KIDS, EDUCATION AND TECHNOLOGY, PART II
by Jerry Michalski

Healthy markets are efficient. They self-regulate. The best solutions bubble to the top and thrive; bad ones die. Ideas and people flow where they're needed and make their presence felt through profitable products and services. Companies steal each other's ideas and learn from other's mistakes. Companies define and propagate standards that make their combined products more valuable, or their customers force them to. Buyers and sellers are generally in tune, co-evolving offerings according to changing needs. These activities are driven by market forces, not central plans, external regulations or artificially imposed measures of performance.

By these measures, the educational software and services market isn't healthy at all -- and not because schools don't have enough money to spend on technology. Even if schools had endless budgets, there are plenty of other factors holding back a genuinely efficient market. Last month, we mentioned many of them, including the glacial curriculum-review-and-approval cycle, authorities' fear of losing control and divisive battles about educational theory.

Whatever the causes, the market feedback and dissemination mechanism is broken here: Many good ideas occur in nonprofit projects or in obscure laboratories where nobody learns from them, and where there is no incentive to bring them to market.

A few get through

Despite the unfavorable market dynamics -- perhaps because of them -- several companies have made considerable inroads selling educational software. This issue of Release 1.0 begins by examining two such companies: software distributor KidSoft, which focuses on the consumer channel, not on creating educational software itself; and integrated learning system vendor Computer Curriculum Corp. (CCC), a unit of Viacom that offers an extensive curriculum built atop management and measurement systems sold to schools, which can use them to demonstrate progress.

The rest of this issue of Release 1.0 examines the less commercial side of educational software in an

CONGRATULATIONS, ROBYN AND JEFF!
effort to explore the disconnect in this market. Here we cover several of
these often low-budget efforts and the products they are spinning out, from
math and science tools to social, narrative spaces. Some of these are com-
mercial products, but many of them may never be commercialized or broadly
used. They are evidence of productive tendencies in the market, especially
in the creation of support systems and shared tools -- items that are infra-
structure rather than shrinkwrapped products.

Interestingly, the US National Science Foundation (NSF) has funded many use-
ful projects along these lines. In fact, almost every project we found in-
triguing was NSF-backed. It seems strange that the NSF is the sole funder
of so much activity. There's clearly a greater role possible for software
developers and corporations.

MAKING MARKETS

Imperfect markets create opportunities. Pressures and trends in the com-
puter and education markets have created some that KidSoft and CCC are ex-
ploiting.

KIDSOFT: BUILDING THE CHANNEL

KidSoft is benefiting from the current home-computing boom, particularly the
acceleration of multimedia machine sales. Families want something to do
with those CD-ROM drives, and they don't have the time to evaluate software.
Neither, it turns out, do teachers or school districts. KidSoft's primary
role is as an aggregator of children's software, with an implied promise to
parents of content quality and appropriateness.

To create a brand identity and generate repeat purchases, the company has
launched Club KidSoft, a subscription CD-ROM service ($30 per year) that in-
cludes a magazine full of activities for kids, software reviews and other
enticements to keep coming back. Each CD has over 40 software titles, which
families can try out, then unlock for a fee by calling KidSoft's 800 number.
Club KidSoft now has over 50,000 subscribers. To get distribution, KidSoft
has negotiated deals to bundle its CDs with new Apple Performas and Compaq
Presarios.

KidSoft does not promote any particular pedagogical model or curriculum. It
relies on its small staff of software evaluators and sells stuff from top-
notch educational-software developers, including the Learning Company, MECC
and Davidson & Associates. The offerings include authoring tools and
project-oriented packages that have characters, plots and end-products to
show, or print and hang on the fridge. A few of them may look familiar:
They are revisions of popular games such as Space Invaders and Dark Castle,
in which developers have replaced the targets with letters to choose and
puzzles to solve -- all in the name of learning multiplication or typing.

KidSoft is going online in a few months, although it won't offer many
details about how and where. Also, The Hearst Corporation recently acquired
a 29 percent equity interest in KidSoft. The media giant's links across
other media should be very helpful to KidSoft. Given the speed with which
electronic commerce is emerging and the rate of change of activity on the
Internet and the major online services, KidSoft will have to be nimble to keep itself visible in the distribution channel. The many new interactivity and content-delivery options opening up will either be powerful new vehicles for the company, or they'll drown the company's message altogether.

Rick Devine founded KidSoft in 1992. He was then a consultant to venture-funded companies and had formerly been with Ticketron. The rest of the management team includes experienced marketing hands such as Dan'l Lewin, who has seen action at Kaleida, NeXT, Go and Apple.

COMPUTER CURRICULUM CORP.

More than 1.5 million students in more than 8,000 schools worldwide use the Computer Curriculum Corp.'s products. The company, a multimedia publisher for the K-12 education market, is the fastest-growing unit of Simon & Schuster.\(^1\) CCC was founded by two Stanford University professors in 1967 and has proven itself quite adept at integrating new technologies and reinventing itself. Its metamorphoses have tracked innovation in the field and followed the vogue of hot topics in intelligent/adaptive educational technology, from computer-aided instruction (CAI), through intelligent tutoring systems (ITS) to the latest term, integrated learning systems (ILS), which CCC both embraces and tries to escape -- or transcend. Though they represent different stages in the evolution of educational technology, all of these technologies are based on the idea that the system's software incorporates carefully structured study materials, plus expert observation and diagnostic capabilities that can aid students at the right time and in the right way.

Balancing freedom and structure

CCC's principal offering is SuccessMaker, a comprehensive system that includes 33 courses ranging from kindergarten to 12th grade, across all major disciplines. The system has three major components: Foundations, which focuses on skills training; ExploreWare, a series of new, open-ended modules that emphasize critical thinking; and an underlying management system that tracks and adapts to students' progress. Foundations includes problem-solving applications, teacher tools (for presentation and measurement) and interconnected student tools (e.g., a math processor, charting program and spreadsheet). The tools work only within SuccessMaker; it is possible to launch other applications, such as Microsoft's Encarta CD-ROM, which is included with the system. ExploreWare is CCC's answer to the increasing demand for theme-based, exploratory learning.

There are a few other components, such as the Portfolio Browser, which offers student-teacher electronic messaging and a way for students to collect and organize their work so that teachers can evaluate it more easily. CCC also includes supplementary materials such as teacher training guides.

---

1 CCC is also one-half of Simon & Schuster's Educational Technology Group; the other half is the Educational Management Group, a company that delivers live, interactive TV daily to over a million students in 35 countries. Simon & Schuster, the US's largest educational publisher, is a unit of Viacom.
Can you say, "Si, si, si?"

CCC benefits from schools' desire to use computers efficiently and to show measurable improvements to concerned parents. SuccessMaker's management system uses a combination of stochastic processing, AI and neural networks to evaluate a student's progress, particularly when to determine a student has understood a section, then which direction to take next. Those transitions are essential to the student's experience: If they're too rigid, the system rapidly turns into an unforgiving taskmaster; too loose, and the student rapidly gets into material that's beyond his capacity. SuccessMaker looks for bursts of insight: contiguous experiences or patterns that show the student is learning the underlying principles.

Of course, another user interface that matters is the one parents see. SuccessMaker offers comprehensive reporting designed specifically for them.

As teaching styles change and the number of electronically available materials expands, CCC is adapting in various ways to ensure that it leverages new delivery methods. Recently, the company announced the availability of its Multimedia Science Classroom curriculum through its SuccessMaker Online program. Classroom Prodigy provides the gateway. With SuccessMaker Online, students and teachers have access to a variety of online resources and learning adventures as well as online communications through Internet e-mail and bulletin boards.

The company is committed to continuing to look for new avenues that facilitate access to and use of technology-based curriculum both in the classroom and at home. For example, CCC is currently participating in a trial program with Viacom and Intel in Castro Valley, CA, to test broadband delivery of its curriculum to home PCs.
Where the general educational market has failed to create useful dynamics, the National Science Foundation has been able to establish a productive sub-market in math and science educational technology. The NSF's grants often seem particularly clairvoyant, despite a relatively conventional assessment process with many layers of peer review.

Many commercial products and ventures have spun out of these efforts, including the concept of Microcomputer-Based Laboratories (MBLs), which has helped launch many small companies. MBLs are PCs turned into data-acquisition and display devices, as well as simulators. With them, students can run and monitor experiments.

The pace is picking up. Nora Sabelli, program director of the NSF's Education and Human Resources directorate, says, "Parents and school boards need to realize how education has to change.... Content also has to change. It used to be designed for students who used paper and pencils. Now the kids have computers; it's a more complex world, and the content has to adapt."

Sabelli is determined to foster these changes. Her program now takes an increasingly proactive role to interact with the private sector by hosting conferences and working with the Software Publisher's Association to match projects and publishers early. The NSF is also working with the OpenDoc consortium to plan a workshop for educators about component software and modular design.

Here are a few projects that have benefited from NSF involvement.

Swarthmore's Geometry Forum

Swarthmore College is home to the Geometry Forum, a highly active and useful resource on the topic of...well...geometry. Among its many activities, the Forum runs teacher workshops, eight special-interest Internet newsgroups, a newsletter (Outposts) and an excellent Web site. Its Web site offers math puzzles and solutions, help with infrastructure and tools, an annotated and searchable collection of Internet resources for educators and students, and links to other math projects, such as MathMagic and MegaMath. Two of the Forum's most popular features are the Problem of the Week and Ask Dr. Math, an e-mail based help line for the mathematically curious -- or distressed.

Although the bulk of traffic on the Forum's newsgroups is from teachers and researchers, the busiest newsgroup is geometry.pre-college, which has many high school participants and has led to some pleasant surprises. For example, John Conway, a noted Princeton mathematician, started spending time in the newsgroup corresponding with high school students. Later, when the Forum decided to pool undergraduate math students to create an online feature for kids named "Ask Dr. Math," Conway offered to be part of the question-answering team.

MathMagic is a K-12 telecom project that posts math problems over e-mail for different age groups to solve in teams. MegaMath is a Web site that focuses on novel, knotty problems in mathematics (such as knot theory) and makes them accessible to students.

---

2 MathMagic is a K-12 telecom project that posts math problems over e-mail for different age groups to solve in teams. MegaMath is a Web site that focuses on novel, knotty problems in mathematics (such as knot theory) and makes them accessible to students.

Release 1.0 26 May 1995
Gene Klotz, a Swarthmore mathematics professor, has directed NSF-funded projects at the College for nine years. Before becoming the Geometry Forum, his projects had been known as the Visual Geometry Project (VGP). The Forum is solely funded by NSF grants. The current, three-year grant is for $500,000. The operation is lean: Annie Fetter, the Forum's energetic and creative hub, is its sole full-time employee. Many others help.

The group's activities have led to commercial products. Starting in 1988, the VGP was home to the development of the Geometer's Sketchpad, a dynamic geometry program described in more detail below. They also wrote computer-animated videotapes and workbooks about three-dimensional concepts. The Sketchpad is a common tool across many of the Forum's activities.

Although it is not yet the case, the Sketchpad is becoming the pencil and graph paper that this community uses to communicate. A few students respond to the Problem of the Week by submitting Sketchpad proofs, some of which get published on the Web for others to see and use. In fact, by configuring the Sketchpad as a helper application for a Web browser, it launches automatically when one browses a Sketchpad sketch. That turns a Web site with links to documents and sketches into a geometer's conversation area, complete with special tools.

The Geometer's Sketchpad

The Geometer's Sketchpad is a mathematics modeling tool with dynamic dragging. Think of it as a constraint-oriented drawing program that lets students and researchers construct geometric models of geometric problems, algebraic functions, and physical situations. Users can explore a model by dragging objects around and watching the rest of the model respond, by measuring quantities such as angles, lengths, and areas, and by tabulating and graphing gathered data. In using Sketchpad, students find themselves making mathematical conjectures. Dragging and observing lends powerful support to the conjecture, but leaves the student with the problem of coming up with an explanation of why -- a proof.

The Sketchpad includes a scripting language and animation, which makes it possible to experiment with fractals and other complex mathematical shapes. It also allows for annotations and other presentation aids. Sketchpad began as a tool aimed at the high-school geometry class but has proven itself useful from the upper elementary grades through graduate-level research mathematics. Indeed, new theorems in geometry have been discovered and proven with its aid.

The Geometer's Sketchpad is published by Key Curriculum Press, started 24 years ago by Steve and Peter Rasmussen to publish their mother Lore's writings about teaching elementary-school mathematics. In 1990, the publisher visited the Visual Geometry Project at Swarthmore College and connected with the program's creator, Nick Jackiw. Rasmussen got NSF funding to bring Jackiw to the publisher's offices in Berkeley, CA. Jackiw has just finished version 3 of the program, which sells for $170 for a single-user version or $900 for a site license. Through catalogs and trade shows, Key Curriculum Press publishes a steady stream of curriculum materials for using Sketchpad to help teach geometry, trigonometry, perspective drawing, conic sections, proof and more. The company also publishes innovative algebra software, mathematics textbooks, and supplementary materials for mathematics teaching and learning.

Release 1.0 26 May 1995
We have discussed the use of MUDs and MOOs for activities beyond games (e.g., academic or business interaction, community building) several times the past few summers. Now we examine them as educational environments, a setting for which they are wonderfully suited. There's something compelling about kids interacting online by building and sharing things that they normally can only imagine. If engagement is one of the keys to learning, MUDs (and their descendants) will play an important role in educational technology.

The question is larger than whether MUDs will be used as supplemental tools for specific assignments such as creative writing. That will probably happen. More interestingly, MUDs can be centers of activity, personalizable platforms from which students can connect to term projects, homework assignments, collaborative works in progress, outside resources and each other -- programmable lockers in the hallways of cyberspace, only better.

MUDs need not be purely textual, though plain text can be advantageous and powerful -- and it's certainly far cheaper to implement and offer access to than any rendered graphical environment. Imagine what daVinci Time & Space might do with such spaces, or Disney or SKG Dreamworks.

The underlying question is what the common educational software platform will be, if one actually emerges. Will it be an integrated learning system's multimedia environment; more conventional, horizontal applications, such as e-mail and the Web; or MUDs such as the ones we describe below? These choices are not mutually exclusive, and will in fact be increasingly integrated. However, which one is the design center is important. It's possible that MUD-style interfaces will be the most compelling market-making environments of all.

MICROMUSE: SCIENCE ON A SHOESTRING

Barry Kort likes kids and science. After spending 22 years enmeshed in network-planning jobs at AT&T and defense-related jobs at Mitre (and watching each dissolve, the first with the breakup of AT&T and the second with the end of the Cold War), he decided to fulfill a lifelong ambition to make science accessible to kids. In physical life, Kort often uses magic to engage kids' curiosity. In 1990, he ran across a different kind of magic:

---

3 MUD = Multi-User Dungeon (or Dimension); MUSH = Multi-User Shared Hallucination; MUSE = Multi-User Simulation Environment; and MOO = MUD, Object-Oriented. Mostly used for online gaming, these systems are all genetically related and vary in their programmability and object-orientedness. Typically, only wizards (system administrators) can create new objects in a MUD; anyone can create objects in MUSHes, MUSEs and MOOs. MOOs are written in a more structured way and offer a more powerful and complex programming language than the other systems. We occasionally use the terms "MUD" or "MOO" to refer generically to the entire category. See Release 1.0, 6-94 and 7/8-94 on multi-user virtual environments and 6-93 and 7-93 on community.
TinyMUD, an early MUD that charmed him and inspired him to create other such spaces focused on informal science education for kids.

That fall, with some MUD friends, he helped design MicroMUSH, which had a 24th-century space-faring community theme. The design team wanted to create a safe, fun, informal, constructivist space for kids. The community wrote a charter that included a mission and a social contract, and agreed to make MicroMUSH a non-violent place. The designers eliminated the "kill" and "rob" commands common in most MUDs. Kort suggested they make the space theme realistic, which began the link to science education. Now the environment includes applications such as Space, an astrophysical navigation system written by a grad student at Utah State, and Rain Forest, written by a Boston University student of environmental sciences.

Many kids were attracted to MicroMUSH, including MIT professor (and computer luminary) Hal Abelson's daughter Amanda, who eventually started a MUSE of her own. When the student who was running MicroMUSH graduated and the system was about to go homeless, Abelson gave Kort an underused and obsolescent Motorola workstation. A gifted 14-year-old helped Kort port the system to the new machine. In the process, he changed it to a MUSE software platform and renamed it "MicroMUSE."

"Learning is the quintessential emotional experience. The scientist's primary emotional affect is fascination, puzzlement and curiosity -- maybe even some confusion. I hope we can create that feeling for children, and help them get to the feelings of insight and satisfaction. When kids get it, they have an enormous, unmistakable neuro-peptide rush."

-- Barry Kort, MicroMUSE

Over time, this community has spawned several MUSEs, loosely linked as MUSEnet, that run on hardware scavenged from or contributed by BBN, MIT, Mobil and DEC. MicroMUSE is unfunded and volunteer-operated. Kort, who works at BBN as an unpaid consulting scientist, charges no fees for participation. For him, this is a labor of love and an explicit career choice to foster virtual situated learning environments.

Kort also teaches about science elsewhere online. Recently he was a guest in Scholastic's forum on America Online, which had a "magic of science" theme for a month. Kort's current project at MicroMUSE is to weave links to other systems, including WhaleNet, a collection of whale-related research efforts around the world centered at Simmons College and Wheelock College in Boston.

--

4 BBN (formerly Bolt, Beranek & Newman) has a long tradition of doing educational research. Some of its recent noteworthy projects include Co-NECT School (Cooperative Networked Educational Community for Tomorrow), which offers a transformational model of project-based learning and collaboration in a technology-rich school environment, and a turnkey Mac-based Internet server for schools that includes software (called FrontDoor) that makes configuration and management relatively easy.
Scale and integration

As currently implemented, MUDs and MOOs aren't very scalable. BBN researcher Wally Feurzeig, a colleague of Kort's, recently won a short-term NSF grant to examine the feasibility of large-scale, distributed, multi-user virtual spaces. The project targets infrastructural issues such as dynamic application load balancing across wide-area networks. Feurzeig is also working to integrate scientific applications into the MUSE architecture on a testbed system that he runs on Kort's fleet of MUSEnet computers.

Two candidate applications are RelLab, which allows users to do relativity theory virtual experiments, and GenScope, which models genetics all the way from DNA sequencing to population genetics. Each is a separate, graphical application similar to the Geometer's Sketchpad. Feurzeig and others continue to explore how applications and multi-user environments fit. The combination of applications and easy wide-area connectivity is going to change all standalone software. If some of the tools inside integrated learning systems work this way, too, it may open ways for different markets to link up and grow together.

MARIMUSE AND PUEBLO: CREATIVE VIRTUAL SPACES FOR KIDS

At Phoenix College in Arizona, Billie Hughes and Jim Walters explore, adapt and develop new technologies to enhance student and teacher activities. In 1992, a colleague introduced them to Barry Kort's MicroMUSE. Inspired by what they saw, Hughes and Walters began to explore the use of MUDs as spaces for formal education. In August, 1992, they created MariMUSE (named after the Maricopa school district) and tested it with college students.

Then they decided to see if the motivating nature of a virtual world would work with at-risk children. After a small pilot project, they held a summer program for teachers and students at the College in 1993, which led to their launching MariMUSE at Longview Elementary, a school in a troubled part of Phoenix. Camp MariMUSE has become a regular summer highlight at the College.

Of the 950 students at Longview, over 300 now participate in MariMUSE. Students access it via Telnet at 50 terminals around the school (only a few of which are full-fledged PCs); they also have access to Gopher and Lynx. (For the telnet address to MariMUSE, see Resources, page 16.) The kids are offered unlimited time online and disk space; their activities are gated by the limited number of terminals available. Many students arrive early and stay late so they can get to the public terminals in the school library. About 10 teachers are online; several others are ready to jump in.

The road to Pueblo

In late 1994, Hughes and Walters met Xerox PARC researcher Vijay Saraswat at an MIT-hosted MUD brainstorming event. Saraswat was exploring participatory virtual environments as settings for communities of practice with his colleague, Danny Bobrow (see box). The MariMUSE and Xerox groups joined forces and received an Advanced Research Projects Agency (ARPA) grant to develop MOOs as educational spaces.

Release 1.0

26 May 1995
Together, the groups have created Pueblo, a parallel virtual environment that will soon replace MariMUSE. Pueblo is built with LambdaM00 code from Xerox PARC. LambdaM00's benefits including a simpler, more object-oriented development environment.

Other MOOvers and shakers

At the 1994 PC Forum, Xerox PARC's director John Seely Brown described the concept of communities of practice and the emergent behaviors that such groups exhibit as they share tools and insights (see Release 1.0, 2-94). PARC researchers Danny Bobrow and Vijay Saraswat are experimenting with environments conducive to such interactions.

The US military is highly motivated to find better ways to train personnel. Kirstie Bellman is on loan from Aerospace Corp. to ARPA's Software and Intelligent Systems Technology Office. Bellman is an expert in the design of extremely large conceptual environments, such as the myriad nested systems required to launch and run the space shuttle. She brings a systems perspective to the education environment, which all too often is stuck on a project or tool perspective.

Bellman saw her first MUD four years ago and was struck by its potential. She now sponsors studies of MUDs as design and educational environments. Her group's main project is CATEI, the Computer-Aided Training & Education Initiative, which is tackling some interesting issues, such as evaluation methodologies (when is VR appropriate, when does it get in the way?); intelligent assistance (a robot that accompanies you might ascertain what lessons you might need next, etc.); and teacher involvement (early training systems that tried to bypass teachers failed).

As her thesis project at MIT's Media Lab, Amy Bruckman is developing a Mac-based M00 front-end for children called MacMOOSE. Kids will use it to enter and participate in Moose Crossing, a Lambda-based M00 that Bruckman is creating for the project. MacMOOSE will help kids create and share objects in the textual MO0 world. The MO0 will also feature interesting critters that the kids can play with. It's a daunting project -- a bit like creating a virtual, text theme park singlehandedly.

Practically all of these efforts are based on constructionist ideas that lead back to MIT professor and educational theorist Seymour Papert, and through him to the works of Jean Piaget, John Dewey and Maria Montessori. Other influencers include Jean Lave and Etienne Wenger (situated learning), Alan Kay and Timothy Gallwey (Inner Tennis). The underlying premises are that people create their own mental models of how the world works (or doesn't), and that they do better at this process when they are engaged in creative activity.

Icebergs, coyotes and hieroglyphs

MariMUSE is a great place for children to master basic literacy; it also has salutary effects on participants' social interactions (more on that in

Release 1.0 26 May 1995
a moment). Many factors motivate kids to communicate in the system. They can build things that they don’t have in real life and may not even imagine getting, such as palatial homes with indoor gardens, or submarines. In MariMUSE, participants treat each other as responsible members of the community. Older students help younger ones figure things out.

Hughes and Walters designed MariMUSE as a place that blends free-form play and curriculum-related learning. They want an environment that helps kids develop the attitudes and skills necessary to be successful through college. At one point, a student started a trivia game that let people create their own trivia sheets. Before long, some of the kids’ trivia questions mimicked the curriculum. Though it may stretch credulity, they were putting math word problems up of their own accord.

Even though MariMUSE and Pueblo are text-based and require mastery of a programming language in order to make stuff, Longview’s kids have designed all sorts of things in them. They have created a mock-up of the Titanic, complete with a band, lifeboats (that males can’t board; ah, chivalry!) and a dining room with edible food; an Arizona animal exhibit linked to social studies coursework; an ancient Egypt site; and a skeletal system in which each MUSE room is a bone.

Change -- personal and technological

Measuring educational progress in this kind of environment is difficult, and the MariMUSE crew hasn’t had many resources for in-depth evaluation. The system’s administrators do, with permission, log kids’ interactions online and analyze them. Some of the most remarkable changes they have noted are in children’s attitudes. One child who had been severely withdrawn from social interaction began to help others online, then to interact on the playground. She is now an important resource in MariMUSE. Another who always got into fights before and after school stopped fighting and started to get to the library early so he could get on the public terminals; he also began to stay late.

The system’s developers have many ambitions. They want to integrate the curriculum more. They want to explore innovative combinations of technology, such as WebMOO, which links Web pages to MOO interactions and artifacts. Although they may seem primitive or contrived, these environments herald what is likely to be the average desktop ten years from now. Some workers may prefer rendered 3D spaces, others will go for more exotic decor, but the fundamental draw and usefulness of multi-user spaces will bring them into the center of our activities. What Microsoft Bob lacks in visceral appeal, MariMUSE has in spades. The market-making platform lies between the two, atop the glue the Internet offers.

Release 1.0

26 May 1995
PERIPHERAL VISION
by Esther Dyson

Probably the biggest business of the next year or two will be tools for making Web pages on the one hand, and for searching them and other Internet content on the other. The old text-retrieval tools -- PLS, Verity, Folio, WAIS, Fulcrum -- are being reborn as Net search tools. Indeed, the very word "agent" has (incorrectly) become almost synonymous with information filter, although that is a fairly passive task compared with what agents could do (respond to your mail as well as sort it, get you airline tickets, negotiate appointments; see Release 1.0, 2-93 on General Magic).

The problem with all these filtering systems, including ones that build "personal newspapers," is not their performance, but that they are only the first step. As the quote across indicates, filtering limits your vision. It enables you to strip away -- wittingly or not -- contradictory arguments, disturbing points of view, unexpected information. It helps you to confirm your convictions rather than question them. You don’t come across the unexpected.

Searching lets Alice find Juan’s house and perhaps all his like-minded neighbors, but she’ll never discover the rest of the territory he lives in.

Searching is dead! Long live mapping!

In short, what we need is not a way of finding specific items -- either by ID or by specific criteria -- but ways (many ways) of mapping and visualizing intellectual territory. We’ve talked about some entrants in this category before, notably Nextra from Neuron Data and CM/1 from Corporate Memory Systems (see Release 1.0, 8-92 and 3-93). Misha Donskoy of DISCo showed his fish-eye interface at PC Forum last March. And tools such as AllClear and many programming tools enable you to visualize programs. Dan Bricklin’s brilliantly simple OverAll Viewer lets you see whatever it is at three levels of detail; it’s a tool for building such context-displaying systems. The forthcoming tool from Vermeer will enable designers to design not Web pages but Web sites, visualizing all the links among pages, and even to other sites.

In short, we’re looking for ways to map a content space. Precisely because content varies in nature as well as in details, there’s no one-metaphor-fits-all solution, but rather the potential for a profusion of content-specific creativity.

One of the newest entrants is V-Search from Libertech of Durham, NC (the Research Triangle). Development started two years ago when lawyer Dan Egger got fed up with traditional methods of text search. He did research as a litigator for Public Citizen Litigation Group and later clerked for Judge William Bryan in Washington, DC, but he knew there had to be a better way than hunting in the dark; he wanted to see the field he was poking around in. Funding of several million dollars comes among others from Doug Cobb, known for his many newsletters and books about PC software.

V-Search relies on the useful fact that legal documents (like medical documents and Web pages, as it happens) frequently cite one another. Rather than examine semantic links (based on presence and frequency of words...
FROM AN ONLINE DISCUSSION......

In reading news accounts of the militia organizations that appear to be behind the Oklahoma City bombing, it is striking the degree to which they are reliant on modern "few-to-few" technologies. Many people have pointed out the extent to which fringe and hate groups have made use of the Internet as an organizational and mobilizational tool. But the issue is not just that the communications technology facilitates the exchange of information; it also permits groups to filter out other types of information that might otherwise have served as a reality check. One reporter interviewing some militia members quoted a local sheriff as saying that in times past, these guys would have stood around the barbershop grousing about the government, but most information coming from the outside world would have been filtered through a larger media organization that most likely wouldn't have confirmed their point of view. Today, when they reach out to the outside world they find [...] a large network of like-minded people all over the country to support their particular paranoias.

[Although] the one-to-many character of earlier broadcast media was problematic [...] , it did have the virtue of knitting together something like a national community that would start from a similar information base (i.e., consensus that there were no Russian troops currently stationed in Mexico), even if individual citizens came to different political conclusions. It seems to me that contemporary few-to-few technologies allow segments of civil society to opt out of that national community in ways that weren't really possible in the past. These right-wing cases are not without precedent; extreme left-wing groups operated within their own separate and frequently quite delusional information world for many years. But the latter required a great deal more organizational effort, and often help from outside nation-states, than is required at present.

-- Francis Fukuyama
author, "The end of history"

within a document), V-Search focuses on analyzing the links between documents, which represent the intellectual effort of the lawyers who wrote them. In other words, the system looks at the network of links, identifies clusters of related documents and finds closely tied documents even if they never explicitly cite each other. Thus, if A cites B and B cites C, it imputes a link between A and C.

V-Search does this up to those famous six iterations (six degrees of separation) that are sufficient to capture 99 percent of the related items, according to statistical studies. (You can imagine how much fun it would be to apply this technique to relations among people, if they could only be explicitly represented; e-mail volume between people would be an excellent proxy. Of course there are privacy concerns, but we expect the CIA is already onto this one.)

Deriving the clusters is nice, but the next step matters too: representing the information in a meaningful way. This is where the content-specific
creativity comes in. As a lawyer, Egger knows how lawyers think. His display shows the target document at the top of the screen (see screenshot across). Displayed along with it are the "sources" (documents cited), "influences" (documents that cite the target document), or the "context," which includes the most relevant sources and influences and also relevant documents not explicitly cited (which are flagged, since they are easily missed in a conventional search). The X axis is time; the right edge of each document shows when it was created or last modified. The Y axis is relevance; the most closely related documents (on the basis of the link relationships) are shown at the top.

Finally, each document icon reveals further information: its depth indicates the relative size of the text; its color and texture show whether it's a statute or a legal ruling, and what kind of jurisdiction issued it (state or Federal appeals court, state statute, IRS ruling, whatever). Of course, you can click on an item and find out more about it, or display the entire text if you want, with key words highlighted. (The underlying text tool is Folio, but the Libertech technology is designed to work with most text tools.)

For a lawyer, this provides a concise but rich context for each document. Not only does it improve the lawyer's ability to find what he's looking for (the A-to-C links), but it enables him to see where his case fits in...

Egger and chief techy Ron Sauers (who led design of Persuasion for Windows for Aldus) have done a lot of work to make all this meaningful to the legal world. The company is in close discussions with Lexis, a partner company to Folio in the Reed Elsevier stable (see Release 1.0, 2-95), and is planning to sell the product as an OEM-style tool (with royalties) to as many online legal publishers as it can find. Of course, a law firm can use the tool to put its own internal legal documents in context with external ones available from such services.

_Egger and chief techy Ron Sauers (who led design of Persuasion for Windows for Aldus) have done a lot of work to make all this meaningful to the legal world. The company is in close discussions with Lexis, a partner company to Folio in the Reed Elsevier stable (see Release 1.0, 2-95), and is planning to sell the product as an OEM-style tool (with royalties) to as many online legal publishers as it can find. Of course, a law firm can use the tool to put its own internal legal documents in context with external ones available from such services._

Man does not live by law alone

Along the same lines, we can imagine equivalent (but very different) interfaces, for say, a medical database. You could take a disease, and display related articles about various interesting cases, treatments, drug trials, epidemiological studies. Drug studies might be one color; individual case histories another. Perhaps recoveries would be a light color; cases without cures would have a black edge. (One of the investors is David Jones Jr., active in a number of medical companies.)

We can also imagine another version of V-Search as a tool for management consultants to examine information flows within a company (as long as it used e-mail heavily); a similar tool is InFlow from Krebs Associates.

Obviously, it would be wonderful to use such tools and others to map bulletin boards or newsgroups; ideally, a faster version (the current one takes some time to pre-process a text base) could work in realtime chat sessions. Imagine seeing a person's remarks in context. You could see who listens to whom, and color cues might indicate the number of messages on a topic, showing the intensity of interest.

Unfortunately, one thing that will remain hard to determine automatically is the fine distinction between close relevance and sheer redundancy, or between reasoned argument and spurious sputtering about the same topic.
A sample V-Search screen. The target document is at the top of the screen. The most closely related document is Pagel, Inc. v. Commissioner; relevance decreases as one moves down the display.
RESOURCES & PHONE NUMBERS

Kirstie Bellman, ARPA, (703) 696-2219; kbellman@arpa.mil
Wally Feurzeig, BBN, (617) 873-3448; fax, (617) 873-2455; feurzeig@bbn.com
Barry Kort, BBN (MicroMUSE), (617) 873-2358; bkort@musenet.org
Martha Conellan, Frank Snyder, Computer Curriculum Corp. (CCC), (408) 541-3307; fax, (408) 734-2194
Michael Begeman, Jeff Conklin, Corporate Memory Systems, (512) 918-8000; fax, (512) 918-9600; begeman@msi.com, conklin@msi.com
Misha Donskoy, DISCo, (408) 944-6270; fax, (408) 944-6272; donskoy@child.msk.su
Bill Finzer, Key Curriculum Press, (510) 548-2304; fax, (510) 548-0755; bfinzer@keypress.com
Rick Devine, Dan'l Lewin, KidSoft, (415) 399-9992; fax, (415) 399-1782
Valdis Krebs, Krebs & Associates, (805) 582-9498; fax, (805) 582-9499; valdisk@aol.com
Dan Egger, Libertech, (919) 419-6233, fax, (919) 419-6041; libertec@cybernetics.net
Amy Bruckman, MIT Media Lab, (617) 253-5108; fax, (617) 258-6264; asb@media.mit.edu
Nora Sabelli, National Science Foundation, (703) 306-1655; fax, (703) 306-0434; nsabelli@nsf.gov
Jim Walters, Phoenix College (MariMUSE), (602) 285-7445; fax, (602) 285-7368; Walters@pc2.pc.maricopa.edu
Francis Fukuyama, The RAND Corporation, (202) 296-5000 x5617; fax, (202) 296-7960; fukuyama@rand.org
Dan Bricklin, Software Garden, (617) 332-2240; fax, (617) 965-8983; danb@world.std.com
Annie Fetter, Swarthmore College, (800) 756-7823; fax, (610) 328-7824; forum@forum.swarthmore.edu
Charles Ferguson, Vermeer, (617) 576-1700; cferguson@vermeer.com
Daniel Bobrow, Vijay Saraswat, Xerox PARC, (415) 812-4367; fax, (415) 812-4380; bobrow@parc.xerox.com, saraswat@parc.xerox.com

WEB RESOURCES

The Geometry Forum http://forum.swarthmore.edu
MUSEnet http://web.musenet.org
MariMUSE (via telnet) pc2.pc.maricopa.edu:4228
MegaMath http://www.c3.1anl.gov/mega-math/
A great Sketchpad example http://olmo.swarthmore.edu/webtour/squares.html

COMING SOON

- What's a zine?
- Links, filters and navigation.
- Advanced user interfaces.
- The economics of the Internet.
- The analog world.
- And much more... (If you know of any good examples of the categories listed above, please let us know.)
## Release 1.0 Calendar

<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 29-June 2</td>
<td>Networld + Interop - Frankfurt, Germany. Sponsor: Seybold Seminars. Call Christi Leer, (415) 578-6985 or (800) 488-2883; fax, (415) 525-0183.</td>
<td></td>
</tr>
<tr>
<td>May 31-June 2</td>
<td>Data Fusion - Washington, DC. Sponsor: Seybold Seminars. Call Christi Leer, (415) 578-6985 or (800) 488-2883; fax, (415) 525-0183.</td>
<td></td>
</tr>
<tr>
<td>May 31-June 2</td>
<td>The Global Online Services Summit - Brussels. Sponsored by Jupiter Communications. Call Harry Larson, (212) 941-9252; fax, (212) 941-7376; e-mail, <a href="mailto:jupiter@jup.com">jupiter@jup.com</a>.</td>
<td></td>
</tr>
<tr>
<td>June 1-2</td>
<td>Licensing Law Institute - New York City. Sponsored by Aspen Law &amp; Business. Call Margaret Ross (201) 894-8260; fax, (201) 894-0074.</td>
<td></td>
</tr>
<tr>
<td>June 4-6</td>
<td>cyber.xpo.95 - Las Vegas. Sponsored by Sysop News. Call Denise Northrop, (614) 452-4541 x3124; fax, (614) 452-2552; e-mail, <a href="mailto:cyberxpo@muskingum.edu">cyberxpo@muskingum.edu</a>.</td>
<td></td>
</tr>
<tr>
<td>June 5-6</td>
<td>U.S. Copyright Office Speaks - Washington, DC. Sponsored by Aspen Law &amp; Business in cooperation with The United States Copyright Office. Call Margaret Ross, (201) 894-8260; fax, (201) 894-0074.</td>
<td></td>
</tr>
<tr>
<td>June 5-7</td>
<td>Digital World - Los Angeles. Sponsor: Seybold Seminars. Call Alison Murdoch, (415) 578-6887 or (800) 488-2883; fax, (415) 525-0183.</td>
<td></td>
</tr>
<tr>
<td>June 7-9</td>
<td>TAG's Retail Compass Conference - San Jose. Sponsored by TAG's Channel Compass, TWICE magazine and SMART magazine. Call Linda Gillette, (415) 957-9433; fax, (415) 957-0504.</td>
<td></td>
</tr>
<tr>
<td>June 13-16</td>
<td>International Teleconferencing Association (ITCA) '95 - Washington, DC. Sponsored by the ITCA. Call Stewart Herbert, (703) 506-3283; fax, (703) 506-3266; or call (800) 891-8633 for fax on demand.</td>
<td></td>
</tr>
<tr>
<td>June 17-19</td>
<td>@National Educational Computing Conference (NECC) - Baltimore. Sponsored by National Educational Computing Associa-</td>
<td></td>
</tr>
</tbody>
</table>
tion. (NECA). If you found the issues interesting, this is
the conference to attend. Call (410) 830-2773; fax, (410)
830-2629.

June 19-20
Multimedia Marketing & Distribution - New York City.
Sponsored by AIC Conferences. Call Trina Johnston, (212) 952-
1899 x334; fax, (212) 248-7374.

June 20-22
Community Networking Workshop - Princeton, NJ. Sponsored by
the IEEE Communications Society. Call Joel Winthrop, (908)
949-5008; fax, (908) 949-8569.

June 20-22
@PC Expo - New York City. Organized by Bruno Blenheim. Call
Annie Scully, (800) 829-3976 or (201) 346-1400; fax, (201)
346-1532.

June 27-28
@Interactive Advertising - New York City. Sponsored by AIC
Conferences. With Jerry Michalski playing emcee the first
day. Call Trina Johnston, (212) 952-1899, x334; fax, (212)
248-7374.

June 28-30
INET '95 - Honolulu. Sponsored by the Internet Society. Call
them at (703) 648-9888; fax, (703) 648-9887; e-mail,
mburger@isoc.org.

July 9-12
The Burton Group Conference on Network Computing - Colorado
Springs. Sponsored by The Burton Group. Call Doug Allinger,
(800) 824-9924 or (801) 943-1965; fax, (801) 943-242; e-mail,
info@tbg.com.

July 11-12
@Magazines and New Media - New York City. Sponsored by Maga-
zine Publishers of America. With Jerry Michalski hosting a
new-technologies panel. For registration info, call Debbie
Lipman, (212) 872-3758; fax, (212) 888-4217. Questions? Call
Diane Cremin, (212) 872-3766.

July 17-20
WGA '95 - Washington. Sponsored by Wireless Cable Association
International. Call Michael MacPherson, (202) 452-7823; fax,
(202) 452-0041.

July 23-26
Spotlight 95 - Laguna Niguel, CA. Sponsored by Infotainment
World and InfoWorld Publishing Company. Call Lia Lorenzano,
(415) 312-0693; fax, (415) 286-2750.

July 25-26
Online Publishing Strategies for Newspapers - New York City.
Sponsored by AIC Conferences and Multimedia Week. Call Trina
Johnston, (212) 952-1899 x334; fax, (212) 248-7374.

August 16-19
AI-ED '95: 7th World Conference on Artificial Intelligence in
Education - Washington, DC. Sponsor: Association for the Ad-
vancement of Computing in Education. Call Gary Marks, (804)
973-3987; fax, (804) 978-7449; e-mail, AACE@virginia.edu.

August 16-20
ONE BBSCON - Tampa, FL. Organized by ONE, Inc. To register
call (303) 693-5253; fax, (303) 693-5518. Where BBSers go F2F
IRL. Registration questions? Ask for Kathy Thrushkill. Exhib-
it questions? Ask for Bob Holley.

August 20-25
International Joint Conference on AI - Montreal. Sponsors:
International Association for AI, AAAI, and the Canadian
Society for Computational Studies of Intelligence. Call Carol
McKenna-Hamilton, (415) 328-3123; fax, (415) 321-4457.

August 23-25
DIS '95 Symposium - Ann Arbor. Symposium on Designing Inter-
active Systems. Sponsored by ACM SIGCHI. Call Sue Schuon,
(313) 747-3110; fax, (313) 936-3168.

September 11-15
EGSCW '95 - Stockholm. Sponsor: Foundation for Cooperative
Work Technology. Call Yngve Sundblad, 46 (8) 102-477; fax, 46
(8) 790-6280; e-mail, ecscw95@kth.se.

Release 1.0 26 May 1995
September 11-15  Information Superhighway Summit - Santa Clara. Produced by IDG World Expo. To register call (800) 225-4698 or (508) 879-6700; fax, (508) 872-8237; e-mail, comnet@idgwec.com or http://www.idgwec.com. Questions? Ask for Marli Hoyt.


September 12-14  Networks Expo '95 - Dallas. Organized by Bruno Blenheim. Call Annie Scully, (800) 829-3976 or (201) 346-1400; fax, (201) 346-1532.

September 19-21  @Unix Expo - New York City. Organized by Bruno Blenheim. Call Annie Scully, (800) 829-3976 or (201) 346-1400; fax, (201) 346-1532.


September 27-29  The Media Alliances Conference - La Jolla, CA. Sponsored by The Kelsey Group. Come understand who's doing deals with whom. Call Natalie Kaye, (609) 921-7200; fax, (609) 921-2112.


October 3-5  PC Expo - Chicago. Organized by Bruno Blenheim. Call Annie Scully, (800) 829-3976 or (201) 346-1400; fax, (201) 346-1532.

October 8-10  *EuroChannels - Paris. Sponsored by Global Touch, Inc.; Ingram Micro; Merisel; and Computer2000. Call Josiane Emorine (510) 649-1100 x14; fax, (510) 649-1155; e-mail, globaltouch2@mcimail.com.

October 15-18  **East-West High-Tech Forum - Bled, Slovenia. The sixth annual sponsored by EDventure Holdings. Call Daphne Kis, (212) 924-8800; fax, (212) 924-0240; e-mail, info@edventure.com.

October 15-19  OOPSLA-95 - Austin. Organized by OOPSLA-95 Conference Committee. Call Karen Breedlove, (503) 691-0890; fax, (503) 691-1821; e-mail, oopsla95@applelink.apple.com.

October 16-20  8th International Symposium on AI - Monterey, Mexico. Organized by ITESM. Call Jose Sanchez, 52 (8) 328-4197; fax, 52 (8) 328-4189.


* Events Esther plans to attend.
@ Events Jerry plans to attend.

Lack of a symbol is no indication of lack of merit.
Please let us know about other events we should include. -- Christina Koukkos

Release 1.0  26 May 1995
Please enter my subscription to **Release 1.0** at the rate of $595 per year in the U.S. and Canada. Overseas subscriptions are $650, airmail postage included. Payment must be enclosed. Multiple-copy rates available on request. Satisfaction guaranteed or your money back.

Name ____________________________
Title ____________________________
Company ____________________________
Address ____________________________
City __________________ State __ Zip __
Telephone ____________________________

☐ Check enclosed.

☐ Charge my
   ☐ American Express  ☐ MasterCard  ☐ Visa
   Card Number _______________________ Expiration Date __________
   Name on Card _______________________ Signature ______________________

☐ Please send me information on your multiple-copy rate.

Please fill in the information above and send to:

**EDVENTURE HOLDINGS INC.**
104 FIFTH AVENUE, 20TH FLOOR
NEW YORK, NY 10011

If you have any questions, please call us at 1 (212) 924-8800;
Fax 1 (212) 924-0240; e-mail info@edventure.com.

Daphne Kis
Publisher