PERFORMANCE SUPPORT: WORKER INFORMATION SYSTEMS

What's a company's greatest asset, according to many annual reports? People, of course, not computers or even reusable code. This issue is about how to invest in people -- albeit through the medium of reusable code and content, or electronic performance support. Performance support is the obverse of workflow: Workflow automates the flow of work from one person to another; performance support helps the person at each workflow node to do what cannot be automated. Many workers' tasks may seem to be routine and limited, but electronic help enables them to handle routine work more efficiently -- and unexpected situations more effectively. Otherwise, if you can't leverage the people, maybe the tasks should be fully automated: Why involve a person at all?

Conventional business wisdom is switching from the capital equipment model of investing to the continuous improvement model. In the past, you did a needs analysis, bought some equipment, used it until it wore out and started over again; now you continually assess your needs, buy stuff, improve it and change as you go. Likewise, in the systems world, in theory, re-engineering never stops.

But with people, we're still in the capital-equipment mode. You draw up a job requisition, hire someone, train him, and let him grow on the job. When he leaves or retires or your business expands, you start over with more requisitions....

Of course, this picture is exaggerated, but generally training is considered a costly event rather than a continuing investment process. We separate it from work and focus on the time it takes from work, even though its goal is to save time in the long run.

With this as background, let's take a look at the notion of performance support. The idea is simple: Online support for the performance of work, instead of for the use of software. The difference is subtle but the impact can be huge. Online performance support encourages people to think about their work, rather than fuss with computer tasks. Moreover, since it's online like regular help,
users can keep on learning as they perform their jobs, rather than in discrete training sessions or software.

What is performance support? That depends on who is selling it. Many vendors come out of the training world, and consider it just-in-time training, applied as needed instead of beforehand (which makes sense except for airline pilots!). The politically correct word for a user is "performer."

Worker information system

Others, from the computer world, call it online help for tasks instead of for the system itself. In a broad sense, performance support should be part of every application for end-users, with a focus on the performer's task rather than the tools or the corporation's data.

For example, a sales support system such as Intel's iKNOW (page 8) assists a salesperson in eliciting and analyzing client needs, and matching those needs to the company's offerings or comparing them to a competitor's. Avis's TAFT (page 10) was designed so that the performer can enter data in any order, just as the car-rental customer delivers it. An analyst's support system such as Hartford Insurance's (page 11) helps to collect the relevant data and lead the performer through the proper steps. A tax system such as RUI's (page 12) will guide Russian workers with what they need to know about business as well as the intricacies of the computer itself.

Performance support is also a kind of content software; the content is the specifics of the information and the process required to perform a specific set of tasks. Thus, for example, it combines the data a worker needs with guidance on how to assess the data or present it to a customer. The quality of performance support depends not so much on the technology as on the content it embodies and its relevance to the performer's tasks (see Release 1.0, 11-92 and 2-93).

From yet another perspective, performance support can be a groupware application: Performance support content can come from other workers as well as from management. Performance support spreads best practice as well as new procedures and insights throughout an organization. It need not -- should not -- be rigid and fixed (although there should be someone to vet it so that misinformation is not spread).

Technically, performance support frequently looks like database access and navigation tools plus context-sensitive online documentation. It can be built with hypertext tools or expert systems; it needs to know what the user is doing; it should be kept in neat modular fashion so that it's easily changeable as the underlying system changes.

This issue discusses some of the technology issues in performance support, the marketplace, and a few case histories.

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If executives can be made so much more productive through better information systems, why not give similar power to those on the front line -- the workers? 
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Release 1.0 
24 August 1993
New bottles fundamentally improve old wine

What makes performance support different from plain old help on the one hand, or decision-making expert systems on the other?

As noted, performance support is different from help because it focuses on a task, not on the tools used for the task. This is a fine line in practice, and a good solution, as opposed to an application or a piece of performance support, should comprise both. But in principle the distinction is clear. Help helps the user to use the software; performance support guides and assists the user in accomplishing a task, with or without software.

On the other side, if an expert system can make a decision, it should. If it can’t, it should collect the right information to help the user decide appropriately. Many performance support systems include expert systems as part of a broader arsenal of capabilities.

Performance support is built using traditional tools, but with the user’s task in mind. That is, you organize the data to make it easier for the user to accomplish something specific. While tutorials tend to run in a specified sequence and help is usually indexed and searchable but with no sequence at all, performance support ideally follows the sequence of the task but is flexible enough to accommodate a broad range of situations and sequences as they happen.

For example, a spreadsheet can make data manipulation easier, but a performance support system such as Hartford’s UIW (page 11) reminds the performer what factors to consider, flashes reminders if values are left out or are out-of-range, and so on. It is inherently content-rich and task-specific. A pr support tool such as MediaManager (page 15) guides a pr agent not just through the data about media contacts, but through the entire process of finding appropriate contacts by topic, calling them, making appointments and following up with confirmations; the performer can follow her own sequence, but the steps are displayed on the screen in windows.

The performance support marketplace

Long-run, performance support is essential to any well-designed application used by humans: It's an embodiment of the processes and procedures that add value to any company’s raw materials or basic functions. There are three primary market segments:

- custom systems, which presumably contain competitive advantage. They can be built by outside consultants or in-house. Greg Long of RWD, a performance support consultant, notes that they are best done through a joint effort of in-house business/content experts and outside performance support experts (cf. expert systems). (page 8; vendors, page 14)

- generic applications, which are basically business content software, such as planning a conference, orchestrating a move (we know about that one!), handling public relations or managing people. (page 17)

- tools, many of which are traditional "help" tools, such as hypertext, multimedia, user interfaces, groupware tools and the like. (page 20)
PERFORMANCE SUPPORT IN PERFORMANCE

Imagine...

Juan calls the Add-a-Card hotline in a huff. He has just been informed that his payment is overdue and he's annoyed. He wants to cancel the card. Alice takes the call. She doesn't know Juan, of course, but already he's screaming at her. "I charge $12,000 a month, and your lousy company...!"

Does he really charge $12,000 a month? (Alice herself, a part-timer, earns $12,000 a year.) Does he normally pay promptly, as he claims? Good data capture and display could quickly show the answers to Alice. Better yet, an expert system could answer the question: Is this customer profitable to us? Should we try to keep him? Or should we get him to pay up and then...good riddance!

What Alice needs is not so much an answer but a strategy: Try to keep this customer? Or let him go? It's up to her to handle him, but the system -- performance support -- can give her guidance on her goal.

The system doesn't insult her intelligence by giving her a script to read, especially not in response to Juan's unpredictable and creative invective. But it lets her know what her company is trying to accomplish -- keep Juan or lose him -- and it trusts her judgment in controlling the situation.

Ultimately, performance support will become mainstream, the province of all system builders. At that point "performance support vendors" will either be leaders in specific content niches, or suppliers of tools and expertise to application developers and corporate customers.

Why now?

You could view performance support as just a marketing construct -- a way to position a collection of nifty new technologies: hypertext, case-based reasoning, multimedia, expert systems. Partly true, but that doesn't invalidate it as a concept. It's about how to use these technologies to build useful systems for the real world, rather than about new technology per se. (Case-based reasoning itself is mostly a packaging of expert systems and text retrieval through pattern-matching.)

Both the technologies and the time are right. Service industries are on the rise, and performance support appropriately focuses on serving customers, sales support, life insurance policy design and other service tasks. (Workers do "perform" in other fields as well -- from factories to management development.)

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Empowerment requires more than delegation and preaching. It requires support. -- Gloria Gery, PS consultant
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Some major factors:

- Businesses are trying to make organizations flatter and reduce cycle times, pushing decision-making into the hands of more people -- ones closer to the customer or the task. Yet people need help in doing these tasks.

- The easy jobs can now be automated. The overall nature of business is changing, with more focus on quality of service, interaction with the customer, quality inspections, corrections on syntax and troubleshooting. The challenge is to automate support of people in functions that can't be automated -- whether they're calming an irate customer, reasoning by analogy to handle a new situation, selling a cemetery plot or sitting at a reception desk. With performance support, workers can concentrate on the value-added part of the task.

- Many jobs are changing rapidly, and encompassing a wide range of tasks that no single person can learn in full. It's not worthwhile to train people completely; rather, performance support equips them to learn as needed (with more content in the performance support than any single performer will ever use). Some tasks occur so rarely that they're not worth learning, but it's handy to have the requisite support available.

- The workforce is becoming more diverse and less likely to share common knowledge, assumptions, attitudes or behavior. Performance support is a grass-roots medium for business-technology transfer. As companies enter new markets and new countries, performance support can help ease the training burden. It is the ideal way to share knowledge across a broad, diverse user base and enforce a base level of consistency.

- Turnover is a big problem in many businesses. Performance support can help get new workers up to speed faster, reducing both formal training time and the time needed for a new worker to reach average or peak efficiency. And by making the job more pleasant and less confusing, it can help to reduce burn-out and turnover in the first place.

Why not until now?

Performance support has been floating around for several years already. But the term hasn't caught on, most likely because its proponents tend to come from the training or human resources end of things, and get little respect from MIS or line management. (Much the same issue hampered information retrieval and information services, which were originally the province of librarians.) But now that computers are in the hands of line managers and business departments, performance support has followed. The concept is finally coming out into the light as companies pay more than lip service to the annual report's claim that "people are our greatest asset."
LEARNING WHILE YOU WORK

The point is learning, not training. Most learning doesn’t happen in classes anyway, but on the job. Until you’ve done something, you can’t generally learn it effectively. What you need is just-in-time coaching, not just easy-to-find manuals online.

There are several goals of performance support. The simple one is to let a newcomer handle all the facets of a specific, defined task. As people take on more jobs that are more complex or more comprehensive, they need help accomplishing unfamiliar tasks that are part of an expanded job—such as dealing with an overwhelming set of rules about vacation time, or selling a new variety of security to a widow or orphan. Some of this is pure data retrieval and presentation—-not rocket science at all.

A second goal is to support the user in doing the job beyond what a customer could do for himself or get a computer to do. That is, if all Alice does is retrieve information and read it over the phone to Juan, she won’t have a job for very long. She needs to calm him down, sell extra services to him, or otherwise add value to the data he could just as easily get from an information kiosk, a voice-response system or an online information service. (Pretty soon, it will cost Juan more to get Alice on the phone than it does to dial into a database for himself.)

The learning organization—feedback

But the most ambitious goal is to support the users in doing the job beyond what the supervisor or company could teach him. If all you do is what your boss tells you, one of you is redundant.

All the buzz about management these days pays homage to the learning organization. But how do you get people—and their organizations—to learn? The way to learn for an individual is to try new things, make new decisions, etc. The way to learn for a company is for people to share new information and insights—either feedback to management or peer-to-peer performance support (i.e. groupware).

Feedback requires channels (and tools) for employees to send information back to management while they’re on the job, noticing what customers tell them, how particular tasks could be made more effective or easier to perform and other insights gleaned in the thick of activity. (One company focusing on such systems is Diacom, of Aptos, CA, to be covered in a future issue.) But if you ask for feedback, you must be able to handle it!

For employees to learn from each other, you need some kind of peer-to-peer communication (also known as information-sharing groupware; see Release 1.0, 8-92). This is an enticing notion: Employees learn from each other, sharing wisdom and insights. As each learns individually, he contributes to the greater-than-the-sum-of-the-parts knowledge base of the group as a whole. There are three flaws in this rosy scenario:

First, what will make the employees want to share? Sometimes people prefer competitive advantage over their peers within the corporation, to competitive advantage over other firms (especially when companies get too large and inward-focused). This problem may require a change in the cor-
porate culture -- and its incentive structure, whether money, recognition or other means.

Second, creating performance support for others is not an easy task (which is why it's a promising market for those who do so). It requires people to make explicit what they know, and to take the trouble to enter it into the system. It's much more than simply sharing a database of contacts, although that's a start.

Third is the issue of quality control. Suppose what people have learned and want to share (now that incentives are in place) is "wrong" -- whatever that means? It may contradict corporate policy; it may work in one location but not another; it may annoy the boss; and so forth.

This problem is no different from managing a normal corporate immune system against erroneous information and practices, but the technology of performance support makes both the opportunities for and the dangers of information dissemination greater. Regular performance support lets the corporation train and teach employees, top-down; groupware lets them learn from each other. If you have capable, motivated employees in the first place, this can be a powerful enhancement to their abilities. In the end, it's probably better to allow a freer flow of information, and hope that employees themselves will take care of the garbage. Frequently the battle is the company establishment against new ideas, right or wrong.

It would be a waste of time to have someone whose only job was to oversee the information disseminated through a corporation; everyone should be in charge of finding fallacies and the like. But we can certainly imagine it: "Juan Tigar, corporate knowledge integrity officer" or "Alice Haynes, director of information validation."

A look ahead...

But there's more. There are two kinds of performance/learning (just as in a meeting there are two kinds of communication; see Release 1.0, 3-93). One is cognitive and content-oriented; the other is social, or how people work together. One covers performance of specific tasks, whether routine or beyond-routine, and is the focus of current performance support. It focuses on the substantive content -- although it should give employees the knowledge to go beyond what they're told.

The second covers motivation and organizational learning -- which is not just the sum of individual learning. It means wanting to do the right thing, sharing as well as understanding the company's goals. It means learning how to work together with a specific group and the individuals in the group. It generally comes from personal interaction -- whether sharing the task of heaving around boxes during a move, having lunch with the president in the company lunchroom or playing soccer at the 115-Percent Club trip to Hawaii. Sure, a video of the president outlining her goals for 1995 could also be motivating, but in the end it depends on the force of her personality even as delivered through a video (augmented by a speech coach, to be sure).

We'll cover this in a future issue.
CUSTOM SYSTEMS

When performance support is truly successful, it will be taken for granted and will no longer be a specific market. Instead, it will be part of every well-designed application. On the other hand, performance support experience will carry cachet in a resume or a company's list of capabilities, just as user-interface and client-server expertise does now.

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Issues of intellectual property and competitive advantage arise.
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Because performance support is so close to the heart of a business, a large part of this business will be custom systems, which companies will attempt to use for competitive advantage. How much good is performance support purchased off the shelf, when it's available to your competitors? Thus, it should be developed in close contact with the ultimate users and the business process owners, even if some implementation is handled by outside consultants. (See page 14. Separately, there will be a semi-mass market of uncustomized but customizable performance support tools; page 17.)

Performance support should also be modified/improved continuously, as the applications and associated business procedures themselves evolve. If you want people to keep learning, you need to give them new things to learn, not the same old performance support from last year. (There are always new people coming in who need the basics.)

INTEL -- FROM CATALOGUWARE TO PERFORMANCE SUPPORT

As the most successful company in its market, Intel from time to time faces charges of questionable sales practices (among other things); the FTC recently ended an investigation of the company. In order to defend against such charges, and to ensure that its own sales people consistently follow corporate policies, Intel is paying scrupulous attention to its sales training and support programs. One of them is a performance support system called iKNOW, for Intel Knowledge Now Online Worldwide, part of Intelligence, Intel's program for deployment of notebooks to the field.

Intel, the company that wants you to use ever more hardware for fax, e-mail, groupware and real-time conferencing, and which uses them itself, also has an internal performance support system for its salespeople. The effort is managed by Beth Towle, a former systems analyst and more recently a senior business planner at Intel.

Intel's problem is that each Intel salesperson sells the entire product line of some 2000 different products -- everything from fax cards to flash memory, from microprocessors to naked pcs. No single salesperson can keep track of all of these, let alone follow a myriad of competing products that never quite match precisely. "Well, it's more powerful than the 87CA196KRU, and a little more expensive, but it also has a special caching feature..." There's no good way to compare products precisely. Moreover, sometimes a customer wants to know the specifics: the logic design of a chip, for example, or the appropriate components to use with a certain fax card.
Intel salespeople used to travel with heavy catalogues, sheaves of spec sheets and their own arsenal of presentations. Despite covering the whole line, most salespeople in fact had a specialty or two, depending on their customer base. But that meant that they missed the opportunity to sell the whole line, leaving opportunities for other more focused firms. Sales approaches were inconsistent from person to person and market to market.

So far, iKNOW is just being rolled out. It is designed to help salespeople do their job, which is explain Intel's broad range of products to customers. It is used by both internal salespeople and by dedicated reps within outside distributors. More than just an online catalogue, it is built around the concept of a presentation: a product line, competitive information, animated demos, typical applications, and every salesperson's dream -- responses to common objections. Eventually it will talk to other modules of the Intelligence system, which will handle tasks such as order-taking.

"We built it to follow the Wilson Sales Training model [which describes the sequence from first contact to closing]," says Towle. "The further away from us they are, the more they like it and rely on it." A salesperson can add his own information (but not overwrite the corporate info or pricing rules) and devise his own path through a sales presentation.

Lawyer in a laptop and other wonders

And then there's "Lawyer in a Laptop." Is it okay to offer a discount if a customer buys another product as well? Can you promise early delivery under certain conditions? What can you say about competitive vendors? All these questions are discussed by the lawyer in a laptop, a special animated help system that the user can call up from the menu. (This part is not designed for display to customers!) It explains the various legal issues, and -- to make the whole exercise bearable -- shows vignettes of good salespeople and bad salespeople with practices to avoid. For example: The bad guy promises a special deal if you buy from Intel exclusively.

iKNOW is built with Asymetrix ToolBook, and is distributed through the Lotus Notes replication facility to each of Intel's 1200 salespeople, plus about 300 dedicated reps who work for Intel distributors. Towle's group has now built a template for use by subject matter (product) experts, who can use it to create the appropriate modules. This is much more than simply information access, says Towle, who originally envisioned simply putting Intel's catalogues on-line. "In fact," she says, "not all the information is necessary. We try not to distract them with extraneous details, and just give them what they need for each customer." The information is displayed according to the rules of Information Mapping, a company that specializes in the display of complex information.1

The biggest challenge she faces is getting the process of making the modules semi-automated. Her goal is to produce modules within 30 days of new product releases, so as to keep up with Intel's never-ending stream of new prod-

1 Information Mapping is based in Waltham, Mass. It runs courses, publishes books and now sells software in conjunction with vendors such as Interleaf. We will cover its approach in a future issue.
ucts. To date, her team of two -- a programmer and a content expert -- has produced 13 modules in eight months, working with the appropriate subject experts in various product areas, and with Ariel PSS as outside consultants. "We still haven't fully worked out the process of getting people coordinated to do it," she says. While salespeople love the tool, and it's especially useful for people new to the job, producing the content is not a priority for product marketing engineers with other challenges on their minds; it's even more of a chore than documentation! For now, they pretty much produce the modules from scratch, importing ASCII files or diagrams into ToolBook.

In the long run, we expect, Intel will use some form of SGML-based publishing tool that will allow product specs and literature to be converted semi-automatically into iKNOW modules.

"We've created customer versions of some modules such as Pentium (without the sales support and confidential information) as disks for customers.

AVIS -- FROM MAINFRAMES...TO MAINFRAMES WITH PERFORMANCE SUPPORT

AVIS recently installed a "client-server-host" performance support system. That is, the company kept its traditional mainframe-based reservations system intact, but it replaced the 3270 front-ends with an intermediary Sun SPARCserver 10 running Sybase SQL Server and 700 Macs in a system called Tulsa Advanced Function Terminal (TAFT). The Sun looks like an LU6.2 node to the host, but like a server to the Macs, which act as nice friendly clients for the users. The Macs do not lead the performers through the traditional inflexible sequence of information collection, but rather let the users enter data as they receive it from the clients; the Sybase server translates it for transmission to the host.

To develop the system, which took 18 months (although it will continue to be upgraded, of course), TAFT programmers and analysts spent weeks listening to employees and to actual phone calls. "With a traditional mainframe system, the employee would have to lead the conversation according to the prompts on screen," says vp networks and technology Peter Tittler. ["No, don't tell me that yet! First say when you want it!""] "But customers give us information in their own order. They talk about things their own way; they say 'next Monday,' not 'August 30.' The reservation agents kept having to translate."

AVIS made the system flexible so workers can bounce up and down the screen. They can use accelerator keys, cursor keys or the mouse, depending on what each prefers. Moreover, they don't have to enter the data in the "right" place. For instance, if a customer tells them "next Monday for three days," they can type "=MO =+3" into the date field, even though there's a separate field for length of rental. If the customer happens to say "from the fifth to the eighth," they can type in "=5 =8," and the system will accept that and translate it into the same set of 0s and 1s for the mainframe.

Moreover, says Tittler, the system has replaced the paper reference rack, a 12-inch set of paper and updates covering such things as minimum rental age in Minnesota, for someone with a credit card but without a corporate agree-

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2 That's just mainframe talk; don't mind it!
ment with Avis. The original thought, said Tittler, had been to put the entire manual on-line, with a full-text search engine, and perhaps with hypertext. But the users objected; now the manual has been turned into a linked expert system. If the rental is in Minnesota and the user presses the "age" key, the system already knows all the details that have been entered; it can flash the answer and how to break the news to the customer, or it can ask appropriate further questions (Is the customer in military service?). The issue wasn't the effort of taking the manual from the shelf, of course (although that's a pain, too), but reading through it and finding the parts that applied to a particular situation.

The results so far are preliminary, says Tittler, but promising. The call center has more than 1000 employees, with turnover about 20 percent; overall, about 250 people need training (start-up or refresher) each year. The start-up training time has already dropped from 18 days to 13, and he expects it to sink further to 10 days. In the past, it has taken 6 months for new employees to reach average productivity; obviously, reducing that would be a real benefit. Moreover, says Tittler, "We hope we can reduce turnover if we make their life less stressful."

"When we did the pilot, we saw a significant decrease in talk time; we alternate between getting talk time down and sales up. But the trade-off has definitely shifted to more revenue per minute of talk-time."

HARTFORD INSURANCE -- FROM ONE TASK TO MULTI-TASK PERFORMANCE SUPPORT

While developers at Avis looked at users to see how they actually worked, the issue at ITT Hartford Insurance was the opposite -- helping workers to adapt to a large-scale re-engineering program in the Hartford's commercial business market segment to cut costs and provide better service. The answer is the Underwriter Information Workstation (UIW). This is a desktop system that will deliver a majority of the 88 applications Hartford plans over the next five years as part of the re-engineering program.

This re-engineering of the business will require broader expertise on the part of Hartford's commercial underwriters. The goal of UIW is both to enable them to take on more tasks and to reduce turnover, since such people are expensive to hire and train. "They now have multi-faceted jobs," says Celia Duke-Moran, educational consultant in ITT Hartford's Information Management Education Division. "Someone who just did property insurance may now need to know casualty insurance plus be a point of contact for sales and loss-control as well. We're moving to a one-point-of-contact model, where a single person can handle multiple aspects of an account. We're trying to reduce the pain of becoming expert at all that. Ideally we'd rather not have people stop working while they pick up their new skills."

Basically, the UIW will comprise a number of applications for its newly multi-faceted underwriters. The first to be outfitted with performance support is Property Underwriting Analysis, already in use. Its performance support includes extensive background information, along with expert systems for evaluating risks and supporting rating (pricing) decisions on commercial risks. It makes sure underwriters consider relevant factors for each kind of risk, by industry, location, prior experience of applicant, and so on. The specific factors for a hamburger franchise, for example, would be dif-
ferent from those for a jewelry store, even though both are retailers. The system adjusts easily to the level of expertise of the user; novices can pick items off lists and menus, while experts can just key in the appropriate codes. There's ample help, from warnings on inconsistent answers, to forms that come up at the appropriate point in the sequence of a rating session. And all the information in the previously paperbound underwriting manuals is in there, along with training modules for novices.

Duke-Moran chose Asymetrix ToolBook, both for its friendly GUI and for its hypermedia capabilities, which can link pieces of rich information to each other or to data from more structured sources such as customer files. "When you put someone in a traditional, isolated learning environment," says Duke-Moran, who teaches when she's not working on projects such as UIW, "you've taken them away from what really matters to them, and I know as their instructor that my training event is somewhat entertaining. But in the working environment, the support has to be more serious -- friendly, yes, but not entertaining. The workers are on the front line; they want to be informed, not entertained."

So far, the system has been rolled out in just one flagship office, but it could eventually broaden to comprise 44 offices and about 4500 users.

APPLE IN RUSSIA -- FROM ABACUS TO PERFORMANCE SUPPORT

Russia brings many of the problems of supporting workers into sharp relief. Not only do most Russian workers not know computers or word-processing, many don't even know what an invoice is, how to answer the telephone properly, or how to calculate profits. Specifically, government employees have little experience with examining taxpayer financial statements, handling unemployment insurance or health benefit claims, selling apartments into the new private housing market, or doing most of the tasks facing them under the new regime. Moreover, there's no one around with experience to train them. A full solution in Russia is more than just platform, network and applications. It includes training and -- of course -- performance support.

When Apple's Mac entered the US market, it competed with DOS, and it defined its own market of tasks and customers who required a graphical user interface, most notably the desktop publishing market, and expanded from there.

But in Russia, the Mac now faces a market with an existing standard -- and Windows. Apple has about 10 percent of the market in the US; in Russia, it has maybe 1 percent. Worse than that, while Mac software is readily available in the US, in Russia it's almost impossible to find; meanwhile, DOS software is available all over Russia for purchase or copying.

Thus in Russia, Apple's exclusive distributor RUI has tried to redefine the market to avoid competing directly with the pc and Windows. Its revenues now exceed $1 million a month, but that's still just the beginning.

3 Although the same applies to employees in the new private enterprises, it's still the governments (unfortunately) that have the money to pay, and the workforce size to merit large-scale development projects. Private enterprises might be a better market for generic performance-support tools.
Government support

RUI's general manager Brian Keating, who formerly ran a training business for Drake International, is taking almost a mainframe approach, promising customers a full solution and downplaying the proprietariness of the platform. "We're looking for 'foundation' areas, such as taxes or health care, where there's a need for continuous learning as the rules change," he says.

Keating's approach is to build an entire set of government applications, along with the appropriate performance support. Obviously, this will be a long-term project, requiring the help of a number of consultants -- experts both in government and in software/performance support development. But his first contract, awarded this summer, should be a fine proof of concept -- not just for Russia but for Apple itself.

That contract is for 1000 Macs, from the Federal (Russian) tax inspectorate in the Republic of Bashkortostan east of Moscow. (The Mac site in Bashkortostan will be the largest Mac-based tax operation in the world, says Keating.) Formerly called Bashkiria, the Republic has about 4.2 million people. It is Russia's second-largest oil producing region and its largest refiner -- in short, a place well worth collecting taxes from, especially as industry goes private!

The first, $1-million-plus stage of the project, now in progress, includes a full turnkey system for maintaining financial records on taxable entities and monitoring the collection and disbursement of tax revenues. It will be built around the 4D database from ACI of Paris (parent of ACIUS in the US), and will probably include a host database such as Oracle. It also includes the new Russian version of ClarisWorks, contracted and distributed by RUI. Most interesting, it will include substantial amounts of QuickTime help, on topics ranging from "What is a computer?" and "Why use a computer instead of paper forms?" to "What is a tax?" and "How do you calculate profits as defined by the tax code?" The underlying application will embody the current tax regulations; it is designed for easy modification!

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IBM recently decided to organize its marketing around customer markets rather than its own systems: Users' tasks rather than the vendor's technologies shape the market.

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Release 1.0

24 August 1993
MASTERS OF THE TRADE

Currently, the performance support community consists of scattered corporate developers and a number of vendors. Many of them from the training world, and others from documentation (online or print), systems development or consulting. The industry itself has gotten most visibility within the training world, partly because the concept was developed early on by Gloria Gery, who came from the training world. Her newsletter, Electronic Performance Support Systems, was published by Weingarten Publications, which itself focused mostly on the training market, with publications and conferences.

In 1992, Ziff went on an acquisition binge, acquiring Weingarten along with Help Desk Institute and the Computer Training and Support Conference from the Masie Institute -- which together now comprise the Ziff Institute. Weingarten's and Masie's and now Ziff's conference/trade shows draw thousands of attendees, but performance support still remains something of a stepchild of training, a track at conferences rather than a conference topic itself. Next March, Ziff hopes to hold a discrete performance support conference, with the financial support and logistical help of most of the vendors profiled here.

For now, there's a huge training market, whereas few companies yet know that they want performance support; they just know they need help! Thus, performance support tends to show up all over the place, but the vendors group together at training events. Ultimately, there will be a performance-support market that parallels and merges with the large-scale project market; system integrators such as EDS and Andersen Consulting are already promoting their performance support capabilities. Indeed, performance support fits well into the currently hot area of re-engineering: It can help workers adapt to new applications -- and new business processes. Thereafter, a performance support system can help inculcate modifications smoothly as the re-engineered company continues to change its practices incrementally.

The field of performance support is filled with consulting firms with a variety of specialties, approaches and angles. For example:

GLORIA GERY -- NITTY-GRITTY GURU

Gloria Gery is the guru of performance support. She wrote the movement's seminal book, "Electronic Performance Support Systems," in 1991. (She also wrote "Making CBT Happen" in 1987.) Now an independent consultant, she began her serious career with twelve years at Aetna, teaching people how to use computers and working on strategies for "end-user computing," as it was called in those days. "I realized that training is fundamentally compensation for badly designed systems. Along the way I discovered how to build systems that were not only usable but supported work performance. When the task was just data entry, we never got involved in the relationship between work training and systems training, but now you can't separate them. That's how I ended up with this concept of performance-oriented software."

Currently, she works as a high-level consultant, helping customers to reframe their thinking about using computers for work performance and to design prototype or pilot systems. She also advises them through the implementation process, either in-house or with outside developers. Her biggest clients are Duke Power, Federal Express and IDS; she has also been involved with the users profiled here (Avis, Hartford and Intel).

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Having written her first two books from a training perspective, she is now ready to start a third, on "design principles for performance-centered applications." It's more than just user interface, she notes; it's organizing an application from the inside so that what the user sees makes sense structurally.

"Training is foreplay for learning. Do people get excited? Are they satisfied at the end?"

-- Gloria Gery

ARIEL PSS -- AERIAL VIEW

Ariel PSS is based in Mountain View, in the thick of GUI-land. It has built a nice business with customers such as Intel (above), Fidelity, Prudential and Ford Motor Credit. Founder Barry Raybould started in the computer industry at Prime and Computervision, in systems development and support. In 1989, before the term was invented, he started trying to integrate training support and documentation into what amounted to a performance support system. Looking around for people with similar inclinations, he discovered Gloria Gery and they started to work together informally to refine and promote the concept.

He established Ariel PSS in 1991; it now has six full-time professionals and works with approximately 50 contractors from the fertile Silicon Valley soil, ranging from programmers and content experts to artists and animators. It consults not only to end-users but to other Valley software companies who want to make their software more usable, such as Avantos (below), Caere and Viewpoint Systems (now KnowledgeWare). Revenues this year should be about $1 million of pure value-added.

Raybould's cause is integration: "Different groups -- documentation, systems, training -- all have their own methodologies for representing content based on their own end products. But you can't use a training approach for online support; you can't use raw documentation in training. With performance support, I try to build one broad underlying representation that can support all them; it doesn't know the boundaries of each system and can support them all."

COMWARE -- FROM TOOLS TO EXPERTISE

By contrast, Comware, a 50-person company, comes out of the computer training business. President and owner Dick Horn worked in the training and documentation areas at Cincom and Federated Department Stores before founding the company in 1980. Besides performance support system design and development, Comware offers training services and tools, reference materials and even marketing collateral and point-of-sale animations. Thus, it exemplifies the thesis that there's an underlying base of meta-information about any product, which can be presented in different ways for different purposes. The company has its own proprietary development tools (Knowledge Support System) and a cross-platform class library with natural language, animation, navigation and query tools. It also makes frequent use of ToolBook, Visual BASIC and Visual C, and SGML for some textual material.
In fact, both those tools and his own are becoming commodities, acknowledges Dick Horn, who spoke at the last PC Forum. "We use them to leverage our own expertise and the non-commodity information of our customers. One point is to reuse information for one job for other jobs, but with job-specific context and access methods. For example, we created some animated sales demos for a software company, and now we're incorporating some of the same content into the performance support for customers to use after they buy the product. Vendors used to tell customers not to worry their pretty little heads, just buy the product. But now customers are becoming much more sophisticated and want more control of background information about their software."

Comware customers include Martin Marietta's operations at the Oak Ridge nuclear facility, mostly concerned with procedure compliance and safety; Promus Companies (Embassy Suites, Harrah's Casinos, Hampton Inns) for reservations and customer service; and US West, for guidance to people in the field who have to design and run courses even though they aren't trained as trainers. (Something recursive there...)

CONSULTEC -- A DIVISION OF CONSULTEC

Consultec is a Boston-based division of a mainframe-oriented software company called Consultec in Atlanta. The Boston division was originally called Consultec Training, but the division finally dropped training from its name last year as it broadened its focus to performance support. The parent Consultec is a subsidiary of General American Life Insurance in St. Louis; it runs large systems projects both for General American and for outside customers such as government agencies and Medicaid. The training group got its start in 1986 doing the computer-based training portion of a welfare eligibility system Consultec built for the Commonwealth of Massachusetts.

Over the years, says principal Chuck Dickinson, "our focus has shifted from training for a system to training for a job, and from training to just-in-time support in the job environment -- that is, in the computer they use."

Performance support customers include Boston Edison and First Chicago Trust. Consultec's most notable recent project was a performance support system for dental claims administrators at Blue Cross Blue Shield of Michigan. It used Preference, an on-line help system for mainframes from Legent, and stretched it to the limit to provide the information if not the visual equivalent of a GUI through the medium of 3270 terminals (windows but no icons or buttons). The system includes all the information in the manuals, and then some, such as suggested actions or automatic links to additional data. Says administrator Sue Jones: "Now we're no longer updating our manuals; we just update the computer files. Pretty soon we'll go and take the manuals away physically."

That's quite a step, considering that there were four sets of manuals for four sets of functions: policy, claims processing, provider inquiry and customer inquiry.

Consultec stresses the need for user testing for nitty-gritty ease of use. "Users won't make more than three or four steps to get what they need," says Dickinson. For example, Consultec has a tracking tool, part of Legent's Preference tool, which records usage of the system to see which index terms are used and which aren't. If users repeatedly type, say, "cleaning procedure," get no answer, and then ultimately select "prophylaxis," then "cleaning procedure" gets added to the index. (So does "prophy***."

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PERFORMANCE SUPPORT FOR GENERIC FUNCTIONS

Many vendors of horizontal pc software tools are making it easier for users to manipulate the software to do certain tasks -- notably Microsoft’s application Wizards, Lotus’s Smart Help and WordPerfect’s QuickTutors (developed by Usability Sciences). Beyond that, a number of vendors are starting to build full-scale business applications with extensive performance support capabilities, handling generic tasks such as organizing and managing a conference, launching a new product, moving an office or qualifying a sales lead. Here are two examples:

MEDIAMAP’S MEDIAMANAGER: FROM FLAT FILES TO PERFORMANCE SUPPORT

MediaMap’s new MediaManager is a wonderful example of content software: The software comes free with MediaMap’s full-service annual subscription to its 1000-page quarterly listing of 2300-plus mainstream computer-oriented people in the trade and business press and research houses. The basic subscription costs $2500; you can also buy other modules such as banking publications or Western Europe for $395 or $595. The service has about 800 subscribers, mostly the pr or corporate communications departments of computer companies or their pr agencies.

MediaMap keeps all the information on an ACIUS 4D database at its offices in Cambridge, Mass. It occurred to founder John Pearce some time ago to ship the data electronically as ASCII files and then FileMaker flat files, but he soon realized that this was insufficient.

Enter performance support -- making the data alive and fit for the task.

"We interviewed our largest customers -- including Apple, National Semiconductor, Wang, Lotus and Software Publishing," he says. "We spent days talking with everyone from administrators printing labels to the head of corporate communications." Much of their work consists of generating lists for anything from a mass mailing to a selective free-review-copy offer. Other tasks include follow-up phone calls and preparing "briefing books" -- a person by person guide to the analysts or reporters an executive will meet on a press tour. "Juan writes an insider’s guide to the multimedia business. He will sit up and beg if you feed him tidbits about your competitors" -- no, sorry, that’s unkind!

The system also handles editorial calendar tasks: "Find all the articles/surveys/reviews on disk drives. Now subset them to the ones with deadlines before September 15. Next find the editorial contacts, and send them all the following form letter..." When you make the follow-up calls to the managing editors and find the individual responsible for the special survey has changed, there’s a space for adding that individual and recording key points of the conversation.

4 Now you know -- if you’re a media person -- where those companies got your name!

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Under the covers: 4D

Overall, the tasks consist mostly of massaging data in a number of special ways. A competitor, notes Pearce, loads data into the ACT product from Symantec. While that tool is good at managing contacts, it lacks the pr-oriented list-making capabilities of MediaManager and the other flexible database capabilities of 4D. For starters, the ability to put a single person on multiple lists is essential.

MediaManager is a giant 4D application loaded with MediaMap data; a Windows version, coming soon, will offer parallel capabilities on FoxPro. When a customer receives his quarterly disk, it updates the basic contact information and text profiles, but not the information you have added about individual contacts, preferences, or other details. Such annotations are coded by who or what group made them; for example, within a pr firm the folks handling 3Com would constitute one group, while those handling Apple would comprise another. Corporate communications staff, editorial loans and product marketing could each make their own comments, and then share them as necessary. For example, a networking marketer might want to see the last time Juan was contacted about networking, while a more senior person might want to see how many times anybody in the firm had called Juan over the past three months.

Want to visit Juan and his counterparts? Now you can prepare a briefing book, ordered by the date and time of your appointments and including directions to the site. ("Beware of dog" in the case of a contributing editor who lives in the country, or "Check with guard at number 100 for entry to 104 on weekends" for Release 1.0.) The system accommodates annotations, since it delivers the briefing book as a word-processing document.

MediaMap is a felicitous combination of the data and the tools to use the data effectively. It makes life easy for senior pr people, and guides junior ones to doing the right thing. Of course, there's room for more. For example, there are no sample letters, no draft press releases with boilerplate descriptions and pick lists of superlatives. And it still lacks the information on trade shows and conferences that MediaMap publishes on paper. However, MediaMap is starting to look at that. Its most recent experiment is a printed, wirebound conference briefing book for MacWorld -- basically just a printout briefing book (ordered alphabetically rather than by appointments).

The information MediaMap provides is valuable by itself, but it has been trapped inside a heavy, 1000-page book. The MediaManager software, thrown in for free, now helps customers to exploit that value.


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You could call Avantos ManagePro performance support for managers. When we first saw the product, we considered it too complex and detailed for most managers. It reminds managers of all the pesky tasks they're supposed to do to develop their people while they work on planning, budgeting, managing a product roll-out or whatever. It helps/requires a manager to monitor the performance of each subordinate, tying goals to achievements, checking on progress, holding regular performance reviews, and so forth. In fact, it has much of the flavor of a "management information manager" -- but please don't coin a new acronym. It's sort a calendar with performance support for managers, with a database of subordinates and their goals, linked up to target dates and details of what each employee is supposed to be doing. It's not heavy-handed since the manager uses it to organize himself; the employees see only the result: a more organized boss.

We assumed it would never catch on because people usually operate a little more casually. That may be true, but most of them would like to be more organized. Moreover, with downsizing and an increased ratio of employees to managers in many organizations, many managers need all the help they can get. Thus ManagePro has won a cadre of loyal users, about 12,000 of them.

The original concept, says Avantos vp of product development and co-founder Gerald Huff, was to get managers to focus on long-term development of people even as they're monitoring short-term performance on specific tasks related to an individual project. In actuality, the company has found that people tend to use it as a daily tool rather than a strategic one. They're using it for performance support, not just planning and reviewing progress but making it happen with to-do lists, actions plans and the like. Thus the biggest requests for version 2 were better integration with existing applications, so that managers can use it constantly in conjunction with their other apps, and multi-user access, turning it into a coordination tool -- peer-to-peer project management in addition to management development. That will help the whole team keep track of what's happening and who's in charge of what. Thus, from being an individual manager's tool it has turned into something approaching democratic groupware at least among a certain group of users.

And, as we noted in our issue on groupware, the best groupware will be content-specific: rather than a generic e-mail system or even a bulletin board, the group version of ManagePro is a template for a team to keep track of their activities on common projects and co-ordinate with other teams. It allows each person to see how he's doing and how his work fits into the scheme of things. It also enables him to see what will happen if he doesn't pull his own weight. Yes, groupware can sometimes be disturbing because it makes the unspoken visible and explicit...but only for companies that need disturbing.

Disclosure: We are a limited partner and a 2-percent owner in Mayfield Software Partners, which has a $125,000 investment in Avantos (10 percent of a total Mayfield Fund investment of $1.25 million).
Performance support, like any hot concept, has ties to other hot concepts. Specifically, it's an instance of content software, where the content covers a particular job or task. In most cases that a particular job in a particular company, including company policies and strategies; but to build such systems you need generic tools....

The tools used to design, implement and deliver performance support aren't unique to performance support; they include everything from data warehouses, GUIs and cascading menu systems to hypertext, expert systems, case-based reasoning (Release 1.0, 1-92), voice or pen input, simulation and animation. In essence, the tools are the same; the difference is how they're used. (You can even build performance support into a mainframe application, with the PS content displayed on a 3270 terminal. Obviously, it's hard to do so, and the result will never be as nice as fast-response, GUI client-server systems, but it is possible. One such system is the Blue Cross Blue Shield systems built by Consultec (page 16). Avis's TAFT (page 10) uses mainframes for the application, but the performance support is delivered on Macs.

Although we're not a fan of multimedia in general, it can enhance performance support if the content is well-designed. (Other applications include advertising and presentations.) Multimedia becomes a way to represent the content, with voice instructions, demonstrations, video clips, etc. Videos, however, are expensive and hard to do well -- and very hard to update. (Of course, you can reuse some video from advertising or presentations, or it may be advertising or presentation, in the case of some sales-support systems. That enables the cost to be spread over a broader base.)

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You know those videos they show on airlines -- the ones about safety, not the ones about vacations in Antigua or the wide range of inexpensive duty-free goods? You could call them performance support for the passengers.
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That leads to simulations and visualizations. If you could build good enough simulations or visualizations, you could reprogram them rather than reshoot a video. For example, a human figure could smile instead of frown in response to a customer's request following a new corporate policy.

In using the tools, a developer must focus on the user and the user's cognitive style. Does he want a video or a diagram? A voice-over or a printed explanation? Does he learn better by trial-and-(nonfatal) error, or by following directions? Ideally, a system will adjust to any user's preferences.

From data management to hypermedia and SGML

Many of these systems use hypertext tools such as Asymetrix ToolBook and OWL International's GUIDE, with pointers from various parts of the application. That, of course, is somewhat rigid and hard to manage. There's no easy way to know what needs changing, or where. Nor can the help easily be reused among different applications with similar functions. (A lot of these arguments sound like the arguments for object-oriented programming -- or at least a modular approach -- in general.)

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That is, you want to be able to categorize and store the ancillary content, to make it easier to link to user's tasks, on the one hand, and easier to find for changes and modification when appropriate. The performance support content must be identified and linked as discrete, retrievable objects, so that a developer or even a user can find all the support for a given kind of task, or can easily reuse both code and support content in defining a new application and the appropriate performance support (cf. the capabilities of ParaSET, Release 1.0, 5-93).

To the extent possible, the text of the performance support should be tagged -- so that product names, phone numbers and for example, can be easily identified and changed. Thus the performance support could be easily modified when product lines or prices change, when procedures change, and the like. Frequently, the easiest way to do this is with embedded SGML tags (see Release 1.0, 4-91). In principle, you could dynamically query a database, but that would impair performance of the software (to say nothing of the user).

But this approach simply organizes information that someone has generated, attaching it appropriately to an application system. More interesting is the issue of how the performance support is generated: From the specs for business rules, data and procedures, can you generate the appropriate performance support content as well as the software to execute the automated portions of each business process? Ideally, changing an item in the spec changes the software and also changes the instructions and a related simulation. Change the dimensions of the screw or the number of knobs, and the diagram in the on-line instructions will change appropriately, and step 5 -- "Close all three valves" -- will turn into "Close all four valves."

"SGML has limitations for multimedia, but it’s good for text. It would be nice to have an equivalent common language to tag and manage simulation objects."  -- Dick Horn, Comware

Objects and expert systems

In addition to simple help that's attached to menu items or other screen objects, it helps if the software can recognize what the user is up to. This again is an argument for object-oriented programming. Instead of executing a sequence of lines of code, the user is sending identifiable messages to identifiable objects. That enables the system to know what's going on and provide appropriate help. Alternatively, systems such as Apple's Eager (see Release 1.0, 5-91) can figure out what the user is doing, confirm it, and do it for him automatically. (Of course, at some point those actions may become a generic action that could be summoned by a menu...)

Expert systems and object-oriented configuration tools such as Trilogy's SalesBUILDER (see Release 1.0, 10-91, 2-93) are also likely components of many performance support systems for appropriate applications.

Programming tools/scripting

But performance support is more than just a new name for passive help texts. It may include interactive dialogues, parameter-driven responses to a user's questions, and mini-lessons appropriate to the task at hand. The tools to
develop such capabilities can include all the technologies mentioned here, as well as GUI tools such as PowerBuilder and Visual BASIC, object-oriented languages such as C++, environments such as Smalltalk, and Multimedia tools such as Macromedia Director. In addition, scripting tools such as Userland's Frontier and AppleScript are helpful (see Release 1.0, 5-91).

**Groupware/communication tools**

Performance support can also be two-way interactive, giving users access to experts at a help desk, or even designated experts whose main job is the content, not supporting other people. Tools include conferencing systems, e-mail, Lotus Notes and bulletin boards (see Release 1.0, 8-92).

Moreover, performance support needn't operate just within a company. It could also include automated access to outside experts; for example, an accountant's performance system could provide access to Lexis or Nexis, or to an expert reachable through the market-oriented information services of the future (see Release 1.0, 7-92). Alternatively, there's the model where the "outsider" is a customer, who does the work instead of the employee. That is, an automated teller machine could provide performance support for a bank customer, or a medical system could remind a patient to take medicine.

**Integration**

More important than any of these technologies is the need to integrate them -- and to hook them to the user's applications, linking information to specific tasks to which the information is relevant. Most of the systems deployed are coming out on Macs or under Windows. The reason is not just the GUI interface but the underlying ability of these systems to support links to concurrent programs with the performance support content.

That's why a traditional hypertext tool isn't much use, whereas something that can link text to OLE objects -- can be a valuable tool despite the lack of many other functions. Thus the most frequently used tool appears to be Asymetrix ToolBook; an object-oriented toolkit, it provides hypermedia linking, scripting and other facilities, with support for all of the Windows capabilities. On the Mac, the Mac environment itself (enhanced with QuickTime and HyperCard) provides many of these capabilities. Another option is Interleaf's Active Document technology (see Release 1.0, 3-90), an object-oriented environment masquerading as mere document-processing.

On the system level, Apple Help is available for third-party software developers to use in adding their own help or performance support. With its purchase of Gain, Sybase is also trying to move one step ahead of the database GUI tools and deliver a full-fledged object-oriented development environment for database applications with integrated performance support -- something that should come close to translating from business specs to code and performance support, as described above. Stay tuned.

"Getting all the tools we used to work together was a real challenge. You need someone very technical on the team."

-- Celia Duke-Moran, ITT Hartford

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Nancy Weingarten, Ziff Institute, (617) 252-5115; fax, (617) 252-5539
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**ITAA management conference** - Seattle. Sponsored by Information Technology Association of America. Call Valerie Czuszak, (703) 284-5350; fax, (703) 525-2279.

October 25-29  
**INTEROP 93** - Paris. The mother of all networking conferences, now global. Sponsor: Interop Europe. Contact: Carinne Propper, 33 (1) 4639-5656; fax, 33 (1) 4639-5699.

October 26-28  

November 1-5  
**Information and Knowledge** - Washington, DC. Sponsor: ACM. Call Pamela Scott, (212) 869-7440; fax, (212) 944-1318.

November 2-4  
**EuroComNet 93** - Amsterdam, The Netherlands. Co-sponsored by IDG World Expo and RAI Amsterdam. Call Lisa Judd, (508) 879-6700; fax, (508) 872-8237; Rob den Hertog, 31 (20) 549-1212; fax, 31 (20) 646-4469.

November 3-5  
**InterTainment '93** - Santa Monica. Sponsored by Alexander & Associates. Call Sally Plourde, (212) 684-2333.

November 5-7  

November 7-10  
**GeoCon/93** - Cambridge. Sponsored by Soft-Letter. For foreign software vendors hoping to find a US market. Call Tom Stitt, (617) 924-3944; fax, (617) 924-7288.

November 14-18  
**Hypertext '93** - Seattle. Sponsor: ACM. Link up with other linkers. Call Steve Poltrock, (206) 865-3270. (Pity they scheduled it during Comdex!)

November 14-19  

November 15-19  
*Comdex* - Las Vegas. The one and only! Contact: Peter Young at Interface Group, (617) 449-6600; fax, (617) 449-6953.

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December 5-9  Lotusphere '93 - Orlando. Sponsor: Lotus Development. Call Diane Horak, (617) 862-4515.

December 6-8  Wireless Datacomm '93 - Washington, DC. Sponsor: Business Communications Review. Call Linda Hanson, (914) 779-8711.

1994


February 15-17  Networks Expo (formerly NetWorld) - Boston. Sponsored by Bruno Blenheim. Call Annie Scully, (201) 346-1400 or (800) 829-3976; fax, (201) 346-1532.


March 20-23  **EDventure Holdings PC Forum - Phoenix. Sponsored by us: You read the newsletter; now meet the players. Call Daphne Kis, (212) 758-3434; fax, (212) 832-1720; MCI 511-3763.

March 22-25  Seybold Seminars '94 - Boston. Sponsor: Seybold Seminars. Call Beth Sadler or Kevin Howard, (310) 457-5850 or (800) 433-5200; fax, (310) 457-8599.


April 12-14  New Media Expo - Los Angeles. Sponsored by The Interface Group. Call Peter Shaw, (617) 449-6600.


May 4-6  Digital World - Los Angeles. Sponsor: Seybold Seminars. Call Beth Sadler or Kevin Howard, (310) 457-5850 or (800) 433-5200; fax, (310) 457-8599.


Please let us know about events we should include. -- Denise DuBois

*Events Esther plans to attend.
@Events Jerry plans to attend.
Lack of a symbol is no indication of lack of merit.

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Daphne Kis
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