Just in Time Learning with Electric Library

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ABSTRACT
THE ARRIVAL OF DIGITAL LIBRARIES has necessitated the creation of a new defi-
nition of literacy. This author is an inventor of an online reference li-
brary service (Electric Library/Homework Helper) and posits that "free-
form" learning and information delivered on demand to a scholar is the
highest form of new media literacy. This "just in time learning" embodies
all of the most popular aspects of twenty-first century literacy as recently
defined and debated by educators and librarians. The author surveys
recent research and literature on the topic and defines twenty-first cen-
tury literacy in a new light, expanding on the traditional definition while
incorporating a discussion of the Electric Library as it pertains to this
new media trend.

INTRODUCTION
While the future is quickly bearing down upon us, the debate contin-
ues to rage over technology and its role in our schools and libraries. It is
assumed by many that computers alone are a panacea for what is wrong
with our education system today. Some argue that they are used for little
more than "drill and kill" exercises; still others complain that there is an
exigent lack of effective technology and curriculum integration. But con-
sider the alternative—a nineteenth-century curriculum based entirely on
paper textbooks. As such, most of these texts aim at a very low common
denominator, and many contain outdated information by the time they
are printed. It is difficult to debate what many know to be true: Technol-
ogy can do what textbooks cannot—interact.

As the entire world outside of the school and library becomes electronic (e.g., beepers, CD players, cell phones, video games), the problem of keeping students focused and learning is compounded. This MTV-style barrage of information and ideas from a wide array of sources that confronts today's students is truly mind boggling. It challenges the efforts of even the most gifted parent, teacher, and librarian. Now technology and other advances rapidly make obsolete much of the information imparted to students over the course of a child's formal education. The situation has become a crisis.

Students need to experience the joys of free-form learning and self guided discovery rather than being tethered by the constraints of outdated tomes, overcrowded classrooms, and information overload. A passion for learning—a reward for seeking—must be offered if they are to succeed. The power of digital libraries and new media technologies can provide this reward and break the shackles of nineteenth-century literacy. The downward pressure on costs for technology and communications matched with new and easy-to-use learning software means that Just In Time Learning—twenty-first century learning—is becoming a reality for all of our students.

Making this future a reality necessitates the building of an educational system based on the "just in time" learning philosophy. It requires the development of learning tools essential to survival in this rapidly changing world—tools that teach children to be the intellectual explorers of tomorrow. One such tool is Electric Library™, an online reference service designed for students. The challenge of designing a digital library that fosters and enhances learning in the new millennium is met by incorporating the basic elements of twenty-first century literacy.

TWENTY-FIRST CENTURY LITERACY ELEMENTS

In June 1991, the U.S. Department of Labor issued its first report from the Secretary's Commission on Achieving Necessary Skills (SCANS). This watershed document examined the changes in the world of work for the twenty-first century and highlighted the implications of those changes for learning. It summarized how the world has changed for schools in preparing our young to work.

> A strong back, the willingness to work, and a high school diploma were once all that was needed to make a start in America. They are no longer. A well-developed mind, a passion to learn, and the ability to put knowledge to work are the new keys to the future of our young people, the success of our young people, the success of our businesses, and the economic well being of the nation. (U. S. Department of Labor, 1991, p. 1)

The report continued to define five competencies which rest on a three-part foundation of skills and personal qualities. These three parts are

defined as basic skills, personal qualities, and thinking skills, the last be-
ing the centerpiece of the SCANS foundation and a primary factor in the
development of the Electric Library. Of the five competencies, the one
most concerned with what is classically defined as twenty-first century lit-
eracy, is information competency. The report defines this as: (1) the
ability to acquire and evaluate information; (2) the ability to organize
and maintain information; (3) the ability to interpret and communicate
information; and (4) the ability to use computers to process information
(U. S. Dept. of Labor, 1991, p. 12). According to SCANS, six individual
components constitute thinking skills: creative thinking, decision mak-
ing, problem solving, seeing things in the mind's eye (i.e., processing
symbolic and visual information), knowing how to learn, and reasoning.

Everyone would agree that these are all absolutely critical skills to
teach, for success in the working world would be difficult without them,
but how to best instruct our students in acquiring these skills has been a
matter of considerable ongoing debate. Technology can certainly help
in this worthy endeavor. As Herndon (1994) stated simply in his discus-
sion of technology integration in one school district: "The concept of
computer literacy as a separate educational endeavor is outdated."

Rosenberg's (1991) view of this kind of computer literacy is that its
training does not deliver much in preparing youth for today's job mar-
ket. The pressure to bring computers in the classroom comes from the
marketplace, parents, and administrators. Citing one director of a com-
puter-literacy lab: "[Administrators say] get the computers first, then ap-
ply pressure on teachers to use them, instead of identifying an educa-
tional need and asking if a computer could help with that." Instead, the
author argues that real computer literacy hinges on discussing the con-
text into which the technology fits and focusing on case studies that study
large, complex, and real world systems.

Consider for a moment the new media information realm Berenfeld
(1996) calls the infosphere. He argues that the evolving information
environment in which we are immersed needs a metaphor that implies
the growing unity, interdependence, and accessibility of information pro-
duction. To Berenfeld, the infosphere summarizes nearly all human en-
deavors; and technologically it traces back to the telegraph and radio,
the first computers and monitors, and the Internet and the World Wide
Web.

> The impact of today's telecommunications revolution on schools goes
> vastly beyond replacing the old blackboard with a shiny whiteboard.
> The infosphere is revolutionizing the very nature and dynamics of
> the conventional classroom experience. This new learning environ-
> ment, by design, emphasizes student's autonomy and independence.
> Classroom learning will become student-driven, interactive, experi-
> ential and collaborative—all goals long-cherished by many educa-
> tors but never before attainable. Students will no longer passively

> receive information but will manage and synthesize it and even
> contribute to the infosphere. They become not only takers, but "giv-
> ers," or creators, of information....In this innovative paradigm, stu-
> dents' abilities to contribute to the infosphere will be integral to
> their learning (p. 83)

The lifelong revolutionary learning Berenfeld describes bears resem-
blance to Papert and Talcott's (1993) "knowledge machine" in its ability
to redefine information acquisition and the very nature of learning.
Through this knowledge machine, children freely explore all parts of the
world by touch and sight and have the power to know anything they de-
sire. It stimulates literacy by Papert and Talcott's definition, which they
define as thinking about and seeing the world differently than one did
previously. This definition encompasses the true meaning of twenty-first
century literacy. Digital libraries, undeniably a piece of this new literacy,
are certainly part of this promise to elevate the learning experience to
levels envisioned by Berenfeld and Papert and Talcott.

But how do children navigate the seemingly countless options for
participating in and learning from the so-called infosphere? How can
they embark on lively expeditions through information space and return
with newfound knowledge and experience? The answers lie in the very
heart of the information universe itself, where information overload and
chaos reign supreme.

DIGITAL LIBRARIES

Libraries are a familiar place. Whether the local community version
or the very large university research library, a good library illustrates what
is right with America. Donovan (1995) writes that libraries safeguard our
freedom and keep democracy healthy. "They are ready when they are
needed to enrich our minds and defend our right to know, just as other
institutions defend our safety and property. But without sound minds,
the American dream of safe streets and secure homes will never be ful-
filled."

Of tandem importance is the library's unique ability to nourish cre-
ativity. "People can be creative without libraries, for sure. But can there
be a creative society without a library?...In the library we are all children.
By stimulating curiosity—parent to the twin forces of creativity and imagi-
nation—even the most focused and specialized library serves the pur-
pose of lifting the mind beyond its horizons" (Donovan, 1995).

In order for the library to continue to satisfy curiosity and nourish
creativity, it must meet the overwhelming need to not only incorporate
but to apply technology (i.e., information digitization). With 78 percent
of our nation's libraries housed in elementary- and secondary-schools
and one-third of all library patrons being children (Speer, 1995), such
integration is essential to the future success of the library. Speer believes

that "the lure of computers is a good one, because kids love technology, and the library may be the only source." Billings (1996) asserts that libraries, as "living changing bodies of information," are increasingly keeping pace with the move toward digitization as "their traditional printed resources are being enhanced and extended through electronic technology."

The adoption of digital information represents a great step for libraries keeping pace with information technology but resolves only part of the issue. One problem that remains is that of the incredible vanishing library. Surely, as our nation cuts here and there to maintain some degree of fiscal prudence and integrity, library line items fall prey to the budget ax. Speer (1995) reported that half of the elementary school libraries in the United States bought less than one book per student in a year's time, and half of the secondary school libraries bought less than one-third of a book per student. This is the most compelling reason for the creation of a digital library—a library without walls. Inside lies binary code waiting for the opportunity to teach without the limitations of leaky roofs and staff and budget cutbacks.

Today the marketplace arrival of lower cost data storage and infrastructure means increasing amounts of information can be made digital. But, for the moment, the problem of cheaper storage is being compounded by the sheer volume of new media coming into the marketplace. In this era of mixed media, the question becomes not just what to buy but in what format to buy it.

The digital library solves this dilemma. Systems exist today that care not in which format the information lays.

> As we move forward and embrace the concept of the virtual library, what we embrace most importantly is the concept of removing all obstacles. It is the absence of barriers of time and distance that make a library a virtual library.... What we see is a means of sharing information without much regard to time or location. People have the information when and where they want it. (Margolis, 1996, p. 32)

But what of the aforementioned bibliographic skills? Does the virtual library require a Dewey Decimal System? Must the data set be part of a controlled circulation? And what if we lived in a world where the information specialist—the library scientist—is a twelve-year-old named Bobby sitting behind the computer in homeroom? The answers to these questions are being relayed, just in time.

JUST IN TIME LEARNING

The world will always need librarians as there will always be libraries. However, as fewer people buy paper books and newspapers and instead glean more of their news and entertainment digitally, there will clearly be less information available in print form. Instead of lamenting the fact

that computers are creeping up and stealing our privacy, consumers should rise up and say, "I know these computers are powerful, I know they can help my children, and I want to know how!" It is incumbent on technology companies to work in tandem with educators and librarians to assist consumers in realizing this potential.

Imagine a world where any student, no matter the age, is focused not on math drills and sentence diagramming but on real-world problem solving—explaining and reading about new concepts taught by teachers in the classroom with real-time information. A world where current events are read and taught in the classroom as they happen, or complex abstract concepts are illustrated through a three dimensional image created by MIT university students and downloaded by Mr. Murphy's seventh grade science class. And Ms. Cummings's art class visits the Louvre for the fifth time in a week to verify the skin tones on Mona Lisa's face. It is precisely this kind of dynamic learning environment that will not only serve to keep our children focused and interested in learning but will also prepare our students to use technology for its most divine calling—i.e., as a means to an end.

Just In Time Learning (JITL) is a fundamental embodiment of the key elements needed to propel students from twentieth to twenty-first century learning (see Table 1). This ideal is not meant to be held as a singular vision, part of some kind of self-aggrandizing pedagogy. It is designed instead to illustrate the potential technology has in completely revolutionizing the learning process. The basic planks that make up JITL should be defined in the context of classic literacy—a most familiar paradigm. For if grand ideas are related in everyday language, they will be more easily adopted and open to access (and debate), which is one of the key tenets of this new learning paradigm.

What net impact will JITL have on our children—on all seekers of knowledge? Why JITL? There is no longer a need to judge our children by what they know. Standardized tests are now obsolete in their ability to judge the worthiness of an individual, classroom, or school. A more accurate metric, according to contemporary standards, judges based on the "how" of a child's knowledge, emphasizing the significance of the overall learning process—the ability to think critically—not solely the end result.

Today, it is a complete impossibility for one person to know everything about his or her chosen field—the amount of information available makes this an impossible scenario. But a person should not be penalized for not knowing what significant event happened on April 14, 1865. People should be measured by their ability to understand the context of this event and what it means to our civilization, past and present. This ability becomes increasingly important in light of today's practice of "sanitizing" history and other textbooks for political correctness. Our

system of education, our learning tools, should provide for students the access to the information as it is needed. No one textbook author or curriculum guide can prepare a student to appreciate and learn from an infinite data set. Such a data set, requisite for JITL to succeed, is found in the existing digital library.

Table 1. Elements of Twentieth versus Twenty-First Century Learning

Classic	21st Century
Finite Data Set	"Information Space"
Rote Memorization	Critical Thinking & Exploration
School Learning	Lifelong Learning
Haves vs. Have-nots	Information Democracy

ELEMENTS OF JUST IN TIME LEARNING

Information Space

As technology has evolved, the amount of information made available digitally—especially in terms of what can be easily accessed—has grown demonstrably. This is good. Historically, there has been a finite data set, usually set by the rich and privileged, for they were the ones that could afford the books and could fill the shelves of fee-based libraries. Even today, it is only the most economically advantaged school districts that have the "good" books. Some of our poorer schools simply have no books to distribute.

To be effective, twenty-first century literacy requires a limitless data set or "information space" (not dissimilar to Berenfeld's infosphere). With sufficiently powerful tools and agents being created to search (locate), acquire (access), and process (download), a terabyte of data can be easily navigated and mastered by even a ten-year-old. It is through a truly vast data set that information has context, color, and borders. It is through this information chaos that order can be made.

Critical Thinking and Exploration

Perhaps the most important element of JITL is teaching critical thinking and information exploration skills, much like the aforementioned thinking skills as defined by SCANS. Students need to experience the joys of free-form learning and self guided discovery. A passion for learning—a reward for seeking—must be offered if they are to succeed. The power of digital libraries can provide this reward and break the shackles of rote memorization. Making a seemingly infinite amount of quality information available to a young absorbent mind makes a lot of sense but constitutes only part of the package in this new-century learning. The young mind must also be sharpened with critical thinking skills, which

JITL achieves by integrating ideas and concepts once reserved for high school and university students into curricula as early as the first grade. As easy as it is to tell a banana from an orange, a five-year-old mind can grasp either-or and if-then thinking skills which are the basic building blocks of critical thinking. Equipped with this mental tool, a child can navigate a sea of information and draw conclusions based on objective reasoning that suits that child's tastes or values—not the values or answers one textbook author posits as relevant facts.

Lifelong Learning

By giving our children these opportunities to access real-world information and rewarding them for seeking it, and by equipping them with the ability to sort it out—to create mental maps of ideas—they get more than a diploma at graduation. The die will be cast early. They will become lifelong learners. And the continuing evolution of new media tools will only serve to reinforce the ease of acquiring new and meaningful information that was out of touch earlier in their lifetime but is now available at the touch of a key (e.g., poetry in a Tunisian vault unearthed and put online by an archeology student in the year 2010 made available to everyone via the World Wide Web).

Information Democracy

And what of equality with this new-age education? There exists today such inequity in our schools that it is no surprise that so many of our children cannot master basic skills. Technology, to the surprise of many, has galvanized belief that our schools can be better than they are and be made to fully serve their key constituents—children. Technology is holding a candle to our schools, and parents, teachers, librarians, and communities around the globe have taken notice. Herndon (1994) noted, for example, a decrease in truancy and discipline problems with the full-scale, district-wide integration of technology in the classroom.

Private companies have also taken notice. Dozens of private initiatives are launching nationwide to wire and install hardware in our schools in an effort to bring them up to speed with the private and government sector, where there is little doubt a majority of them will interface with some kind of computer to access information for their jobs. JITL's final plank is to make information access ubiquitous and publishing a simplified task.

With the advent of the World Wide Web, anyone with access to a computer with an Internet connection can publish a magazine. It is this universal access and ability to create information that rounds out the picture. If our citizens are informed, educated critical thinkers, they will interact and create more content for "information space." This information democracy, through which everyone has the opportunity to be both content consumer and content publisher, means that interactions will

become more meaningful and reinforce the behavior unanimously de-
sired to be instilled in our school-age youths—interactive learning.

> Ironically, schooling, which is said to prepare students for life in the
> real world, is tremendously isolated. Learning is compartmental-
> ized behind closed doors. Telecommunications expand the learn-
> ing context by bringing the real world into the classroom. Students
> and teachers can establish interactive connections with anybody or
> any source, making learning more relevant to their lives, interests
> and concerns. (Berenfeld, 1996, p. 80)

Digital libraries and the tools to create and access them are necessary for
JITL to succeed, for they wholly incorporate its framework into everyday
learning and serve to cultivate the essential skills children need to be-
come lifelong learners of the future. Electric Library is one such tool.

JUST IN TIME LEARNING WITH ELECTRIC LIBRARY

Through a networked system, computers can provide an ideal me-
dium for igniting the passion in learning, especially when there are soft-
ware applications that set the students free to learn at their own speed.
Such an application is Electric Library from Infonautics Corporation.

Designed from the ground up as a twenty-first century literacy tool,
Electric Library embodies all of the necessary technical requirements that
make JITL a very real possibility by the turn of the century. Launched as
Homework Helper on the Prodigy Service in early 1995, this application
won much praise from critics along with more than eight distinguished
awards. It was launched on the Internet in February 1996 and has been
utilized by individual consumers, schools, and libraries ever since.

There are four distinct elements of Electric Library that support JITL.
For the new Information Space, there exists an astounding collection—a
library—of hundreds of newspaper and magazine sources, international
newswires, classic books, encyclopedias, thousands of images and maps,
as well as major works of art and literature (see Figure 1). The primary
focus of this aggregation of content is to ensure the highest level of diver-
sity-containing materials that service the information needs of all chil-
dren, a data set that truly "summarizes nearly all human endeavors"
(Berenfeld, 1996, p. 83), as with Berenfeld's infosphere. Servicing the
information needs of all children is defined as being able to provide sat-
isfying answers to all of their questions, on all levels of cognition and
curiosity, with data that are reliable and easily accessible.

Securing a vast and diverse collection of content materials was one of
the original challenges faced during the development of Homework
Helper, predecessor of Electric Library. With the increasing number of
publishers converting their information into digital formats, the chal-
lenge did not equal an obstacle. Focus groups formed during the devel-
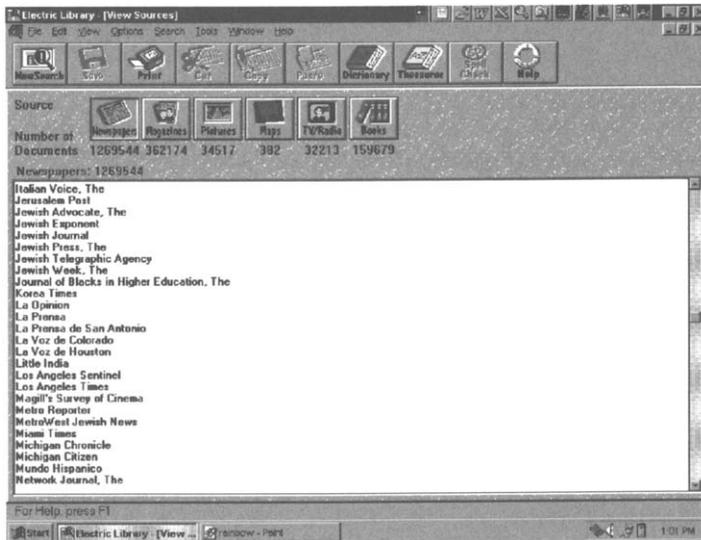opment stage, coupled with intense market research, helped to determine

Figure 1. Diverse and quality content constitute this information space.

the specific quality content deemed suitable and desirable for such a service. Parents and educators were surveyed and interviewed to assess what kids were reading, both for pleasure and for school assignments. What specific sources housed the answers to their thousands of questions? The answer to that question was simple: everything. Children are so innately inquisitive, there is no one book or encyclopedia that can provide *all* of the information they seek. For this online reference library to succeed, it must provide a plethora of sources in a variety of formats; the content must have the capacity to answer such an age-old question as "Why is the sky blue?" as well as those of a university student studying the political evolution of a foreign land. With that in mind, and scores of titles from which to select, content for the service was sought and acquired through direct arrangement with the content providers. Many publishers are eager to forge alliances with developers of online tools. Many are anxious to be part of such a vehicle designed for students.

Equally as important was ensuring that the materials in Electric Library were age-appropriate, as safe as the content a child would discover in his or her school or local library. The pervasive fear of educators and parents alike of the "dangers of the Internet" is abated, reassuring them that what can be found online through their library is reputable. With the grade-reading level clearly marked in the headline listing of each article retrieved from Electric Library, selecting the appropriate documents becomes an easier task for even the younger children. The evalu-
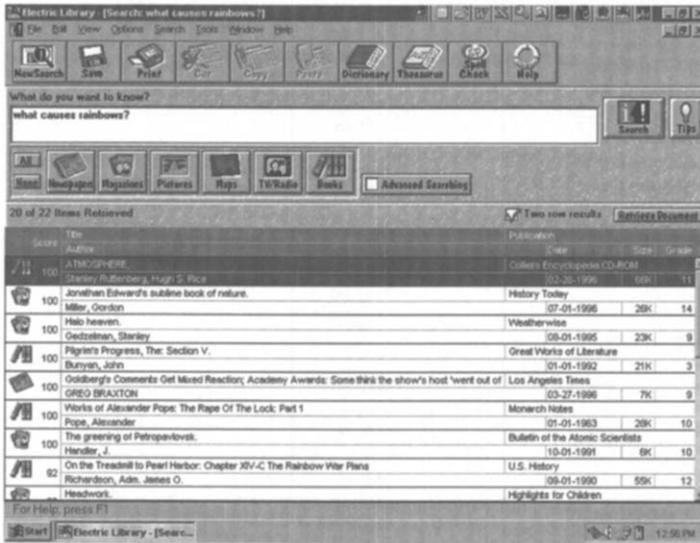
Figure 2. Sophisticated search technology ranks documents by relevance, and indicates key bibliographic information and grade level reading.

ation of grade-reading level is determined by an algorithm based on a model developed by Fleisch-Kincaid, a widely accepted metric in academia.

For the second element of JITL, critical thinking and exploration, numerous search engine features were identified as being fundamental components in order to bring these elements to life. To begin with, the service was designed to be a natural language service. Children needed to be able to explore a data set with free-flowing thoughts; to ask their questions much the way they ask a question of their teachers and parents. By eliminating the need to learn and use complex search languages, a child of any age would be able to easily navigate the system, thus removing a major "barrier" that traditional online searching posed for children.

In conjunction with the natural language design, a powerful search and retrieval function was built that returns articles ranked by relevance, randomly (no publisher has preference), with the ability to download multiple documents or images simultaneously (see Figure 2). Incorporating this element of JITL into Electric Library entailed designing the search engine to both encourage and enable children to think for themselves; to make it conducive to the learning process and growth of information-gathering skills.

Ranking the search results by relevance in a random order is essential to fostering information exploration for two primary reasons. By
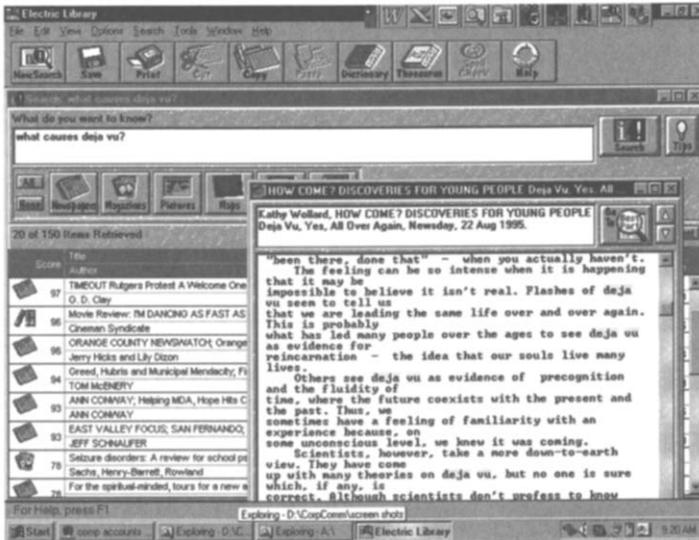
Figure 3. The "Best Part" feature helps children quickly find answers to their questions by jumping them to the most relevant portion of documents.

eliminating the need to physically wade through documents, relevance ranking can save scores of time, freeing students to explore longer and with more depth, further promoting the active learning required to succeed in the modern workplace. It also facilitates the process of discerning which documents most completely fulfill their research needs. This assists them in learning to think critically about the text of the documents and the meanings within, to consider the actual relevance to their research needs. This feature does not, however, do the work of analyzing the contents for them. It points them in the right direction, much like a librarian guiding a child to the right bookshelf, but does not describe each step along the way or what they will discover upon arrival. This is something children will discover for themselves.

Listing the relevance-ranked documents randomly, as opposed to by alphabetic or other means, also guarantees that each search is unique— that each experience is unique. Two children researching the same topic can potentially unearth vastly different sources and information from one another. This fosters individual discovery as they navigate this information space. Additional features that cultivate critical thinking and promote exploration include a "Best Part" option and the intelligent expansion of query terms. Proprietary technology, the "Best Part" option, automatically jumps the user to the section in the displayed document that is most relevant to the search terms (see Figure 3). A great step beyond
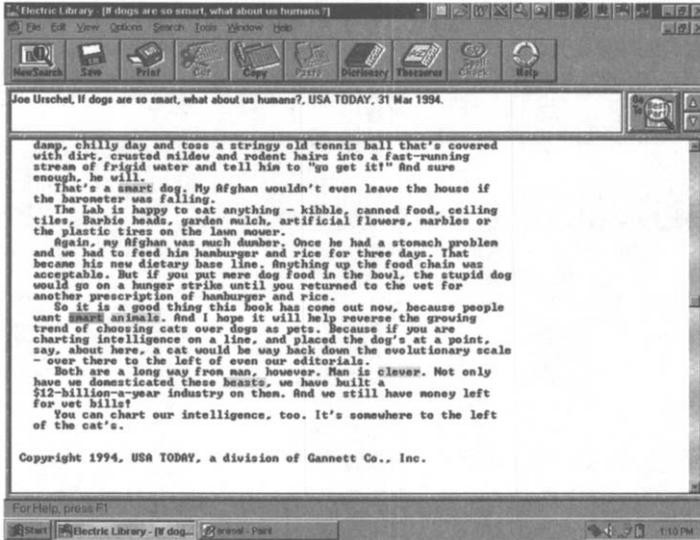
Figure 4. The intelligent expansion of search queries introduces alternative terms to a child's search, leading them down new paths in information space.

traditional keyword highlighting, this further reduces time spent wading through pages of text; children can determine at a glance whether they want to download a particular document. They can also quickly determine whether or not their search queries are generating the expected and desired results. If not, they are driven to rethink their question, to redefine what it is they are seeking using a variety of terms and sources.

The intelligent expansion of query terms opens doors and expands minds by introducing new elements, new terms, into a child's search for information. A search for "smartest animals," for example, would also find documents with the terms "intelligent creatures" and "clever beasts" (see Figure 4). The meaning of the query terms are expanded based on their context. This feature is significant in encouraging children to think beyond the simplistic, to expand thought processes, and to increase their vocabulary, thereby improving the success of the current and of subsequent searches.

The dictionary and thesaurus lookup features can also serve to expand children's vocabularies. These features enable the user to select a word from a displayed document and automatically display the dictionary meaning or thesaurus entries by clicking on a button. The ease and speed of doing so increases the likelihood that the feature will be used when an unfamiliar word is encountered. With the wide range of material available spanning reading levels, this becomes a frequent occurrence.
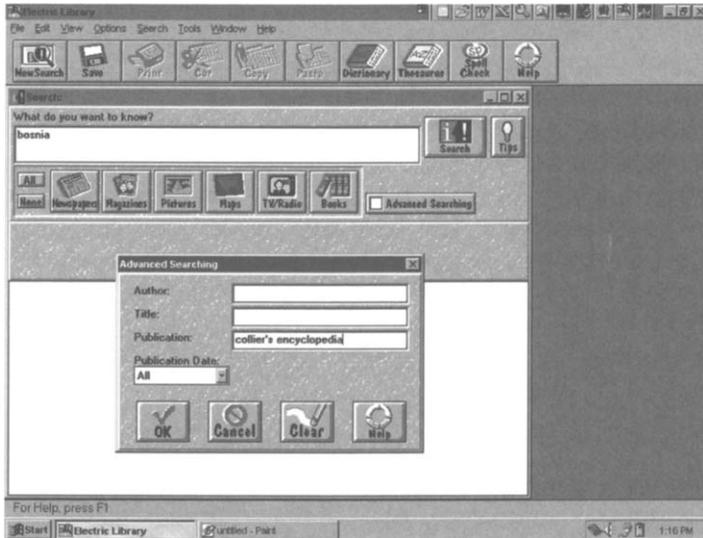
Figure 5. Lifelong learning necessitates tools easy enough for children and sophisticated enough for continued use as they mature.

An additional selection of colorful buttons, whose functions can be quickly and easily ascertained, was added to the interface. These consist of buttons identifying source types (i.e., books, maps, newspapers, etc.) that could be selected or deselected with one click. By enabling the user to determine which source types to search, the service encourages the consideration of not only the specific information sought, but where it can best be found. Where books may be appropriate for one topic, documents on a current events topic may be more readily found in a newspaper. Learning to differentiate between source types and having the capacity to do so at the touch of a button can aid children in fine tuning their research skills.

For lifelong learning, there is an ever-evolving technology focus (search retrieval) on the product as well as the opportunity to evolve and customize the interface to meet the tastes of adults and older students without compromising intuitiveness. For example, as child-friendly as this digital library is, it is sophisticated enough to be a viable research option for a student of any age. As students continue to begin experiencing computers at younger ages, the potential for a system to be applicable to their needs through the years—perhaps over their lifetime—is equally important.

One example of this is Electric Library's advanced search options, which allow the user to define his or her parameters by author, publica-

tion or publication type, and date range (see Figure 5). Found more
typically in only commercial business databases aimed at the information
professional, such a feature caters to the needs of more experienced on-
line users, such as older students.

There are also product plans in place to design and implement a
visual navigation system for exploring information space. Such a system
enables children to transport themselves, seemingly across space and time,
through virtual actions such as "jumping," "flying," "diving," and "swim-
ming." With such a system, a simulation of Papert and Talcott's Knowl-
edge Machine could soon become a reality.

For information democracy, all data are available all the time and
are easy to access. Electric Library's high level of intuitiveness makes it
easy for children of all ages, with varying degrees of computer experi-
ence, to navigate all parts of the system. For the first time, an online
system exists for everyone; a system that enables children to conduct so-
phisticated online research that was once available only to business and
information professionals.

With the high-end client-server architecture on which it is based, Elec-
tric Library truly is accessible to any child with a computer and Internet
access, whenever they need it, seven days a week.

Furthering the cause of information democracy are the plans to cre-
ate a distributed database network for Electric Library subscribers. This
network would allow subscribers to become Electric Library content pro-
viders, completing the circle of JITL.

CONCLUSION

There are those who wish to be left behind and hope that technol-
ogy fades away, and there are those that cannot afford the information
revolution but actively desire it. And there are those that have fully em-
braced and implemented a technology-based curriculum in their library
or school. For those who want to make it happen in their library, List
(1995) has these words of encouragement:

> To Net-loving cybrarians: Bear in mind that this is a time of transi-
> tion. There should be room for many along a continuum of exper-
> tise in using the Internet. The profession needs people like you to
> charge into the newest developments and open them up for the rest
> of us. Encouragement, not exclusivity, is needed. There is a fine
> line between patronization and motivation of those not up to your
> speed, and I urge you to walk it. I also recommend that you exam-
> ine what you are not doing while you're out surfing to make sure
> you're not creating a bigger sandpile for a nonsurfer colleague to
> deal with. To administrators: work with your faculty and staff to
> develop clearly stated policies about the place of the Internet in your
> library. Articulate the way in which time spent on the Net will affect
> performance evaluations. Give your faculty and staff the reasons

behind electronic purchasing decisions so they don't feel that the machines are getting all the money. To the so-called Luddites: Shed the title! Learn the Net—at the pace you need to make your job accommodate the technology. Simply maintaining the status quo can very quickly equal stagnating professionally.

It is incumbent on all to ensure that computers become part of the American educational landscape. The private sector is most responsible, however, as it is the most financially capable, and it is the primary beneficiary of an educated and technologically literate population.

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