IRL: LEARNING IS SOCIAL
by Jerry Michalski

We would like to hear from you. To post your thoughts about this newsletter, please use our threaded discussion system on the Web (it uses frames, Java, Shockwave, subliminal messages and tiny electrodes, so you will have to make sure to load a compatible browser; see our compatibility page first). Also, before you can post, you must register. That requires you to choose a unique user ID and password (and store them in a cool, dry place so you don’t forget them), as well as fill out a few simple forms with information we promise not to divulge to anyone. Scout’s honor.

When you want to post a comment, you will have to find, then join, the proper conference and topic for the kind of comment you would like to make. Observing the rules of netiquette (need a refresher? click here) and working within the constraints of the discussion system’s primitive editor (really your Web browser’s primitive editor), you can then post to your heart’s content. Remember, of course, that others are reading what you’re posting and may quote you out of context in other places, and you won’t find out about it until the damage has spun out of control and you read your words in alt.fan.chuck.norris.

What?! That’s crazy. More likely, what you’ll do is pick up the phone and call us, or send us e-mail with your thoughts. And we will welcome your call or message, because that’s how we learn what’s going on and what you care about.

Making do

This tongue-in-cheek (and frighteningly accurate) vignette shows how simple it is for people to circumvent or ignore "official" procedures. It happens all the time in more formal work settings, too, where job descriptions, org charts, training manuals and forms dictate how and when things must occur. In reality, work gets done around, between and often despite sanctioned and explicit processes. Individuals and groups learn to cope with their environments.

Official procedures don’t have to be egregiously offensive to be ignored. Well-designed, well-intentioned procedures get skipped all the time because they don’t offer their users enough flexibility, reliability or speed. What if we could harness this energy?

PEOPLE ARE THE KILLER APP
Add people and stir

Our opening vignette is pretty simple: One person interacts with the threaded discussion system or calls us directly. Life gets much more complicated when it involves groups, even in simple activities, such as a group's daily routine to order lunch, divvy up the tab and collect the money. Never mind complex activities, such as what it took to build the corporate Website (vs. how its planners thought it would be created). Practically every activity has a tacit social dimension: Who can get the printer repaired the quickest by working the supplier's cranky dispatchers. How everyone copes with a critical producer who misses deadlines.

By engaging in these activities, the members of a group are not only making do and getting their jobs done; they are also making themselves. That is, individuals (and groups) construct their identities through membership and participation in groups. In their book *Situated Learning* (see Resources, page 17), IRL researcher Etienne Wenger and anthropologist Jean Lave described this state (and process) as a "community of practice."

Learning is social

This issue of *Release 1.0* is about learning and identity in communities of practice. It describes innovative work done by the Institute for Research on Learning in Menlo Park, CA. IRL's approach combines insightful research on learning with active participation in partner companies' communities of practice. This approach puts IRL between the academic world and the business world of organizational consulting, where economic and market forces are pulling at it.

Exploring both IRL's approach and its own identity issues gives this issue of *Release 1.0* a nifty recursive twist: We not only describe case studies of IRL work, we also treat IRL as a case study. Not surprisingly, the Institute's own practices are helping define its identity in a way that fits its theories nicely but also illustrate the difficulties. Those theories have implications far beyond IRL.

IRL's work encompasses learning in many situations, from school settings to job training, career enhancement, lifelong learning, on-the-job learning and workforce preparedness. Although half of IRL's work is in K-12 education, we focus here on IRL's work with corporate clients, where IRL is less of a traditional resource and its role is murkier -- and where it is doing groundbreaking work (see opposite).

IRL's experience holds many lessons for computer-system design. After all, a database is only as good as the data people put in it; plenty of databases are full of dummy entries that clerks punch in to get past screens quickly, meet their quotas and, yes, satisfy customers. IRL also has a lot to teach corporate consultants, organizational designers, interface designers, facilities planners, managers and educators.

We begin with IRL's history and world view, with case studies along the way. Then we go on to IRL's own practice and its position in the markets for consulting, academic research and training. From there, we examine some software that has emerged from IRL's work and reflect on some of the work's implications for technology development.
In describing IRL, we also cover two important entities: Etienne Wenger, an IRL researcher whose prior and continuing work on communities of practice is a touchstone for IRL; and Congruity, a small consultancy that often works with IRL and has virtually become one of IRL's business arms.

A scarce resource

If this is the relationship revolution -- and we believe it is -- people need to know more about the social aspects of learning, knowing and creating. Yet it's amazingly hard to find groups doing research or consulting in these areas. IRL is one of the few organizations that is doing disciplined sociological and ethnographic research that incorporates learning, technology, identity and community in an appropriate and useful way.

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**Xerox's Integrated Customer Service experiment**

At their worst, traditional curricula teach what training-system designers think needs to be known, and in an order and context that often doesn't stick and isn't relevant. Worse still, they miss many things that are critical to getting the job done -- the tacit knowledge that bridges all the gaps in the official procedures. So why not teach in a real-life situation?

In 1993, in order to consolidate three different call centers into a single one in Lewisville, TX, so customers would need only one 800 number to call, Xerox started an experiment called Integrated Customer Service (ICS). Its birth was not easy. Before ICS was begun, outside consultants recommended expanding an existing expert system and hiring low-wage clerical workers to work from scripts. Xerox's training department stated that staffers wouldn't be able to perform sales and service because the jobs' personality profiles were so different. Besides, they added, it would take 52 weeks of training to get them up to speed on all the things they needed to know.

IRL derailed the expert-system approach by showing that the existing system wasn't really being used, despite formal usage statistics that indicated it was. Researchers videotaped a service rep at work and projected the video on a big screen with the sound turned up loud. The calls were noisy and chaotic, with many things happening at once. To find the information he needed desperately to complete the call, the rep was typing junk into the system. The point was made.

The unit didn't have the time or budget to take people off-line for training. IRL decided to start its project with live calls. It brought the workers together, pairing sales and service representatives. With access to one another's practice and expertise, they got themselves up and running in 14 weeks (despite tussles with project managers about minor things such as long phone cords so reps could coach each other). Participants also developed great team spirit.

The practice ideas from ICS spread to other projects, and were eventually formalized more as PHIL, PHased Interactive Learning, a generic design for learning by working with peers. PHIL is gradually being put to use in many places within Xerox.
IRL was founded in 1987 in response to "A Nation at Risk," a Federal study that drew much-needed attention to the educational crisis in the US. David Kearns, then the chairman and ceo of Xerox, was IRL's first champion; initial funding came from the Xerox Foundation. The Institute is a separate, not-for-profit entity. (Disclosure: Esther Dyson is on IRL's national advisory council.)

A few IRLers came from Xerox. Now, with 60 employees, the Institute has depth in many disciplines, from sociology, psychology and education to AI, anthropology and linguistics. Its activities influence the design of work, facilities, organization and technology.

IRL engages in a wide range of projects, many of which are funded by a combination of agencies, educational institutions, grants and corporations, notably the National Science Foundation. Corporate patrons include Xerox (of course), National Semiconductor, Steelcase, NYNEX and Hewlett-Packard. Most of these companies are funders because they are also fans and clients of IRL. They believe in its methods and benefit from its practices. More on this in a moment.

**Guilds had a clue**

To figure out what to do about education, IRL researchers looked into non-traditional models of learning. One that jumped out at them was apprenticeship, which is in use around the world and is usually successful.

Unlike schools or training programs, apprenticeships aren't based on sets of problems to solve or skills to master that culminate in tests that some people (the unfortunate tail of the distribution) must fail. Instead, apprenticeships are about learning a practice. Anyone who gets it is successful. Apprenticeships are real. They take place in real life, with real people, rather than in a simulation, lab or classroom. (Of course, apprenticeship has its dark side. It's hard to ignore a history of indentured work, abusive bosses, cheap labor and guilds that monopolize knowledge.)

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"A community of practice is a group of people developing a shared way of working or playing together to accomplish something, usually involving individuals with different roles and experience. People learn as they participate in communities of practice; organizations learn as they develop them."

-- Peter Henschel, executive director, IRL

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Apprenticeship is by its nature a social process. You are apprenticed to a person, master in a trade, which you will eventually be part of. The process implies becoming a member of a community through participation in its activities. In fact, the interactions with members of the broader community are often more significant than those with the master.

IRL researchers generalized the patterns of apprenticeship and applied their concepts to the interactions normally found in modern corporations and schools. From that came Lave and Wenger's concept of emergent communities of practice.
About communities of practice

In 1994, PC Forum attendees got an introduction to communities of practice in a talk by John Seely Brown, who is Xerox's chief scientist, runs Xerox PARC, and is IRL's co-founder and patron saint. JSB described a Xerox project he was involved in to improve the efficiency of copier-repair technicians ("tech reps") in the Denver area. The project managers assumed that the solution would be technology, probably in the form of AI-based job-performance aids and intelligent tutoring systems.¹

To study the situation, JSB sent PARC anthropologist Julian Orr and some colleagues of his to observe how the tech reps worked. After a short while, Orr suggested a completely unorthodox solution that required little technology and no software development. Instead of AI tools, how about putting two-way radios in the tech reps' hands and letting them chatter during the day as they repaired copiers around Denver?

Orr had noticed that troubleshooting copiers was a collaborative activity. It took several individual's experiences, assembled anew each time a problem arose, to create a narrative that would explain how the copier had broken and how to repair it. Equipped with radios, the tech reps could listen to each other until one had something to contribute to the repair in progress. Then that rep would jump into the "center" of the conversation, help out, and step back out.

The activity of hanging out, helping as needed and stepping back out again is known as "legitimate peripheral participation." (It also describes the beneficial function that lurkers play in online discussion spaces.) Most communities of practice allow for multiple forms of participation at varying levels of expertise, which lets many people gain access and wait for their opportunity to take part.

Eleven brokers broking

We all belong to many communities of practice; their boundaries and our participation in them change all the time. Shifting of this kind is generally good. When some communities dissolve and others emerge, it's a sign of health, although communities benefit greatly from continuity. Communities are connected through brokers, "boundary objects" and boundary practices. Brokers are people who frequently cross boundaries between the groups and carry information, practices or other items with them. They often make introductions between groups.

The tools, documents, objects and technologies that help coordinate practices are "boundary objects."² They can be training and procedure manuals, status reports, blueprints, chip designs, bills of materials, bid documents, etc.

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¹ See the 1994 PC Forum transcript; Release 1.0, 6-93 and 7-93 on community; and "The People are the Company," by John Seely Brown and Estee Solomon-Gray in Fast Company (Resources, page 17).

² "The Social Life of Documents" (Release 1.0, 10-95), by John Seely Brown and Paul Duguid, describes documents' roles as boundary objects.
change orders and more -- often the best ones are the ones that are all marked up with comments, exceptions and short cuts. The Web offers a new and powerful kind of boundary object.

Even neighboring communities of practice can see the world in quite different ways. Brokers not only carry artifacts and practices from one group to the other, they also help translate them. A way of scheduling jobs might work well for one group but need extensive modification to meet another group’s circumstances and preferences. Compensation schemes or work rules might vary.

Companies can enhance cross-pollination by creating boundary practices that support the connections. Inter-departmental softball leagues might work as well as off-site training sessions.

Weaving work

Shirley Edwards is a broker at Xerox -- someone who spans communities of practice and helps make things happen among them. Three years ago, she directed real estate planning for the company. Although her corporate mandate was to do everything she could to reduce costs, Edwards kept thinking about how the spaces she was developing (and consolidating) needed to support the work that would go on inside them.

During a major internal real-estate strategy presentation that Edwards made, she injected a subtle statement of this concern. A few members of her audience got her message and suggested she visit Brigitte Jordan, who worked at PARC and IRL and had led a workspace-related project for Steelcase.

Xerox then funded a project to quickly turn a warehouse into an office building. Edwards brought IRL in, and the two groups got used to collaborating. Other projects followed. Edwards became a broker and a bridge between IRL and Xerox units with real business problems. Now she devotes much of her time to overseeing projects between IRL and Xerox as part of her work in the Xerox Center for Transformation, with support from the head of Xerox’s human resources and quality initiatives and PARC’s John Seely Brown.

Seven principles

IRL specializes in understanding the ways that social dynamics contribute to learning in business and educational settings. "Contribute" is probably an understatement. From the IRL perspective, learning is inherently social, so interpersonal dynamics don’t merely contribute, they are central to the construction of knowledge and even identity. The following principles express many of IRL’s beliefs quite compactly:

• Learning is fundamentally social.
• Knowledge is integrated in the life of communities.
• Learning is an act of membership.
• Knowing depends on engagement in practice.
• Engagement is inseparable from empowerment.
"Failure" to learn is the result of exclusion from participation.

- We already have a society of lifelong learners.

Saying that learning is social doesn’t mean we can’t learn things by ourselves; it means that we learn things in a social context. Knowing things changes our relationship to them and to other people. We become experts. In doing so, we do far more than learn about specific tasks or objects. By contributing to communities and by finding our place within them, we find out -- and actively define -- who we are.

Companies often separate social activity from work activity. They prohibit chatter and frown on those hanging around the water cooler. In doing so, they suppress the very activities that they elsewhere fund lavishly through consultants, time-and-motion studies, total-quality initiatives, procedure manuals and expert systems.

Of course, there are plenty of people who will abuse coffee breaks and other unsupervised moments. There are also times when tasks must be accomplished precisely by the book, such as when they are mandated by law (which is increasingly the case, unfortunately). IRL’s Wenger notes, "When knowledge is the measure of success and not just operations, companies will have no choice but to enable the social fabric necessary for the social creation of knowledge."

Process and practice

"Process is the formalized part of practice;" says IRL’s associate director Susan Stucky. "It’s not one or the other." Xerox’s Shirley Edwards notes that for years, corporate engineers and senior managers tried to use technology and process to cause change. Systems, manuals and training would get upgraded, but old practices would persist. Recently, slowly, they have begun to understand what it takes to influence practice.

Some things run so deep that it is necessary to get to beliefs and behaviors in order to cause change. For example, a recent Xerox initiative to use Customer Determined Arrival Time (CDAT) in quality measurement is causing plenty of turmoil. CDAT allows that some customers may be satisfied with four-hour or one-day service turnaround, but for service technicians, minimizing response time has always been paramount. That mental change is hard to make, and it has ramifications for many people and systems across the company.

IRL has methods to look at and do something with practice. It also knows how to leverage change, which doesn’t have to involve contacting every person individually, but instead can spread on its own.

Intellectual and social capital

Much has been written lately about intellectual capital, including in this newsletter (see Release 1.0, 12-94 and 1-96). The kind of knowing that occurs in communities of practice is at its core. It sometimes gets called "distributed intelligence" or "core competence."
IRL's Wenger explains: "Competence or practice isn't just a relationship. It's a form of shared knowledge. It is what is being produced by a tight network of people, versus just the links [between the people]. It is the learning potential in the history of their interactions -- their way of looking at the world and making meaning." This is social intellectual capital, and it is the natural end-product -- perhaps more the state of being -- of a healthy community of practice.

"Rather than replicating the big ideas of a few people, IRL's work is about finding ways to leverage the small efforts of the many."
-- John Seely Brown, Xerox PARC

Eureka and beyond

The story about Xerox tech reps using two-way radios to troubleshoot copiers has an epilogue that illustrates the idea of social capital. At Rank Xerox in France, motivated by the tech-rep experience, researcher Olivier Raiman created a system called Eureka. He tackled the process of resolving problems that arose during the first six months of a new product's sales.

Raiman began working with Rank Xerox service representatives and their constituencies -- service hot-line agents, dispatchers, tech reps and specialized senior field engineers -- to create a way for them to share tips. France had a unique infrastructure for the project that everyone already used: Minitel. By adding a custom application to Minitel, Raiman was able to deploy a country-wide program that got everyone engaged, including the network that supported the tech reps.

In effect, Raiman seeded a community-based knowing system. The tech reps constructed their own way to share hints, but they soon figured out that they needed to be more systematic so they knew which hints they could rely on. They created a way to have peer review, referee the hints and post the results to everyone. An interesting note: Managers had tried often to collect repair tips, but to no avail. Getting the official management out of the approval loop is part of what made Raiman's method work.

Says Xerox's JSB, "This social process created knowledge refining. They reinvented the sociology of science." More than that, he enthuses, "Because their names get attached to the hints, they're also constructing social capital, which warrants them becoming more central members of the community of practice, which reinforces it all. Construction of intellectual capital is one side of the process; the other is construction of social capital."

The story's next chapter is Eureka II, a US version, which will have to adapt to US practices and tools -- most likely starting with the Web. (See also Release 1.0, 9-96 and 10-96, on customer service.)
IRL is a hybrid creature -- a quirky combination of educational research think tank, sociology laboratory and corporate organizational consultancy. Flagrantly multidisciplinary, IRL lives slightly outside the structure of traditional disciplines and industries. On balance, IRL is still more an pragmatic think tank than a consultancy, but the things it discovers and helps design have consequences that consultants would envy and should adopt.

Over time, IRL's goals are to move from broad work on education and technology to enabling conditions for learning, from the specific markets of education and training to lifelong learning, from techie information structures and computer models to a focus on the social, and from discipline-guided research to more client-oriented research and design.

 Appropriately enough, practice is what sets IRL apart from its disciplines of origin and potential competitors. Also, its current practice is helping create its identity, which may turn out to be a new kind of consulting in which the clients and researchers work together both for the intellectual satisfaction and the ways it can improve the bottom line. Perhaps thoughtful consulting with shared intent is a new market segment.

There is a productive tension between IRL's social, intellectual and business missions, but, underneath it all, there's still a small identity crisis. The Institute isn't sure which dominates -- the consulting that puts IRL's ideas into the real world and could pay the bills better or the academic pursuit that brings joy to the researchers. Think of it as theory vs. practice (or choose your own opposition: academic research vs. consulting, thinking vs. doing, non-profit vs. for-profit). These pairs combine awkwardly, but they do combine. Keeping the mixture shaken helps it stay blended.

Theory (are they academics?)

IRL's work gores some of the sacred cows of social-science research. For example, strong belief in objectivity and scientific method has led to the requirement that a researcher's activities and instincts should not contaminate the research. As an extreme example, if a cultural anthropologist had a great hunch about what was going on in a tribe but none of its inhabitants gave voice to it, she might have to omit the hunch altogether. And interfere in the tribe's daily activities? No way.

IRL conducts ethnographic studies, but it encourages its researchers to develop deeper connections with its clients. PARC's John Seely Brown explains IRL's role this way: "IRL is not a consultancy. It does research in action. [Its researchers] engage [its clients] through real partnerships, then co-design, -invent and -evolve systems to improve learning. It's a reflective practice. We're no longer participants or observers. We move in as actual change agents." (Note: To make its vocabulary more accessible, IRL now refers to research-in-action as interactive research and design or, better, research close to customers.)

The shared intellectual pursuit is key, says longtime IRL client Jim Euchner (pronounced "ike-ner"), NYNEX's vp of process improvement R&D. "IRL really wants to increase our understanding of how learning happens and to value and
encourage it.... [They] want to break new ground." Euchner believes it is important that IRL preserve its current intent: that it keep the intellectual interest in inventing and understanding, as opposed to the need to sell more work.

Being observant (a core competence)

One of IRL's core competencies is work-practice analysis, which is based on the anthropological tradition of ethnographic field work.

Far from a time-and-motion study, this kind of analysis uses researchers as observant participants in client situations. By treating front-line workers as creators of practice rather than executors of others' processes, the researchers can have discussions that not only heighten awareness of tacit knowledge (and what people really do vs. what they say or think they do), but also let the researchers make assessments and draw conclusions that traditional consultancies can't touch.

The critical element is designing for the people closest to the customer -- getting close enough to see and hear what is really happening in a particular situation.

In this way, IRL functions as a mirror for its clients. Says IRL's Stucky: "When we get it right, some clients react with 'Yeah, so?'; others say, 'Omigosh! Tell us what to do.'" Until recently, IRL's implementation skills weren't as good as its powers of observation. The group has renewed its efforts to do more consultative design.

Surprisingly, real learning moments can be hard to see. It's like looking for black holes or distant planets in space: You have to observe their effects on other objects to infer their presence.

IRL's theoretical approach puts special emphasis on the situations in which learning takes place. Learning not only depends on context, the context actually plays an active role. People come to rely on the context to get things done so they can do other stuff. This may seem to make learning and other community dynamics hard to move, but a community freed of its obstacles or focused on a great opportunity can change with amazing speed.

A small contradiction

IRL's research approach is largely free of value judgments. The focus is on real practices in the physical world, not their cultural or social origins or implications. This helps people feel safer about IRL's involvement; it also helps things get implemented.

That said, client companies have to agree with IRL's fundamental premises about learning, identity and practice. Without such congruence of values, there is unlikely to be any project work. Unfortunately, the values are seldom shared equally by all members of a client company. Skeptics mix freely with believers. IRL's methods are unconventional enough that it's easy to become skeptical (see "Subtle and fragile," page 12). Over time, this can also leave IRL vulnerable to client management changes.

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Practice (are they consultants?)

IRL lacks the visibility and engagement-drawing power of the big consulting firms and names, such as McKinsey & Co., BCG, Bain & Co., Michael Hammer, Michael Porter and Peter Senge. IRL also lacks their packaged-process approach -- and their fee schedules. In too many cases, consulting firms send freshly minted MBAs to their clients to execute plans set in workbooks. They work against the clock, because their billing rates are steep and they need to show results. The results are often short-lived; then the client organizations revert to their old practices.

The revenue model sometimes forces consultants to come up with big answers to justify their consulting fees or to convince clients that they have done something that requires action, even when the situation might warrant much gentler measures. The consulting revenue model also discourages long-term partnerships. IRLers believe that real change in the social fabric happens on human time constants, not those of technology or management.

Post re-engineering

Although IRL’s approach is not intended as such, it fits extremely well after re-engineering. Consultant Peter Hillen of Congruity (see box, next page) notes, "The low-hanging fruits in a re-engineering project are the older engineers who don't appear to be very productive. They're brokers and they're local historians. The culture of the company lives in them. When you throw them away because they don't fit the official business process, you've thrown away an important part of the company culture. You break important links." A focus on communities of practice can help companies recover from the destruction inflicted by their own re-engineering projects.

It is also a good follow-up question: "What did we forget?" Says Wenger, "If learning and knowledge are going to be the stuff of success, then where are they? How are they constituted? How do we support them?" Wenger continues, "Information access used to be the problem. Now that access is not a problem, what do I do with the information?" Unless easy access to information helps create a coherent identity, it will be as debilitating as empowering.

Subtle and fragile

The work IRL does is usually quite subtle, which can be problematic to people used to official procedures and bold strategic plans. The philosophy and approach tend to cause binary reactions when people first hear them. Some people view IRL with the suspicion they would give chiropractic, acupuncture or Feng Shui; others "get it" immediately and wonder why they haven't been working IRL's way all along.

Congruity's Hillen makes the point more forcefully: "Most senior managers don't get what IRL says. Those who do get it have trouble convincing those who hold the purse strings to actually do something." The irony is that IRL’s methods are indeed similar to a chiropractic adjustment or Feng Shui: in some cases, part of a study's recommendation might be to lower cubicle walls one foot to leverage people's tacit cooperation, or to move the water cooler across the room so it forms a better place for people to share anecdotes and problem resolutions.
Congruity is a two-person consultancy that often works closely with IRL and others. In a sense, Congruity is part of the business end of IRL. Congruity's principals, Estee Solomon-Gray and Peter Hillen, founded it to focus on marketing strategy, but kept running into frustrations getting strategies implemented. Solomon-Gray and Hillen were familiar with IRL; John Seely Brown invited them to visit and poke around.

As a result, the two organizations have worked together on several projects. Congruity's practice has evolved to finding competencies in communities of practice that are critical for enacting the companies' strategy, then doing things to cultivate them.

Congruity's showcase project is a three-year engagement with National Semiconductor that began shortly before Gil Amelio, now Apple's ceo, arrived, and took off after his arrival. Amelio created a culture of empowerment and saw communities of practice as a way to refocus the company on specialty markets, avoiding the commodity integrated-circuit business.

In another Congruity engagement, three manufacturing sites that were supposed to turn out identical products were not matching specifications. It turned out that the sites, which were separated geographically, didn't communicate often, and their staff's work practices had diverged unconsciously. It was hard to bring the staffs together physically, so Congruity encouraged its client to build intranet applications to help build community among the people. Naturally, the first topic of discussion on the intranet was the divergence of work practices; the conversation took off from there.

Getting the go-ahead can cause its own problems. Says Hillen, "Once you begin to show the faint outline of a community of practice and show its benefits, some managers immediately want to control it and see its outputs. Balancing the tension between managers and line workers is important because it represents the interplay between strategy (management) and competence (the communities of practice), which ought to inform one another."

Another natural managerial instinct might be to recognize the successful community of practice and perhaps restructure around it -- or at least give it an award, space in the company newsletter and more work to do. But there might be no faster way to knock the group out of commission. The social dynamics of these groups are delicate, and often the best thing to do is simply not to harm them.

In the course of a joint Congruity and IRL study, National Semiconductor managers realized that one set of design engineers was brought in on practically every chip-design project; its recommendations were considered first-rate. Rather than promote the team and flood them with more work, the managers made small adjustments and allowed the unofficial process to continue.

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Care and feeding

So what should managers do to nurture these evanescent communities of practice? Since learning is a function of access, managers should try to create an atmosphere that allows people to participate. They should acknowledge that it is OK to spend time doing community activities, perhaps by taking time to help someone in a different division brainstorm a problem. Managers can also allocate some resources to allow participation. The occasional travel voucher, half-day confab with a catered lunch or cellular phone can work wonders.

Looking at community building more broadly, it's important to note that practice arises where it needs to; it can't be commanded into life. IRL's Stucky says it eloquently: "Build community? We should find community -- figure out which communities people are actually in and go help them."

"Long-distance relationship building sure goes a lot faster if the people can get together for a beer -- even just once."

-- Peter Hillen, Congruity

Release 1.0

21 May 1997
SOFTWARE LESSONS

Although office workers often do their work despite the software they use, many of them would call their software indispensable. The things it lets us do are too powerful to ignore. Software design and people’s needs are still poorly matched.

Writing, publishing and messaging are activities performed for and within communities of practice. From this perspective, you begin to see software requirements backwards. Says IRL’s Wenger, "What matters with software tools is their relationship to practice -- the way they allow practice to occur. A tool has to be appropriated by a practice, and therefore by a community." That sounds like a request for custom, just-in-time application development, which has remained a tantalizingly unattainable goal.

Custom apps are difficult to do quickly, but good ones do meet specific practice needs. For example, as part of a project with NYNEX, IRL developed a Macintosh application called RepTools. The program is a virtual field notebook with an underlying data structure. With it, researchers can take high-level notes that include places, objects, relationships, roles and activities. Users can then sort the objects, show or map their relationships and so on. RepTools also allows users to draw physical workspaces and overlay data and relationships on them.

Unfortunately, technology is often designed by engineers trained to respect process and logic above all else. Practice is not something they are trained to pay attention to. Interface designers may spend considerable time making sure fields and buttons are visible and intuitive, but they are seldom given time to work on how the software facilitates group interaction. The result is tools that err on the side of completeness and structure. The software goes through user testing, but not group testing.

GroupWhere?

The groupware market, which supposedly knows the most about social software, has produced many ill-conceived apps. Take, for example, Action Technology’s controversial Coordinator, which was built to implement a powerful theory of how people communicate to get things done, but was too explicit and inflexible for ordinary people to use (see Release 1.0, 9-92). Most document-management and publishing work-flow systems are only marginally better. People use them because they have to.

Does this mean that software should be open, flexible and formless? Probably not. Work groups might make better use of software that is powerful and highly customizable. One of the wonders of the Web is that it is all of these things.

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3 Some of RepTools’ relationship-mapping functions are similar to organizational design consultant Valdis Krebs’ InFlow software. InFlow can turn staff surveys into maps of who interacts with whom. It can also map company relationships within an industry, given data about ownership, mergers, acquisitions, alliances and joint ventures (see all of Release 1.0, 2-96).
Intranets are extremely powerful tools for supporting communities of practice that span distance and time, and even those that don’t. Threaded discussion databases and indexing engines can automatically build archives of a group’s conversations and artifacts. Newbies can learn by poking around. We won’t belabor the point. Instead, we turn for a moment to the idea of modeling practice.

**Concerto in D major**

A software system called Brahms is currently a focal point of NYNEX’s work with IRL. It was created to address observations about modeling from a work redesign project at NYNEX, at a time when it had lost considerable market share in T-1 services. One symptom was that it was taking 30 days to complete an order. NYNEX’s Euchner was asked to develop an expert system to improve things.

He sent in a knowledge engineer, a psychologist and a phone-company veteran. They reported that the last thing required was another computer system. A typical order went through 21 transformations as it was entered, printed, copied or transferred among the systems. Clearly, the process and coordination were the key problems.

So Euchner assembled a team to build a formal model of the flow using Coopers & Lybrand’s Sparks system, which couples decision-tree logic with simulations. Although Sparks proved to be a powerful way to communicate with management because it could capture "the numbers," the tool didn’t help the team much. Because it could model only the formal, normative work process, the system didn’t show what was really going on. The tool faded into the background, and the group redesigned the work process, which cut provisioning time to under three days, significantly reduced costs and drove down installation trouble reports.

Sparks’ shortfall was the inspiration for Brahms. Sparks couldn’t model the group’s two most important innovations. One was to co-locate people with different job functions working on common tasks; the other was to put someone in charge of coordinating multiple people’s work. All too often, companies assume that documents such as work orders can do the communication, but they sometimes don’t. Instead, they introduce long delays in the communication flow.

Brahms is a modeling tool that tries to give equal representation to the formal and informal processes. It was created by a team of four composed of an anthropologist and a computer scientist from IRL and one of each from NYNEX. They approached work activities in novel ways and hammered out a new way to represent work in a computer system. They also filed for a patent on it. Brahms is useful for modeling system requirements as well as work. It makes the social system’s context more visible, which creates a legitimate framework for talking about the social aspects of work in the design of a computer system to support it.

One of the Brahms design team’s goals was to create a more useful tool for groups to use in their discussions. Today, however, Brahms is so complex that it requires a specialist to do the modeling. Perhaps practice will always defy modeling. If so, how do you develop a design practice that can use the information from tools such as Brahms to make better decisions?
Will we be replaced?

Many of the biggest fans and practitioners of communities of practice were once deep into AI. After hitting their heads repeatedly against walls trying to "engineer" people's knowledge into rules, they realized that a human dimension was missing.

The publicity surrounding Garry Kasparov's defeat by IBM's Deep Blue has many commentators clucking about the future of humanity. If nothing else, IRL's work on learning and identity can reassure us that crucial knowledge is held within the relationships and activities of communities of practice. It'll be some time before Deep Blue or any other computer solves that problem. "If technology is to serve practice," says Wenger, quoting IRL's Jack Whalen, "it should be as a system for experts rather than an expert system."

Edutainment and training systems

IRL's work should also provoke increased skepticism toward edutainment and integrated learning systems. It puts into question what children are learning when they use heavily produced, click-here-for-a-surprise edutainment software.

As we mentioned before, traditional methods of replicating or leveraging expertise generally fail, at least partly because they violate the dynamics of communities of practice. Time-and-motion experts log and catalog work teams' activities in order to replicate their behaviors. Domain experts codify and document the information supposedly worth knowing. Training-system developers then create elaborate curricula that are detached from workers' real duties, activities, needs and interests. The whole process seldom works well.

By compartmentalizing and packaging "knowledge," we often make the job of passing it more difficult and expensive. Left to their own devices with each other, people can pick up skills that trainers think are impossible for people to learn, as they did in Xerox's ICS experiment.

Work, play and learning belong together. IRL's Stucky says, "We're thinking about how to re-integrate learning and work. Years ago, someone thought we couldn't afford the apprenticeship model, so we pulled them apart. What does it take to bring them back together?" Answering that question is IRL's continuing quest.
RESOURCES & PHONE NUMBERS

Estee Solomon-Gray, Peter Hillen, Congruity, (415) 326-3200; fax, (415) 321-7051; estee@congruity.com, peter@congruity.com

Peter Henschel, Susan Stucky, Etienne Wenger, IRL, (415) 614-7900; fax, (415) 614-7957; peter_henschel@irl.org, susan_stucky@irl.org, etienne_wenger@irl.org; www.irl.org

Jim Euchner, NYNEX, (914) 644-2411; jim@ynexst.com

John Seely Brown, Xerox PARC, (415) 812-4341; fax, (415) 812-4037; jsb.parc@xerox.com

Shirley Edwards, Xerox PARC, (415) 812-4238, fax, (415) 812-4334; sedwards@parc.xerox.com

Additional resources:

"Communities of Practice: Learning Is Social. Training Is Irrelevant?" by David Stamps, Training Magazine, February 1997, p. 34.


Situated Learning, by Jean Lave and Etienne Wenger; Cambridge University Press, 1990.

Communities of Practice: Learning, Meaning and Identity, by Etienne Wenger; (manuscript to be published by Cambridge University Press).

COMING SOON

- Buddy lists.
- Link management.
- Market-based security.
- And much more... (If you know of any good examples of the categories listed above, please let us know.)

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## RELEASE 1.0 CALENDAR

**1997**

### May 29-30
**The European Telecom Board** - Stockholm, Sweden. Sponsored by the European Business Board. A senior executive confab to discuss where telecom networks are headed. Call Irene M. van der Meulen, 31 (40) 2974-895; fax, 31 (40) 2974-950.

### May 29-31

### June 1-2
**Digital Insight** - Atlanta (Spring Comdex). Organized by Mitch Ratcliffe of Internet/Media Strategies and Softbank Comdex. Thoughtful discussions from sociobiology (Edward O. Wilson) to business ecology (Jim Moore). Call (617) 433-1650; godsdog@ratcliffe.com; www.imstrat.com.

### June 2-5
**3D Design Conference and Exhibition** - San Francisco. Sponsored by 3D Design Magazine. Learn about VRML and other things 3D. Call Jessica Rogers, (415) 278-5235; fax, (415) 278-5200; jrogers@mfi.com; www.3dshow.com.

### June 2-6
**Object Expo and Java Expo** - New York City. Organized by SIGS. With Marimba’s Arthur van Hoff and VRML parent Mark Pesce. Call (212) 242-7515; fax, (212) 242-7578; conferences@SIGS.com; www.sigs.com/conferences/oeny97.

### June 4-6

### July 13-16
**Genetic Programming 1997 Conference** - Stanford, CA. Sponsored by the American Association for Artificial Intelligence and guided by John Koza, author of Genetic Programming. Call (415) 328-3123; fax (415) 321-4457; gp@aaai.org; www-cs-faculty.stanford.edu/koza/qp97.html.

### June 16-17
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### June 17-19
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### June 19-24
**Electronic Entertainment Expo ’97 (E3)** - Atlanta. Sponsored by the Interactive Digital Software Association. See what’s happened to games in the past year. Call (617) 551-9800; fax (617) 440-0359; www.mha.com/e3/.

### June 23-27
**Online Cooperation Berlin** - Berlin, Germany. Organized by International Conferences Exhibitions & Fairs. Covers telework, remote access and mobile computing. Call Astrid Jaeger, 49 (228) 20-11-90; fax, 49 (228) 21-19-44; icef@pm.bn.eunet.de; www.online-work.com.

### June 24-27
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Fifth European Conference on Computer Supported Cooperative Work (ECSCW '97) - Lancaster University, UK. Sponsored by Apple, Lucent and Holden Computer Services. From community networks to social agents and learning systems. Call 44 (1524) 593-041; fax 44 (1524) 593-608; ecscw97@comp.lancs.ac.uk; www.comp.lancs.ac.uk/computing/research/cseg/ecscw97/.

**Sept 14-16**
The Telecosm Conference - Palm Springs, CA. Organized by Forbes Magazine and George Gilder. Invitation only, with Scott McNealy, Marc Andreessen and Carver Mead. Call (212) 205-55211; telecosm@forbes.com.

**Sept 16-18**

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ACM Multimedia '97 - Seattle. Sponsored by ACM. Make multimedia hum, from interactive documents to virtual realities. E-mail Wayne Citrin, citrin@cs.colorado.edu; www.acm.org/sigmm/MM97.

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

Lack of a symbol is no indication of lack of merit.
The full, current calendar is available on our Website (www.edventure.com).
Please let us know about other events we should include. -- Robyn Sturm

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