

On Learning and Knowledge

[The following is an excerpt from John Seely Brown and Paul Duguid, *The Social Life of Information* (Boston: Harvard Business School Press, 2002).]

[The authors start by considering the differences between knowledge and information.] There do appear to be some generally accepted distinctions between knowledge and information. Three strike us as particularly interesting.

First, knowledge usually entails a knower. That is, where people treat information as independent and more-or-less self-sufficient, they seem more inclined to associate knowledge with someone. In general, it sounds right to ask, "Where is that information?" but odd to ask, "Where's that knowledge?" as if knowledge normally lay around waiting to be picked up. It seems more reasonable to ask, "Who knows that?"

Second, given this personal attachment, knowledge appears harder to detach than information. People treat information as a self-contained substance. It is something that people pick up, possess, pass around, put in a database, lose, find, write down, accumulate, count, compare, and so forth. Knowledge, by contrast, doesn't take as kindly to ideas of shipping, receiving, and quantification. It is hard to pick up and hard to transfer. You might expect, for example, someone to send you or point you to the information they have, but not to the knowledge they have.

Third, one reason knowledge may be so hard to give and receive is that knowledge seems to require more by way of assimilation. Knowledge is something we digest rather than merely hold. It entails the knower's understanding and some degree of commitment. Thus while one person often has conflicting information, he or she will not usually have conflicting knowledge. And while it seems quite reasonable to say, "I've got the information, but I don't understand it," it seems less reasonable to say, "I know, but I don't understand, or "I have the knowledge, but I can't see what it means". (Indeed, while conventional uses of information don't necessarily coincide with the specialist uses, as we noted earlier, "information theory" holds information to be independent of meaning.)

WHERE IS THE KNOWER LOST IN THE INFORMATION?

Knowledge's personal attributes suggest that the shift toward knowledge may (or should) represent a shift toward people. Focusing on process, as we argued, draws attention away from people, concentrating instead on disembodied processes and the information that drives them. Focusing on knowledge, by contrast, turns attention toward knowers. Increasingly, as the abundance of information overwhelms us all, we need not simply more information, but people to assimilate, understand, and make sense of it.

The importance of people as creators and carriers of knowledge is forcing organizations to realize that knowledge lies less in its databases than in its people. It's been said, for example, that if NASA wanted to go to the moon again, it would have to start from scratch, having lost not the data, but the human expertise that took it there last time. Similarly, Tom Davenport and Larry Prusak argue that when Ford wanted to build on the success of the Taurus, the company found that the essence of that success had been lost with the loss of the people that created it. Their knowledge was not stored in information technologies. It left when they left.

KNOWN PROBLEMS

Curiously, if knowledge will go out of the door in the heads of people who have developed and worked with that knowledge, it seems reluctant to go out (or stay behind) in the heads of people who have not been so involved. The CEO of the innovative steel manufacturer Chaparral Steel told Leonard-Barton that for this reason the firm has no problem with competitors touring their plant. Chaparral, he said, is willing to show just about everything "and we will be giving away nothing because they can't take it home with them". Unlike information, knowledge, as we said, is hard to detach.

While the challenge of detaching knowledge from some people and attaching it to others may protect some knowledge assets, it makes management of the knowledge much more difficult. The difficulty has revealed itself in, for example the struggle over "best practices". To maintain competitive edge, firms first search for the best practices either within their own or in their competitors' units. Once identified, they then transfer these to areas where practices less good. The search part has led to a great deal of useful benchmarking. The transfer part, however, has proved much more awkward.

Robert Cole of the University of California at Berkeley's Haas Business School has investigated this difficulty in a recent study of best practice strategy. He looked at, among others, Hewlett-Packard's attempts to raise quality levels in its plants around the globe by identifying and circulating the best practices within the firm. Even internally, Cole showed, transfer was uncertain. Cole's findings seem to justify the now-famous lament of HP's chairman, Lew Platt, as he considered how much better the firm would be "if only we knew what we know at HP".

Although, as Cole emphasizes, HP works across continents and countries, failure to transfer practice is not simply a matter of national or linguistic boundaries. Best practices can have as much trouble traveling across town as they do across

continents. As one winner of the prestigious Baldrige prize who grappled with this problem told researchers in frustration, "We can have two plants right across the street from one another, and it's the damndest thing to get them to transfer best practices".

COMMUNITY SUPPORT

Let's begin by asking in what conditions do knowledge and best practice move. In chapter 4, we saw the reps sharing their knowledge, insights, and best practices quite effectively. These traveled first among the small group of coworkers and then, with the help of the Eureka database, across larger groups of company reps. To understand how these best practices travel, this example suggests, requires looking not simply from knowledge to information, but (as the idea of best practice might suggest) from knowledge to practice and groups of practitioners. For it is the reps' practice shared in collaborative communities that allowed them to share their knowledge.

As we saw, the reps formed themselves into a small community, united by their common practice, servicing machines. The members of this community spent a lot of time both working and talking over work together. In Orr's account, the talk and the work, the communication and the practice are inseparable. The talk made the work intelligible, and the work made the talk intelligible. As part of this common work-and-talk, creating, learning, sharing, and using knowledge appear almost indivisible. Conversely, talk without the work, communication without practice is if not unintelligible, at least unusable. Become a member of a community, engage in its practices, and you can acquire and make use of its knowledge and information. Remain an outsider, and these will remain indigestible.

Two learning researchers, whose individual work we mentioned earlier, Jean Lave of the University of California, Berkeley, and Etienne Wenger, a consultant formerly of the Institute for Research on Learning, explain this sort of simultaneous working, learning, and communication in terms of both the practice and the community. Learning a practice, they argue, involves becoming a member of a "community of practice" and thereby understanding its work and its talk from the inside.¹⁴ Learning, from this point of view, is not simply a matter of acquiring information; it requires developing the disposition, demeanor, and outlook of the practitioners.

Like Orr's study of reps, Wenger's study of claims processing (see chapter 4) showed the importance of the group to both what people learn and how. Within the group, Wenger's study reveals, knowledge, traveling on the back of practice, was readily shared.

It may at first seem that group practice and community support are only appropriate for the tedium of "lowly" claims processing. They might seem to

have little do with the "higher" altitudes of knowledge work, where the image of the lone, Rodinesque "thinker" is more common. Yet the value of communities of practice to creating and sharing knowledge is as evident in the labs of particle physicists and biotechnologists as in the claims processing unit.¹⁵ The apprenticeship-like activity that Lave and Wenger describe is found not only on the shop floor, but throughout the highest reaches of education and beyond. In the last years of graduate school or in internships, scientists, humanists, doctors, architects, or lawyers, after years of schoolroom training, learn their craft in the company of professional mentors. Here, they form learning communities capable of generating, sharing, and deploying highly esoteric knowledge.

Recently a computer engineer described a group that he led on a difficult project that, despite the difference in subject matter, resembles the groups of interdependent technicians and claims processors:

[It] was less than half a dozen people; and the group that did the software and hardware never did get to be more than about a dozen people. It was a tiny enough group that everyone knew everything that was going on, and there was very little structure . . . there were people who specifically saw their role as software, and they knew a lot about hardware anyway; and the hardware people all could program. There wasn't a great deal of internal difficulty. There's always a little, I don't think you can get even six people together without having some kind of a problem. . . . There was amazingly little argument or fighting.¹⁶

This description catches central properties of the community of practice. In particular, it notes how, in getting the job done, the people involved ignored divisions of rank and role to forge a single group around their shared task, with overlapping knowledge, relatively blurred boundaries, and a common working identity. The speaker in this case is Frank Heart of Bolt Beranek and Newman; the group's task, designing the core computers for what came to be the Internet. In all, whether the task is deemed high or low, practice is an effective teacher and the community of practice an ideal learning environment.

TO BE OR NOT TO BE

Of course, whatever the strengths of communities of practice, people learn on their own, picking up information from numerous sources about numerous topics without ever becoming a "member". We can learn something about Tibetan medicine or racing without needing to work with Tibetan doctors or become a Formula 1 driver. The critical words here, however, are about and become. They point to a distinction made by Jerome Bruner, a professor of psychology at New York University, between learning about and learning to be. Certainly, most of anyone's knowledge might best be described as knowledge "about". Many people learn about a lot of things -- astrophysics, Australian

Rules football, Madagascan lemurs, or baseball statistics. In the age of the Web, this learning about is easier than ever before.

But, picking up information about Madagascan lemurs in the comfort of our home doesn't close the gap between us and Madagascan field zoologists. Learning to be requires more than just information. It requires the ability to engage in the practice in question.

Indeed, Bruner's distinction highlights another, made by the philosopher Gilbert Ryle. He distinguishes "know that" from "know how". Learning about involves the accumulation of "know that": principally data, facts, or information. Learning about does not, however, produce the ability to put "know that" into use. This, Ryle argues, calls for "know how". And "know how" does not come through accumulating information. (If it did, "know that" and "know how" would, in the end, be indistinguishable -- build up enough "know that" and you would become a practitioner.) "We learn how," Ryle argues, "by practice". And, similarly, through practice, we learn to be.¹⁷

Ryle's philosophical argument may have brought us dangerously near the realm of abstruse epistemology that we promised to avoid. But it helps explain why the same stream of information directed at different people doesn't produce the same knowledge in each. If the people are engaged in different practices, if they are learning to be different kinds of people, then they will respond to the information in different ways. Practice shapes assimilation.

The practice of managing a baseball team, for example, is not the same as the practice of playing on a baseball team. The "know that" for each job may be fairly similar. Managers and players gather a lot of the same information. But the "know how" for the two (thus the way each makes use of their "know that") is quite different. One's practice is to manage; the other's is to play. Similarly, while management theorists and managers may possess similar "know that," their different practices keep them apart. The two can read the same books, magazines, and journals, but these don't allow either to do the other's job. A good management theorist may explain the practice of management well, but never make a good hands-on manager. Similarly, an excellent manager may prove an inept theoretician.¹⁸

LEARNING IN PRACTICE

Practice, then, both shapes and supports learning. We wouldn't need to labor this point so heavily were it not that unenlightened teaching and training often pulls in the opposite direction. First, they tend to isolate people from the sorts of ongoing practice of work itself. And second, they focus heavily on information.

Nowhere is this isolation more true than in the workplace. Or perhaps we should

say than not in the workplace. For while many of the resources for learning to work lie in the workplace, training regularly takes people away from there, to learn the job in classrooms. The ideal of learning isolated from the "distractions" of work practice still influences many training regimens. So let us look briefly at a couple of examples that suggest some of the limits of the classroom and the resources of practice.

Limits to Going by the Book

The first example draws on research by two educational psychologists, George Miller and Patricia Gildea, into how children learn vocabulary. Miller and Gildea compared learning words in the everyday practice of conversation with trying to learn vocabulary from dictionaries. In the everyday case, they found that learning is startlingly fast and successful. By listening, talking, and reading, the average 17-year-old has learned vocabulary at a rate of 5,000 words per year (13 per day) for over 16 years. The children know both what these words mean and how to use them.

By contrast, learning words from abstract definitions and sentences from dictionaries is far slower and far less successful. Working this way, the children in the study acquired between 100 and 200 words per year. Moreover, much of what they learned turned out to be almost useless in practice. Despite their best efforts, looking up relate, careful, remedy and stir up in a dictionary led to sentences such as, "Me and my parents correlate, because without them I wouldn't be here"; "I was meticulous about falling off the cliff"; "The redress for getting sick is staying in bed"; and "Mrs. Morrow stimulated the soup".

Most of us have seen the workplace equivalent of this -- the eager young intern with all the right information but none of the practical knowledge that makes the job doable. Similarly, a lawyer friend of ours recalled how the first days at work were a nightmare because, despite all her excellent results in law school and on the law board exams, nothing in the classroom had prepared her for the realities of having a client on the other end of the telephone.

The Practical Value of Phone Cords

Another colleague, Jack Whalen, showed the power of practice in his study of learning in a service center taking the calls from customers and scheduling technicians.²⁰ Sending technicians to fix broken machines is an expensive undertaking. It is a waste if the problem does not really require a technician. So the people who take the calls can save the company money by diagnosing simple problems and telling the customer how to fix these for themselves. It makes customers happy, too. They don't have to sit with a dead machine, waiting for a technician to bring it back to life.

The phone operators are not, of course, trained as technicians. In the past,

however, they learned from the reps when the latter called in to pick up their next job. The reps would then explain how trivial the last one had been, and in the process the phone operators could learn a lot from these mentors. When they next took such a call, they could offer a solution. As a result of a change in communications technology, however, technicians no longer pick up their calls this way. Consequently, operators no longer pick up insights. Their opportunity for inherent learning has been lost.

The company has tried to replace this kind of learning with the more explicit support of a "case-based expert system". This is an information-based system that prompts operators to ask the customer a series of questions. The operator types the responses into the system, which then searches for a ready solution. This alternative has not worked well. As the reps found with "directive documentation," it can be surprisingly difficult to get a clear diagnosis and solution this way. Moreover, such a system doesn't help the operators understand what they are doing. And that lack of understanding undermines the customer's confidence. It's hard to put faith in people who are obviously reading instructions off a screen. As a result, customers will ask for a technician anyway, and so defeat the whole expert-system strategy.

To overcome these problems, the company contemplated new training courses with several weeks off site to better prepare new operators. Whalen and his fellow researchers took a slightly different route, however. They studied one service center and the quality of diagnosis its staff provided. There they found two operators who gave especially reliable answers. One, unsurprisingly, was an eight-year veteran of the service center with some college experience and a survivor from the days when reps served as mentors. The other, however, was someone with only a high-school diploma. She had been on the job barely four months.

The researchers noticed, however, that the newcomer had a desk opposite the veteran. There she could hear the veteran taking calls, asking questions, and giving advice. And she began to do the same. She had also noticed that he had acquired a variety of pamphlets and manuals, so she began to build up her own stock. Moreover, when she didn't understand the answers the veteran gave, she asked him to show her what he meant, using the service center's own copier.

So instead of training courses, the sociologists suggested restructuring the phone center. They sought to draw on its reservoir of knowledge by putting all its operators in positions to learn from each other. By opening the place up to this collective knowledge, the redesign effectively created a small laboratory of what Whalen calls "indigenous sharing and collaborative learning". The new plan also asked technicians to come in and take calls intermittently. As a result, operators could learn from them once again.

From these changes, the operators were up to speed in about the time it took to

plan a training course for them and in far less time than was set aside for actual training. Ultimately, Whalen concluded, given the amount and level of knowledge already available in the room, what the operators needed were not so much expert systems or new training courses, but "longer phone cords". 21 (These allow an operator taking a call to slide over to the desk and the screen of a resourceful colleague who could provide the necessary help.) Both examples, the classroom and the workplace, indicate how the resources for learning lie not simply in information, but in the practice that allows people to make sense of and use that information and the practitioners who know how to use that information. Where in other circumstances knowledge is hard to move, in these circumstances it travels with remarkable ease.

PHILOSOPHICAL EXPLANATIONS

To venture cautiously again onto philosophical grounds, the distinction between explicit and implicit dimensions of knowledge can help illuminate why practice is so effective. It's possible, for example, to learn about negotiation strategies by reading books about negotiation. But strategy books don't make you into a good negotiator, any more than dictionaries make you into a speaker or expert systems make you into an expert. To become a negotiator requires not only knowledge of strategy, but skill, experience, judgment, and discretion. These allow you to understand not just how a particular strategy is executed, but when to execute it. The two together make a negotiator, but the second comes only with practice.

The chemist and philosopher Michael Polanyi distinguished these two by asking about the explicit and the tacit dimensions of knowledge. The explicit dimension is like the strategy book. But it is relatively useless without the tacit dimension. This, Polanyi argues, allows people to see when to apply the explicit part.²²

To take another simple example of this sort of tacit "seeing," consider dictionaries again. These are the guidebooks of language and particularly for spelling. But if you lack the tacit dimension required for spelling, shelves of dictionaries do you no good. For being able to use a dictionary (the explicit part) is not enough. You have to know when to use a dictionary. A good speller will say, "I just know that doesn't look right". This is the tacit part. Once it has done its work, you can turn to the explicit information in the dictionary. The problem for a bad speller, of course, is that if he or she lacks the tacit knowing that makes words look wrong, then a dictionary's use is limited. In the end, paradoxically, you only learn to use a dictionary by learning to spell.

In making his distinction between explicit and tacit, Polanyi argues that no amount of explicit knowledge provides you with the implicit. They are two different dimensions of knowledge, and trying to reduce one to the other is a little like trying to reduce a two-dimensional drawing to one dimension. This claim of Polanyi's resembles Ryle's argument that "know that" doesn't produce

"know how," and Bruner's that learning about doesn't, on its own, allow you to learn to be. Information, all these arguments suggest, is on its own not enough to produce actionable knowledge. Practice too is required. And for practice, it's best to look to a community of practitioners.

PRACTICAL IMPLICATIONS

Teach these boys nothing but Facts. Facts alone are wanted in life. Plant nothing less and root out everything else. You can only form the minds of reasoning animals upon Facts. . . . Stick to Facts, Sir.

Charles Dickens, *Hard Times*

The view of knowledge and practice we have put forward here has several implications for how to think about learning -- and related issues such as spreading best practice, improving performance, or innovating -- as well as training and teaching.

In the first place, it takes us beyond information. The idea of learning as the steady supply of facts or information, though parodied by Dickens 150 years ago, still prevails today. Each generation has its own fight against images of learners as wax to be molded, pitchers to be filled, and slates to be written on.

Literature about workplace learning is still laced with ideas of "absorptive capacity," as if humans were information sponges. Indeed, the idea that learning is mere information absorption may be on the rise today because it allows for more redefinition. If we accept this view of learning, then it's a short step to talking about such things as computers or bots learning, as if what they do is just what people do. Looking beyond information, as we have tried to do, provides a richer picture of learning. From this picture, the following features stand out for us.

Learning on Demand

Learning is usually treated as a supply-side matter, thought to follow teaching, training, or information delivery. But learning is much more demand driven. People learn in response to need. When people cannot see the need for what's being taught, they ignore it, reject it, or fail to assimilate it in any meaningful way. Conversely, when they have a need, then, if the resources for learning are available, people learn effectively and quickly.

In an essay we wrote about learning some years ago, we referred to this aspect of learning as "stolen knowledge". We based this idea on a short passage in the biography of the great Indian poet and Nobel Prize winner Rabindrath Tagore.²⁴ Talking of an instructor hired to teach him music, Tagore writes, "He determined to teach me music, and

consequently no learning took place". Tagore found little to interest him in the tedious tasks he was given as practice for these involved not the authentic activity itself, but only a pale imitation.

"Nevertheless," he continues, "I did pick up from him a certain amount of stolen knowledge".²⁵ This knowledge, Tagore reveals, he picked up by watching and listening to the musician when the latter played for his own and others' entertainment. Only then, when what was evident was the practice of musicianship and not dismembered teaching exercises, was Tagore able to see and appreciate the real practice at issue.

A demand-side view of this sort of knowledge theft suggests how important it is not to force-feed learning, but to encourage it, both provoking the need and making the resources available for people to "steal". We regard this as the paradoxical challenges of encouraging and legitimating theft. Organizations have become increasingly adept both at provoking and at responding to changes in their clients' needs. They need to consider how to do this for their employees as well.

Social Learning

Despite the tendency to shut ourselves away and sit in Rodinesque isolation when we have to learn, learning is a remarkably social process. Social groups provide the resources for their members to learn. Other socially based resources are also quite effective.

For example, people who are judged unfit to learn to operate simple tools or who fail to master domestic appliances nevertheless learn to operate complex machines that present users with hazardous, changing environments and sophisticated technologies. We refer, of course, to the car. Technologically, cars are extremely sophisticated. But they are also extremely well integrated socially. As a result, learning becomes almost invisible. Consider, by contrast, the triumphal despair with which people frustratedly boast that they still can't program their VCR. The success of learner drivers -- with or without instruction -- should undoubtedly be the envy of many who design far less difficult consumer or workplace appliances.

The car and the VCR make an interesting contrast. Almost everyone in our society who learns to drive has already spent a great deal of time traveling in cars or buses, along roads and highways. New drivers begin formal instruction with an implicitly structured, social understanding of the task. Now consider the VCR. Most people can use their machine to play tapes. What they find difficult is recording, though that's not a much more complex task. The central distinction between these two functions is that one is often a social act, the other highly individual. You might invite a group over to watch a movie. You are unlikely to invite one over to watch you record.²⁶

Learning and Identity Shape One Another

Bruner, with his idea of learning to be, and Lave and Wenger, in their discussion of communities of practice, both stress how learning needs to be understood in relation to the development of human identity. In learning to be, in becoming a member of a community of practice, an individual is developing a social identity. In turn, the identity under development shapes what that person comes to know, how he or she assimilates knowledge and information. So, even when people are learning about, in Bruner's terms, the identity they are developing determines what they pay attention to and what they learn. What people learn about, then, is always refracted through who they are and what they are learning to be.²⁷

A Brief Note on the "Social"

We emphasize the social side of learning and identity with some caution. The economist Friedrich Hayek claims that social is a weasel word.³⁰ Moreover, people readily point out that they can learn a great deal sitting alone in an office or a library. And you don't have to go very far with the thesis that learning is significantly social to encounter the question "What about Robinson Crusoe?"³¹

Early economists liked to present Crusoe as an example of the homo economicus, the universal economic man, learning and working in splendid individual independence. And that's the idea behind this question. It took Karl Marx to point out, however, that Crusoe is not a universal. On his island (and in Defoe's mind), he is deeply rooted in the society from which he came:

Our friend Robinson . . . having rescued a watch, ledger, and pen and ink from the wreck, commences, like a true-born Briton, to keep a set of books. His stock book contains a list of the objects of utility that belong to him, of the operations necessary for their production; and lastly, of the labour time that definite quantities of those objects have, on average, cost him.³²

Robinson is not just a man in isolation, but a highly representative member of what Napoleon was to call a "nation of shopkeepers".

So while people do indeed learn alone, even when they are not stranded on desert islands or in small cafes, they are nonetheless always enmeshed in society, which saturates our environment, however much we might wish to escape it at times. Language, for example, is a social artifact, and as people learn their way into it, they are simultaneously inserting themselves into a variety of complex, interwoven social systems.

LEARNING DIVISIONS

Looking at learning as a demand-driven, identity forming, social act, it's possible to see how learning binds people together. People with similar practices and similar resources develop similar identities -- the identity of a technician, a chemist, a lepidopterist, a train spotter, an enologist, an archivist, a parking-lot attendant, a business historian, a model bus enthusiast, a real estate developer, or a cancer sufferer. These practices in common (for hobbies and illnesses are practices too) allow people to form social networks along which knowledge about that practice can both travel rapidly and be assimilated readily.³⁴

For the same reason, however, members of these networks are to some degree divided or separated from people with different practices. It is not the different information they have that divides them. Indeed, they might have a lot of information in common. Rather, it is their different attitudes or dispositions toward that information -- attitudes and dispositions shaped by practice and identity -- that divide. Consequently, despite much in common, physicians are different from nurses, accountants from financial planners.³⁵

We see two types of work-related networks that, with the boundaries they inevitably create, are critical for understanding learning, work, and the movement of knowledge. First, there are the networks that link people to others whom they may never get to know but who work on similar practices. We call these "networks of practice". Second, there are the more tight-knit groups formed, again through practice, by people working together on the same or similar tasks. These are what, following Lave and Wenger, we call "communities of practice". Here we sketch the two briefly before elaborating their role in later chapters.

Networks of Practice

While the name "networks of practice" helps us to emphasize what we see as the common denominator of these groups -- practice -- elsewhere they go by the name of "occupational groups" or "social worlds".³⁶ People in such networks have practice and knowledge in common.

Nevertheless, most of the members are unknown to one other. Indeed, the links between the members of such networks are usually more indirect than direct -- newsletters, Web sites, Bulletin boards, listservs, and so forth keep them in touch and aware of one another.³⁷ Members coordinate and communicate through third parties or indirectly. Coordination and communication are, as a result, quite explicit.³⁸

The 25,000 reps working for Xerox make up, in theory, such a network. They could in principle be linked through such things as the Eureka database (though it is in fact not worldwide) or corporate newsletters aimed at reps. Their

common practice makes these links viable, allowing them to assimilate these communications in more-or-less similar ways. By extension, the network could also include technicians in other companies doing the same sort of work, though here the connections would be weaker, grounds for common understanding more sparse.

Networks of this sort are notable for their reach -- a reach now extended and fortified by information technology. Information can travel across vast networks with great speed and to large numbers but nonetheless be assimilated in much the same way by whomever receives it. By contrast, there is relatively little reciprocity across such network; that is, network members don't interact with one another directly to any significant degree. When reach dominates reciprocity like this, it produces very loosely coupled systems. Collectively, such social systems don't take action and produce little knowledge. They can, though, share information relating to the members' common practices quite efficiently.

Communities of Practice

Lave and Wenger's notion of communities of practice, which we mentioned earlier, focuses on subsections of these larger networks of practice. These subsections stand in contrast to the network as a whole in several ways. They are relatively tight-knit groups of people who know each other and work together directly. They are usually face-to-face communities that continually negotiate with, communicate with, and coordinate with each other directly in the course of work. And this negotiation, communication, and coordination is highly implicit, part of work practice, and, in the case of the reps, work chat.⁴⁰

While part of the network, groups like this cultivate their own style, their own sense of taste, judgment, and appropriateness, their own slang and in-terms. These things can distinguish members of one community within a network from others. In networks of scholars, for example, while all may be from one field, it's often easy to guess who trained together in a particular lab or school by their style and approach.

In these groups, the demands of direct coordination inevitably limit reach. You can only work closely with so many people. On the other hand, reciprocity is strong. People are able to affect one another and the group as a whole directly. Changes can propagate easily. Coordination is tight. Ideas and knowledge may be distributed across the group, not held individually. These groups allow for highly productive and creative work to develop collaboratively.

UNDERSTANDING DIVISION

The divisions marked by the external boundaries of these groups have significant implications for the development of organizations, technologies, and

indeed of societies as a whole. Yet they are divisions that discussions of such developments easily overlook.

For example, discussions of the emerging "network society" suggest that society is becoming a single, uniform entity. The network stretches indefinitely, linking the individuals that stand at each node to one another and providing them with common information. Communities, organizations, nations, and the like disappear (victims of the 6-Ds discussed in chapter 1). The network is all, configuring itself more or less as the vaunted global village.

From the perspective of practice, rather than of process or information, a rather different picture emerges. From this viewpoint, any global network has a highly varied topography. While the whole may ultimately be global, within it there are networks of practice with lines of reach that are extensive but nonetheless bounded by practice. And there are communities of practice, with dense connections of both reach and reciprocity, which again put limits on extent. These two, networks and communities, produce areas marked by common identity and coordinated practice within any larger network. And as a consequence of these areas, information does not travel uniformly throughout the network. It travels according to the local topography.

[End of chapter "Learning In Theory and Practice"]

Questions to Consider:

What is the difference between knowledge and information and why is that important? What do the authors think would be the difficulties replicating the program to land a person on the moon? What communities/networks of practice are you a part of? Think of something you have learned and how you learned it. Does your experience support the authors' argument? In what way? Why do the authors seem to believe that learning is more of a social enterprise than a lone enterprise? What is tacit knowledge? Can you think of an area where you have tacit knowledge? Think of three ways that this reading should have implications for your college career? What implications does it have for you in the workplace? How do you think the authors would feel about online learning? Why? Does this reading help us explain why the Charlotte Bobcats, owned by Michael Jordan, one of the greatest basketball players of all time, are such a terrible team? (Why might a great player not be a great manager or owner?) This essay is over 20 years old. Do you think the rise of AI and tools such as ChatGPT undermine the authors' theses?