor already has 180,000 carefully selected websites that would be useful to children and young adults. This core collection can be "leased" by the school librarian and it is updated/maintained daily by the commercial vendor. Such a collection might be a part of the core collection described earlier. Or, the librarian might lease selected chunks of the whole collection offered either for the intranet or for level one access. Other desirable websites of a curricular nature would be added by the school librarian (chief information officer) as a part of the curriculum collection above. And as part of changing curricular needs, the chief information officer could open access to specialized web sites for a few hours as part of a specialized study (controversial sites, very sophisticated sites, or other sites where temporary rather than regular access would be desirable). In addition, fee sites would be a part of the elastic Internet collection as described earlier. Parents would sign up for this level of access and would be assured that selection criteria would have been applied to all of the sites within this collection. If there were sites that parents would rather not have their children access, these sites could be eliminated for the level one access collection that could be seen by an individual student. In the *Harry Potter* example above, some parents might not wish to have these titles accessible to their children and that would be their choice.

Level two Internet access. Level two might be subdivided into a number of various levels depending on the growth and sophistication of the technology available. One might

think of turning on "blocks" of Internet sites, all of which would be screened or selected by a librarian or teacher, areas of the full Internet, but not the entire Internet; larger than level one, not everything. Parents would need to understand the choices this level of access would provide to their children or teens and would have the power to open or close this access at will.

Level three Internet access. Parents might feel that their child or teenager is responsible enough and information literate enough to tackle the entire Internet as a part of their school experience. In this case, the parent could turn on full access or at least full "filtered" access as deemed relevant to their own child's needs. Again the parent would have to understand fully the responsibilities connected to the online switch and could control access, opening and closing it as appropriate.

The picture of the whole

Figure six illustrates the central components of the school library digital collection as a safe, smaller (a relative term), and high quality information system. It emanates from the school library into every learning space in the school and into the homes or locations where learners are served. It would spread out to home schoolers, those who for any reason could not physically come to school, and would reach out to include distant sites or "sister schools" as partnering occurs locally, national, or internationally. Yet it is behind a fire wall.

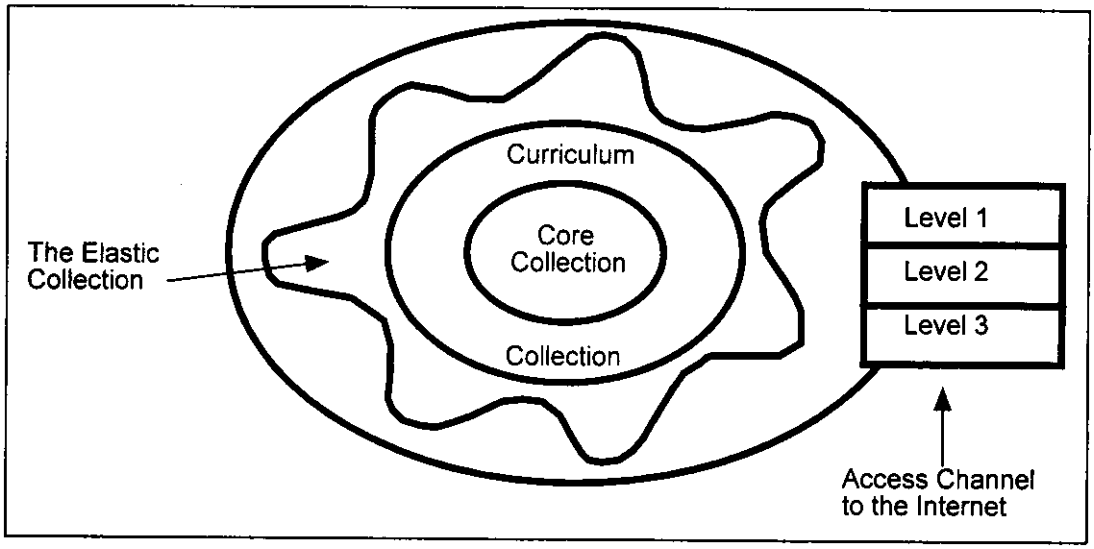


Fig. 6: The Digital School Library and the Internet

Personalized Features of the Academic Space

Within the intranet, every student and teacher should be provided with various other information technologies designed to maximize a learner's opportunities and potential. The current state of technology allows a description of three features, but others are likely to develop. Those described here include tools, push technology, and pull technology.

Tools. Young people and their teachers will need the tools to operate within digital space that will boost their potential to learn and provide both sophistication and efficiency in support of the learning process. Current tools that come immediately to mind include:

- An office suite (word processor, database, spreadsheet including mentoring software such as spelling checks, grammar checks, wizards, or other guidance software such as stimulation toward critical or creative thinking).
- Graphics packages (drawing, graphic art software, concept mapping programs, among others)
- Web construction editors.
- Presentation software (tools such as PowerPoint or Photoshop).
- Communication tools (allowing voice and visual contact with other learners or experts and allowing students and teachers to transmit projects, messages, graphics, or conduct planning).
- Translation packages (both language translation and cross-platform translation or conversion).
- Assistive technology (for blind, disabled or other physical challenges).
- Communication tools (certainly within the educational environment and beyond as parents and protective technologies allow).
- Course/classroom software (programs such as "Web CT" or "Blackboard" where courses are conducted).
- Remote sensing devices (allowing collection of data, experimentation, or experiencing whether onsite or from afar).
- Tutorials for using any of the system tools or their upgrades.
- Management tools for teachers such as grade books and attendance software.

Whether these tools will be resident on the school library server, on the client's device, or a combination of both will depend on the sophistication of technology, band width, and a host of other technological issues known now or in the future. Many institutions already license software packages for entire work groups, an entire student body, or small groups with specialized needs. Thus the pattern for this work environment is already in place and will become more and more flexible as schools exhibit the need to equip each individual with the tools required to flourish. These work tools will need to be updated on a regular basis as innovation and technology advance. Software operation will need to be seamless across the computing devices in the school, personal technologies and home-based or mobile technologies.

Push technology. Both learners and teachers can expect software on the intranet that will allow them to become aware of things that will benefit them. Current push technologies might include:

- Automatic notification software – including calendaring, notification of assignments; alerting messages about new software available; messages alerting the user to new articles on topics of personal interest or research; opportunities available for scholarships, learning opportunities; student activities and service projects; and a whole host of other messages to grow and develop as a responsible member of the learning community. For teachers, this technology would provide notices of new professional articles or research reports of interest; alerts concerning policy changes or opportunities for professional development to list just a few.
- Messages/news from administrators, librarians, teachers, parents. For both students and teachers, messages of upcoming events, announcements, reminders, opportunities are designed to help the individual plan and work successfully within the educational environment.

Pull technology. Pull technologies include the various search engines and meta-search engines to allow the user to locate desired information within the information system. Over the past two decades, search engines have become better and better, and there is reason to believe they will become smarter and more adaptable to a particular individual's needs. Progress is being made toward a single rather than multiple search engines that will search a wide variety of information databases and sites rather than using multiple engines with a plethora of icons cluttering the computer desktop. A single meta-search engine might allow us to search first within the intranet and as the parent allows, then outside that environment in the world of the Internet. At the present, the emphasis on building search engines is on *precision*, that is, to provide a selected few sources that meet a need exactly. Dr. David Barr, however, reminds us that learners who are becoming mini-experts in a topic or teachers who want to build comprehensive knowledge, require *recall* as well (where every relevant document is retrieved) (Barr, 2002, p. 21-26).

CAREER AND PROFESSIONAL SPACE

Both within the intranet world of the digital school library and outside its walls in an independent space, each student and teacher might construct a second space devoted to career interests that eventually expand into a professional or vocational information space. This nurturing information environment would support hopes and dreams, plans, and the building of expertise. As a career, a profession or trade is embraced, the information space evolves to support and extend.

For example, a youth headed toward medicine would be able to explore educational opportunities, find help in preparing for college, expect support while in college, and build a career information-rich environment as a physician. For a teacher, this space would provide the informational foundation or "professional library" that would help that teacher stay current, grow, participate in professional development, and grow in other ways to increase their personal expertise. In a number of countries, the adult years are not focused on a single job but seem to be changing at varying intervals. The information space would be at the command of its user. One thinks of an information cone spiraling outward as the child grows and develops toward adult life. And as an adult, the same space nurtures a specific career or helps that adult grow or change to a new career. To reiterate, this space contains:

- Expert topics I am pursuing.
- Career exploration at any stage of life.
- Educational opportunities throughout life.
- Professional or trade group support.

THE PERSONAL INFORMATION SPACE

Outside the digital school library intranet, every student and teacher would construct their own personal information space. This would be in addition to the academic and career space outlined above.

Building a personal space

Young people already connected to the Internet quickly build their own personal information space whether or not they change the look or feel of their home page. As their experience grows, they know exactly how and where to click to get to pieces and parts of their personal space. Customization is already well-known such as My Yahoo. Jakob Nielsen reported recently a number of problems connected with personalizing websites and building

for the child. (Nielsen, 2002) Customization of interfaces is being developed at the University of Maryland and will no doubt develop rapidly as school librarians in league with students develop ideas for viable interfaces. Young people already know what they want in their personal space:

Games. Number one. Numero Uno. From simple to elaborate, the youthful crowd knows what they want, what devices are needed, and how much they cost.

Communication. Young people want to communicate with friends, family, and the school community in that order. Telephones, e-mail, chats and instant messaging currently are center stage in this arena, and this will grow as telephones and personal data devices merge into a single device. Teachers, librarians, and student work groups already benefiting from instant and ubiquitous communication technology have not always learned how to channel this communications technology well or how to focus an individual's attention. Perhaps a set of function switches could be developed to turn on or off selected information spaces at given times.

Family space. As digital information expands, so do opportunities to communicate and function in ways to enhance family ties and nurturing, particularly in mobile, extended, and divided families common in some cultures.

Private space. Many young people have special needs including mental health, physical health, spiritual health and other personal needs that a more private space would satisfy, free from prying eyes and outside forces designed to attract or pull in unwanted ways.

Advantages of the Digital School Library Intranet

Numerous advantages drive the construction of a digital school library, at least one that is ubiquitous, reliable, and available 24/7/365 (twenty four hours a day, seven days a week, and 365 days a year). The following may not be a complete list:

- The digital school library becomes the **primary information system** – the true hub of the school. Finally, on every digital device, computer screen, or instructional space at school or at home, the school library has an essential place as "the place where I begin."
- Digital libraries are available for students who are being **home schooled** yet who need access to the same information-rich environment that government supporters have provided for those attending public schools.
- If a student for some reason moves to a distant location for a season, the digital school library is **available anywhere and at any time**. It might also provide **distance educational opportunities** for young people with special academic needs not available at the local school.
- By utilizing the personalized space that every user can create, the digital school library can provide many more **cultural and religious** materials that can be accessed or ignored under user control.
- The digital library provides for **individual differences** in ways print libraries could not do very well. Using the personalized space construction tools, the library can serve:
    - Age ranges
    - Ability levels
    - Personal preferences
    - Languages

  - Sophistication levels
- **Equity** issues are served very well by the digital school library and are particularly effective with funding agencies trying to serve every child.
- **Access** to information in the digital world will not depend on access to a single physical location with the traditional organizational restrictions to when, where, and at what time information resources can be used. This concept is discussed further in the section of this article dealing with issues.
- Digital school libraries can be **"device enabled."** The information will be compatible with a wide range of devices whether they be computers, hand-held devices, or other technical devices now being developed.
- The technology is now available to provide an information system for young people including **individualized customization.** The "my space" concept is already growing rapidly in many sectors of business and industry.
- Analysis of the digital possibilities allow us to think in terms of a **"smaller," but high quality** information environment. Here, searches come up with both reasonable and/or rich results as queries are made.
- The digital school library intranet vs. Internet concept **transfers responsibility** of information access to the full Internet to parents/care givers where it belongs.
- **Safe information environments** are created away from and protected from the rush-hour traffic on the Internet highway. *Predators of all types are locked out.*
- Digital school libraries still embrace the principles of **intellectual freedom** since all materials within the library are carefully selected under the guidance of selection policies as has been the case for a century. The tug-of-war of ideas is still alive and well.
- Librarians will continue to build a **selected collection** utilizing their time-honored expertise. They recognize the needed core materials, materials that will support specific curricular agendas, and they will know which resources belong in the elastic collection for specialized uses.

Issues Related the Digital School Library

Numerous issues surround the creation of a digital school library. Some have already arisen. Others await more experience, and the development of software and hardware.

Access

The major issue of the digital school library is really identical to the print school library: access. Who can gain access, when, for what periods of time, through what devices, at what speed, and from what locations? It will not take a great deal of effort or networking to surpass the access to the print library that is currently visited frequently by a few, occasionally by many, and never by more users than we care to admit. In the United States, access to computers has risen very rapidly in the past ten years. In nations where wireless technologies are ubiquitous, hand held devices are becoming extremely common so that access issues are decreasing in importance.

The concept of enough

How much information and technology is "enough?" Two factors have limited the size of information space in the print world: what the community would afford, and the limits placed upon the user by the librarian. Governments: national, regional, and local, the world over, claiming poverty, have generally under-funded information systems for young people.

When included in full organizational budgets, expenditures for school libraries have often been low and are given low priority. That is because in any school, salaries, buildings, and maintenance often approach 90% of any funds available so that all services fight over the small percentage left. Of that 10% or so, an adequately funded library will require the largest chunk next to the textbook budget. No wonder the crows surround the body.

In their own way, librarians have also severely restricted access to library materials claiming that some users must be denied access because they are irresponsible. Most librarians restrict access to print reference and periodical collections because of the need to have those materials available during open hours. Still others restrict circulation to one or two items in a given period. Such restrictions have the organization's interest at heart rather than the needs of the users.

Even though library standards in various countries have advocated the idea that "bigger collections are better," in-house restrictions have severely tested this concept. This author knows no research testing "how much is too much."

In the digital world, we already know from experience rather than from research that access to the full Internet produces instant information overload and data smog. So, how much is "enough?" In the proposed high quality, yet safe school library intranet, that concept may be tested not by professionals, but as a deduction based on user control over their own information space. As users create their own portals within our portals, we will be able to study the information spaces they create for themselves to learn better what to regularly stock in the digital collection, what to provide from the elastic collection, and the response of parents to various size channel settings to the Internet. And they should be able to communicate with us about the boundaries, barriers, and problems encountered in the library space. If we find that they are seeking nurturing elsewhere, we will want to re-adjust our boundaries until we find an optimal and liberating size rather than a confining space.

We will also find those of our users who don't care anything about "a rich information space." They see no relevance in becoming educated or in growing and developing in any intellectual way because they don't see a payback. This may be true about their academic information space, but their personal space containing recreational materials may be huge. For example, Apple Computer makes the iPod – a 5 gigabyte cigarette-sized solid drive on which 2,000 songs may be recorded. Early users filled that space up with MP3 recordings in a few days and clamored for more. A 20 gigabyte version is now available. At what point between 2,000 and 8,000 songs will the system become too much for its owner? Or, will the appetite be satisfied at 100,000 songs? Or at home, how large are video libraries growing? A study of behavior in the popular culture may give us clues about "enough" in academic information space. One wonders how many science fiction or fantasy e-books a young person might want to store on their personal digital device. And, if that is possible, how many e-books, articles, dig site updates, and other information about dinosaurs would they want to "own?" Already we know how comforting ownership feels.

The redesign of workspace

Much needs to be done in the design of workspace for children and young people. In the tools section discussed above, we envision surrounding each student with the tools needed to be an efficient learner. Numerous companies have developed child-friendly versions of tools originally designed for adults. Missing, however, at the moment at least, is a workspace

designed for a child where both process and content learning can be developed and delivered to teachers.

One thinks of the need for students to question, find, consume, create, present, and reflect using a tool which would be a record of learning. For example, if the teacher sees only the research paper with the bibliography, the teacher can often not track the sources used by the student, particularly when those are urls that are often unavailable shortly after they are cited.

Imagine a workspace where both the process and the product can be examined. For example, the central part of the screen is the product, the research paper. It might be a multimedia product, but for simplicity sake, let us assume that it is a report or research paper. Surrounding the product space on the screen is the process space that can be consulted with simple clicks by the reader of the paper. Clicks might include the process log, concept maps, full-text resources used in the paper's construction, captured web sites, notes from sources used, logs of research queries, rubrics, and any other useful record of the path matching the product being evaluated.

More comprehensive and easy-to-use software designed by and for youth would lessen greatly the "cut and clip" methodology used so widely. Teachers would be able to assess not only what had been learned, but how that content had been developed.

Breaking the googling habit

While difficult to break the googling habit for students who have searching patterns well established, the good thing about schools is the turnover each year. We can groom our digital library and start again with a new group. First, the digital library must be designed cleverly to attract and nurture a potential student. Then we press our advantage. We might use the strategy of the German corporation Dymler-Chrysler that took a bold step forward in the design of the PT Cruiser automobile. Their automobile is probably no more reliable or superior mechanically from any other, but the unique design caught instant attention and demand spiraled. In the library world we can do better. We can have both a unique design and a much-superior information space. It should not be terribly difficult to grab the attention of our users. Perhaps they can help. Someone has said that the currency of the 21st century is attention.

Working with the commercial world: fair use vs. copyright

Librarians have always been concerned about creating a balance between copyright issues and fair use in the educational world. Given the current confusion within the music world, educational publishers have been reticent to open electronic channels lest intellectual property and publishing revenues be ravished by wholesale copying.

By creating an intranet as the school library, the long-standing protection of intellectual property remains intact. School libraries have always purchased the periodicals, books, and multimedia for their collections or obtained licenses for such things as television programs having time limits on their storage longevity. A printed book is purchased once and made available to many many users over time as long as that book is retained in the collection. We expect the same to be true in the digital school library. Let us not forget. Some companies are providing e-books with a certain number of chairs. An e-book with one chair limits the use of that book to one user at a time but includes unlimited uses.

What is different is the idea of ownership vs. "access to." Subscribing to a periodical in pre-digital days meant that the information would be available to users of the library as long as the librarian cared to archive the periodical run and that usage was unlimited to the patrons of the library. Such agreements in the licensing world are critical, since if a temporary dip in budgets were to occur, the library would still have previous runs of periodical data rather than none at all. For example, if I purchased access to 500 copies of an e-text, that access right should continue for as long as I would care to archive it, or I could keep such e-texts continuously updated through a system of licensing.

In the digital world, publishers and librarians will have to learn how to work with each other to negotiate ownership vs. access rights. The notion that all access by a student to the information pool would be on a metered system might be very attractive to the publishing world but unacceptable to the library and education world who would be held hostage by those who controlled access to content. On the other hand, by creating an intranet, publishers could license materials to a small group of users without the fear of losing control across schools.

Several methods for purchase, licensing, "try before you buy," or free access are already being tested in the digital market. Librarians will continue to vote for the systems they prefer with the money they spend. School librarians will continue to champion the copyright laws but will also insist on the fair-use needs of their students.

Will books survive?

The user will decide. They have already decided in the world of periodicals preferring online, full-text, and downloadable in a few seconds to searching magazine rooms when and if they could get to the library. The same will be true for books. When and if e-books become widely available on ubiquitous personal devices, our users will vote with their usage patterns. We need not make the decision for them. Users already killed 16mm films even though that was a superior format to videotape. Now videotape is under attack. Filmstrips are dead. So are single concept 8mm film loops. No one is crying.

Budgets and the concept of the *information utility*

Digital libraries cost more. True, the cost per information unit per person may be less, but the digital library easily surpasses the size of the largest school library and so costs including the reliable networks to maintain them are higher than their paper counterparts. That's the way it is. Face it librarians, administrators, boards, and taxpayers!

We seem to be emerging into an information utility concept. There are costs associated with school busses, heat, lights, and now information. Don't pay the gasoline bill – cancel school. Don't pay the information utility bill, cancel school. Interestingly enough, my calculations show that the cost per child for e-texts and all digital library materials would actually be less per month than the cable or satellite television access bill in the home. At U.S. current rates, most families are spending somewhere between $35-50 per month for television – a handsome sum if used to build a digital school library.

Commercial competition

Publishers of all types have competed for library budgets in the past. They will in the future. The librarian creating the digital library will vote with their money for the highest quality information at the most reasonable prices. No differences here. If some commercial

providers try to capture a monopoly, upstart digital publishers will arise to challenge them as long as the free market system is in place.

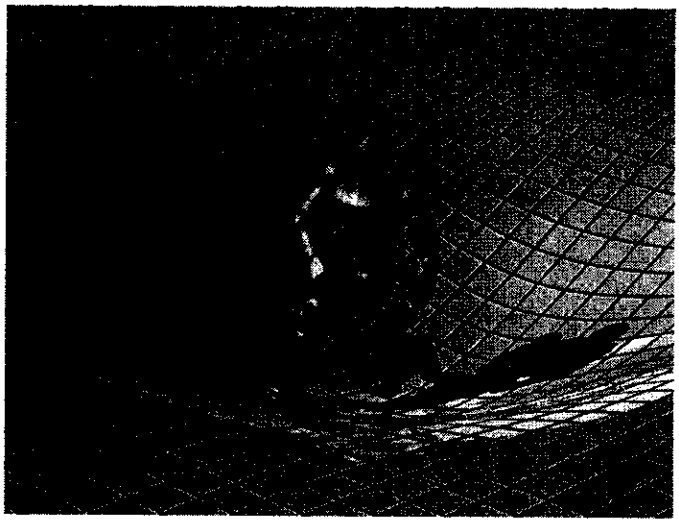
Staffing

Some of the components of the digital school library can be funded and shaped at district, regional, state, and federal levels or their counterparts in various countries of the world. We have some temptation to build one system and serve it out to everyone. While theoretically this could be done, there are a number of important reasons why this will be insufficient. After an extensive review of the research literature on information literacy, Loertscher and Woolls concluded that in the world as we know it, the human interface is a vital component of the information system. (Loertscher and Woolls, 2002, p. 21)

Unless computer systems and delivery mechanisms become extremely intelligent, just linking young people in and turning it on will be insufficient. If and when that scenario happens, we will learn what is best. Meanwhile, this generation needs full-time professional, technical, and paraprofessional assistance to transform the tools and technologies now known into learning.

The Rise of the Knowledge-Rich Environment and A Final Prediction

We have spent a fair amount of space considering the components of the information infrastructure, concentrating for the most part on its content and its structure. Figure seven shows the young person cradled and surrounded by a nurturing information environment.



Such an information-rich and technology-rich environment could still not constitute a knowledge-rich environment if it remains just a tool with potential or a system bypassed by the users for whom it was created.

A knowledge-rich environment suggests the idea of transformation; a space in which data, information, tools, and technology are changed from tools into an active and dynamic learning laboratory where knowledge is born, nurtured, captured, and shared as it operates dynamically.

How might such a dynamic learning environment be stimulated? We might already have discovered the key elements in the work of Lance and others who have studied the connection between school libraries and achievement. (Lance and Loertscher, 2001)

Collaborative planning and the digital school library

Collaborative planning, the integration of library and learning experience through teacher and librarian collaborative planning has long been touted as a key element in library transformation. Urged on by many theorists in the field, many school librarians have experimented over the last 20 years with this outward reach concept. To be sure, they have been in the minority for a number of reasons, mostly because of the road blocks of fixed scheduling of the library in the elementary school. But at all levels, it is evident in the experience of the author after many conversations in almost every state of the United States and in other countries, that the librarians who have discovered the power of collaboration build quite a different world of learning and knowledge construction than their storage and retrieval professional counterparts. Hints of this effectiveness are becoming clearer in the Lance research and in a number of other studies that have included collaboration as a variable.

The role of information literacy

Likewise, school library theorists such as Eisenburg, Stripling, Kuhlthau and others have urged the school library community to insert in the mix of learning activities the introduction of information literacy instruction. Traditionally, this teaching was done as a course taught in "library class" over the school year or in a separate mini-course. Theorists, however have encouraged a different pattern where that instruction is integrated into learning experiences driven by whatever information task needed to master content learning at any given time. By inserting process learning / inquiry / information literacy into the learning activity, librarians discover that learners use information literacy skills to introduce efficiency into the mastery of content. For those young learners who experience the "aha," they become "power learners" defined as a person who is in command of their own learning. Librarians who become diagnosticians using tools such as those created by Koechlin and Zwaan (Koechlin and Zwaan, 2001) discover that they do not have to teach every child the same skills at the same dosage level to stimulate a quite different learning environment.

The responsibilities of the user

School library theorists of late have realized that providing the tools and the nurturing is not enough to see learners transform themselves from mere students into power learners. Mel Levine, a respected learning expert in the United States, one of many new thinkers and brain researchers, calls our attention to the responsibilities of the learner to participate actively in a high-quality teaching and information-rich environment. Levine uses a "concentration cockpit" technique with learners who are experiencing trouble in school. He sees learners imagining themselves as pilots of an aircraft with instrumentation in front of their eyes giving themselves feedback about their behavior, learning, and success in the learning community.

These learner pilots monitor three major systems to take off, fly, and land successfully (Levine, 2002, p. 279)

- Process controls (intake)
    - Mind activity control
    - Want and excitement control
    - Concentration depth control
    - Concentration time control

- Important intake control
- Mental energy controls
  - Alertness control
  - Consistency control
  - Mental effort control
  - Sleep control
- Production controls (output)
  - Preview control
  - Speed control
  - Past experience control
  - Possible choices control
  - Monitoring control

By studying carefully the ideas of Levine, and others, librarians can understand how the learner can be taught to and adjust to an information-rich environment. They can and must transform themselves into power learners.

Small world networks

Mark Buchanan in a recent book entitled *Nexus: Small World and the Groundbreaking Science of Networks* introduces us to the ideas of what happens when an effective librarian uses powerful information-rich networks, collaborating with the teacher, teaching integrated information literacy, and encouraging learner controls. To appreciate the phenomenon, the reader is encouraged to study Buchanan's synthesis from social, neural, information, financial, and even, disease perspectives. Librarians who are constructing information-rich networks layered with collaborative planning, information literacy skills and learner controls may be constructing an environment pictured in figure eight. By adding to this network a few random connections such as cross-disciplinary collaboration as pictured in figure nine actually build and experience a small world network phenomenon or "learning community," or "knowledge-rich environment." It is a phenomenon worthy not only of analysis, but also for research. Such an investigation of excellence, that is, the study of library programs in schools where the knowledge-rich environment has arisen, might give very rich clues to others who are trying to build such systems.

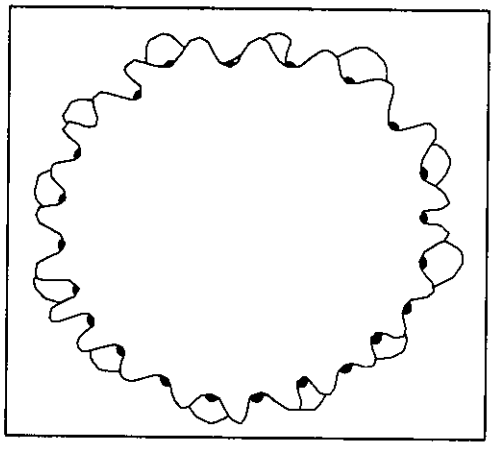


Fig. 8: Common Networks

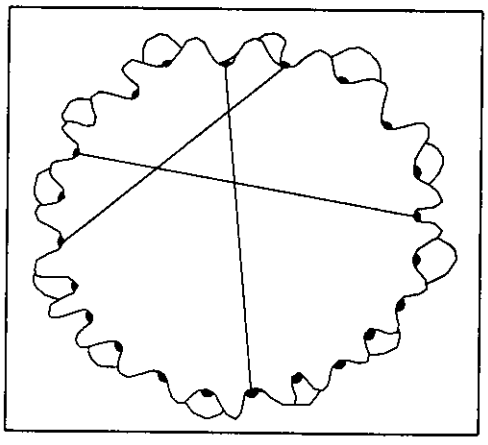


Fig. 9: Small World Networks

A final prediction

The technology will soon be available to create dynamic and three-dimensional virtual spaces within school library information-rich and technology-rich environments. In these environments, there can be numerous views of the information work space of the digital school library. Think of a spiral staircase where the central support column is the digital school library with individualized views for the librarian, teacher, student, administrator, and parent. Think of this work space as a dynamic record of the collaboratively built learning experiences between librarians and teachers. A space where the foundational information web supports and nurtures the learner as pictured in figure ten. The understanding of small world networks stimulated by information systems, collaborative planning, information literacy, and learner controls may prove to be the elusive mixture we have been seeking for some time. It is a notion worth pursuing to build a knowledge-rich environment for youth.

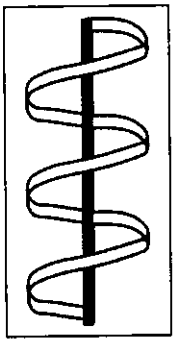


Fig. 10: The Digital Library Media Center as the Hub of the School

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