# STOLEN KNOWLEDGE

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A very great musician came and stayed in [our] house.  He made one big mistake . . . [he] determined to teach me music, and consequently no learning took place.  Nevertheless, I did casually pick up from him a certain amount of stolen knowledge.

*[Rabindrath Tagore quoted in Bandyopadhyay, 1989: 45]*

### 1 OPERATIONALIZATION VS LEGITIMIZATION

One of the most persistent educational questions following discussions of situated learning has been, How can these situated theories be operationalized?  (see Lave & Wenger, 1991, p.41.)  In particular, for those who share an interest in technology, the questions have usually been of the sort: How can ideas of situated learning be instantiated in educational technology?  What sort of systems can we build?  What sort of system would be most appropriate to teach x in a situated way?

We find it quite difficult to address these questions—not because it is impossible to build technology to support learning, but because that is a different problem from building technology for teaching.  Reconceptualizing learning, as situated approaches have done, requires also reconceptualizing prevalent notions of teaching, instruction, the learner, subject matter, technology, and system, transforming these into something quite different and thereby making it difficult to phrase new answers in old terms.  The questions to be asked become radically transformed.

For instance, in what follows, we try to provide some sort justification for transforming the question, How do you operationalize situated theory? into, How do you legitimize theft?  We try to do this particular transformation by contrasting a set of

oppositional terms that respectively underpin and undermine conventional notions of operationalization. These are:

> instruction vs learning
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> explicit vs implicit
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> individual vs social
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> systems narrowly construed vs systems broadly construed

The implications of these oppositions will, we hope, justify our transformation of the initial question.

We base our very brief account here on a longer analysis we did elsewhere in the context of workplace learning, where most of our own work is centered (Brown and Duguid, 1992). There are undoubtedly very significant differences between schools and workplaces as situations for learning. But there are also important though often overlooked commonalities—commonalities that situated approaches have brought to the fore. Consequently, we believe that by taking a situated approach there is a great deal designers for either situation can learn from each other.

## 2. TRANSFORMING TERMS

### 2.1 Instruction vs Learning

The distance between the initial question ("How do you operationalize this theory?") and our transformation ("How do you legitimize theft?") can be illustrated most quickly by pointing to the inversion implicit in the question. Where "situated learning" talks of *learning*, questions about educational technology tend to be framed around *teaching* and instruction. A situated approach contests the assumption that learning is a response to teaching.

It is undoubtedly a little unfair to accuse questioners of inverting the order of things. It was actually one of the primary insightful moves of Jean Lave's work on situated learning (Lave, 1988, Lave et al., 1989) to invert established perspectives and to insist on looking at learning not, as is conventional, from the pedagogical perspective, but instead from the learner's perspective. Whether the learner is a school kid, a carpenter, a cardiologist, or a CEO, if you want to understand learning and what is learned in any

interaction you have to investigate from the point of view of that learner. From that perspective it becomes immediately clear that even if a learner did not learn what a teacher, or educational technology, or workplace instructor attempted to teach, it is not justifiable to conclude that nothing was learned.

The importance of shifting perspective can in part be explained by the difference between the two implicit views of what learning is. On the one hand, it is seen as the end result of a process of transmitting knowledge. When teaching is successful, according to this view, learners will "have" what the teacher transmitted; when it is unsuccessful, they will not. Knowledge then, is unchanging and transitive; learners and teachers, for the most part are either competent or deficient. The knowledge is either successfully or unsuccessfully taught and learned.

The alternative view sees learning as part of an inevitably unfinished, but continuous process that goes on throughout life. Each event, circumstance, or interaction is not discrete. Rather, each is assimilated or appropriated in terms of what has gone before. The process is not, then, like the addition of a brick to a building—where the brick remains as distinct and self-contained as it was in the builder's hand. Instead, it is a little like the addition of color to color in a painting, where the color that is added becomes inseparably a part of the color that was there before and both are transformed in the process. Thus, what is learned can never be judged solely in terms of what is taught.

Of course, this paint metaphor is still misleading. Learning is not such a passive activity. The shade that events, circumstances, or interactions take on in the process of learning are determined through *active* appropriation. This appropriation is unlikely to involve simply what an instructor hopes to impart. It is more likely to involve many other peripheral features of which the teacher might be unaware, but which collectively make sense for the learner. For the act of appropriation is simultaneously an act of sense-making in terms of the learner's view of the world.

The point is illustrated in our opening quotation from Tagore, the Indian poet, musician, and Nobel laureate. Describing the role of the instructor hired to teach him music, Tagore writes "he determined to teach me music, and consequently no learning took place"—at least, no learning in the terms laid out by the teacher and his syllabus. But Tagore reveals with wonderful insight that something important and profound did result from interactions between these two: "Nevertheless, I did pick up from him a certain amount of *stolen knowledge*" (our emphasis). This knowledge Tagore "stole" by watching and listening to the musician as the latter, outside his classes, played for his

own and others' entertainment. Only then, and not in dismembered didactic exercises, was Tagore able to see and understand the social practice of musicianship.

It is a fundamental challenge for design—for both the school and the workplace to redesign the learning environment so that newcomers can legitimately and peripherally participate in authentic social practice in rich and productive ways to, in short, make it possible for learners to "steal" the knowledge they need.

## 2.2   Explicit vs Implicit

Part of the need to "steal" arises because relatively little of the complex web of actual practice can be made the subject of explicit instruction. A great deal inevitably remains implicit in practice itself, where it is always available, for those who have access, to be stolen as required. The alternative, conventional route of trying to render the implicit explicit is highly problematic.

In the first place, though certain implicit aspects of practice can be made explicit for instruction, there is no such thing as a "complete" account (see Suchman, 1987). Consequently, a learner offered only explicit information faces an inevitably partial and often incoherent account of practice. Furthermore, in being explicated, the implicit loses its value as implicit knowledge. The two—implicit and explicit—play two different roles. Compared to abstracted, explicit knowledge the implicit aspects of practice, while occasionally difficult to get in perspective, have a dynamism by virtue of their very implicitness. They are inherent in practice and change and evolve with it. By contrast, abstractions, like signposts, can provide crucial clarification and direction in confused situations. But like signposts, they too can be made irrelevant by practice as it evolves and develops new routes across the domain.

Because of its emphasis on the implicit in practice, situated arguments have occasionally been accused of championing the implicit, and denouncing the explicit and abstract as if these were somehow antithetical to practice (e.g. Palincsar, 1989; see also Brown, Collins, & Duguid, 1989b and Lave, in preparation). But explication and abstraction are *themselves* situated social practices. They are developed in the process of ongoing activity of one sort or another. Thus they cannot be inherently antithetical to it. They do, however, have to be understood in terms of the specific social practice in which they play a part. Being socially located, though abstract, they are not universal. Problems arise, then, not through abstraction *per se*, but rather through the detachment of

abstractions from the practices in which they were created. In particular, problems arise from the imposition on one practice of abstractions developed in another.

Put more generally, abstractions become problematic when their own historical and social locations as practice are ignored. They need to be kept close to and reflect actual, ongoing practice. As Etienne Wenger's (in press) work on the use of expert systems suggests, technologies whose representations of the complexities of practice are misleadingly partial may make that practice difficult or even impossible. In terms of workplace design for learning, then, it is important both to honor the implicit aspects of practice and to ensure that abstractions, as they are needed, are a function of that practice, not an intervention from outside.

### 2.3    Individual vs Social

Practice, like abstraction and explication, is not universal.   On the other hand, none of these is individual.  Rather, all three are contained within social milieux that Lave and Wenger (1991) identify as "communities of practice".  It is implicitly in the context of these that learners make sense of practice.  It is almost impossible to make enduring, coherent sense if the individual is cut off from the practice in which his or her particular activity makes sense.

Even though individual instruction is extensive, if the social context is missing confusion and disillusion are likely.  By contrast, even though instruction is minimal, quite complex practices can be learned effectively and easily where the social context is evident and supportive.

For example, people who are judged unfit to learn to operate relatively simple tools or who fail to learn rudimentary domestic appliances usually learn to operate an enormously complex machine that presents users with a hazardous and continually changing environment and an enormous array of increasingly sophisticated technology—the car.  Cars are socially so well integrated that the learning becomes almost invisible. The success of learner drivers—with or without instruction—should undoubtedly be the envy and the object of many who design far less complex consumer or workplace appliances.  Consider, by contrast, the triumphal despair with which people frustrated boast that they can't use their VCR.

The important distinction here is that driving is a fundamentally social practice. Almost everyone in our society who learns to drive has already spent a great deal of their lives traveling in cars or buses, along roads and highways.  They begin to learn to drive

with an implicitly structured social understanding of the task. Then, even if the task is decomposed, the learner need never lose sight of the overall practice. ==The social world provides scaffolding—and a highly dynamic, versatile scaffolding at that.== In fact, something similar is true of the VCR. Most can use their machine to play tapes. What they find difficult is recording. Here, as with learning to drive, a 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, but you are unlikely to invite a group over to watch you record. To get over the learning problems that have emerged from increasing isolation —an isolation that often results from modern technologies—user groups have flourished in recent years providing people living or working alone with some efficient access to social periphery that can help support and make sense of use.

To relate this again to the design of technology for learning, it seems important not simply to fragment or decompose tasks to make them didactically tractable on their own and for individuals. Any decomposition of the task must be done with an eye not to the task or the user in isolation, but to the learner's need to situate the decomposed task in the context of the overall social practice. The presence of the full context gives the learner the chance to "steal" whatever he or she finds most appropriate. It is vitally important not to fragment the social periphery. One of the missions of technological design should be to provide the glue for this social periphery and to design with an eye both to using the social periphery, and where possible, to enhancing it.

### 2.4   Systems Narrowly Construed vs Systems Broadly Construed

Finally, if it is important not to cut the individual learner off from a larger perspective on the encompassing social practice, similarly it is equally important not to isolate the technology. Boundaries around technologies tend to be remarkably tightly drawn. "Peripherals," "software," and even "users" tend to be defined by exclusion. The technology comes thus to be seen in splendid isolation, to be described in terms of "self-containment," "self-explanation," or "context-independence." Isolation of technology undoubtedly has it attractions: it appears to eliminate the thorny problem of context. But, in fact, isolation ultimately makes both design and use overwhelmingly hard tasks because nothing is self-explanatory. There is no universal, autonomous, and indubitable language of explanation. Designers keep things simple not by isolating artifacts, but by embedding them in the context in which they will be used. This is the system broadly

construed embracing not just the technology, but also the practices, and the communities of practice.

The system in the conventionally narrow sense of the term needs to be connected to this broader system—to the material, technological, and social system that surrounds the practice of which the individual technology forms just one part. Then, a learner can look beyond the immediate object into its periphery to find the means to make sense of a particular task to find—in Tagore's words, which piece of knowledge it is most appropriate to steal.

## 3    LPP AS LEGITIMATE THEFT

These ideas about what learning is and how it occurs, make it difficult for us to talk in standard terms of "operationalization" and instructional technology. For us what is required is summed up in Lave and Wenger's (1991) notion of "legitimate peripheral participation." In the context of their work, on which we rely heavily, a few more points are probably worth making. The first is simply and briefly to direct people whose interest we might have aroused to Lave's and Wenger's own work (e.g., Lave, 1991, 1992; in preparation; Lave et al., 1992; Lave & Wenger, 1990, 1991; Wenger, forthcoming). This work unfolds a rich, complex picture of what a situated view of learning needs to account for and emphasizes, in particular the social, rather than merely physical nature of situatedness.

Next, a few clarifications are probably helpful. First, as Lave (1991) herself notes, the *situation* is not simply another term for the immediate, physical context. If it is to carry any significant conceptual import, it has to be explored in social and historical terms. Two people together in a room are not inevitably identically situated, and the situated constraints on practice do not simply arise in and through such isolated interactions. The people and the constraints importantly have social and historical trajectories. These also need to be understood in any situated account.

Second, *community of practice* denotes a locus for understanding coherent social practice. Thus it does not necessarily align with established communities or established ideas about what communities are. *Community* in Lave & Wenger's view is not, a "warmly persuasive term for an existing set of relations" (Williams, 1977). Communities can be, and often are, diffuse, fragmented, and contentious. We suspect, however, that it

may be this very connotation of warm persuasiveness that has made the concept so attractive to some.

Third, *legitimate peripheral participation* (lpp) is not an academic synonym for apprenticeship. Apprenticeship can offer a useful metaphor for the way people learn. In the end, however, in part because of the way apprenticeship has historically been "operationalized," the metaphor can be seriously misleading. As LPP has occasionally been located somewhere between indentured servitude and conscription.

As Lave and Wenger put it:

> Legitimate peripheral participation is not itself an educational form, much less a pedagogical strategy or a teaching technique. It is an analytic viewpoint on learning, a way of understanding learning. We hope to make it clear that learning through legitimate peripheral participation takes place no matter which educational form provides a context for learning, or whether there is any intentional educational form at all. Indeed, this viewpoint makes a fundamental distinction between learning and intentional instruction. [1991: 40]

One of the powerful implications of this view is that the best way to support learning is from the demand side rather than the supply side. That is, rather than deciding ahead of time what a learner needs to know and making this explicitly available to the exclusion of everything else, designers and instructors need to make available as much as possible of the whole rich web of practice—explicit and implicit—allowing the learner to call upon aspects of practice, latent in the periphery, as they are needed.

This is certainly not a trivial challenge—particularly for schools. The workplace, where our work has been concentrated, is perhaps the easiest place to design because, despite the inevitable contradictions and conflict, it is rich with inherently authentic practice—with a social periphery that, as Orr's (1990) or Shaiken's (1990) work shows, can even supersede attempts to impoverish understanding. Consequently, people often learn, complex work skills *despite* didactic practices that are deliberately designed to deskill. Workplace designers (and managers) should be developing technology to honor that learning ability, not to circumvent it.

The classroom presents a quite different challenge. Classroom conditions are often assumed to be the ideal place for all forms of learning. In our view they are, in fact, highly problematic. There is undoubtedly ongoing practice in the classroom, and there is learning. But the gap between these and the didactic goals of education is often severe.

We have protested against attempts to deal with workplace learning by taking people out of the workplace and putting them in classrooms.

Goldman's (1992) work illustrates the richness of the interpersonal interaction that is usually either overlooked or deliberately disrupted in the classroom. She, like Eckert (1989), shows how the primary activity in a classroom is the student's construction of their identities. This activity is generally viewed as an aberration or a distraction. Yet it offers a rich resource. Goldman points to the overlapping worlds *in the context of which students*, in conversation with one another, construct their understanding and their identities. If these are curtailed, then so is much of the learning potential. Students, she notes, are eminently capable of "accomplishing work with each other," but this is importantly, "on their own terms." Their social work, she emphasizes, is

> not counterproductive to the accomplishment of their science work and may even be a necessary prerequisite. . . . When the group engaged in conceptual learning conversations they became very close, focussed and unified. [1992: 7]

Roschelle's (in press) work follows similar lines. He too saw conceptual change arising out of collaboration. The students he studied worked, like Goldman's, with a physics microworld. And their insights too came not so much through studying the simulation as through talking about it. In conversation—supported by the technology which allowed them to test their hypotheses, illustrate their inchoate thoughts, and review and revise their developing understanding—the students converged on a shared, articulated understanding.

The means to build connections *between* learners and *to* the world of full-blooded practice are essential. In the workplace, learners can, when they need, steal their knowledge from the social periphery made up of other, more experienced workers and ongoing, socially shared practice. The classroom, unfortunately, tends to be too well secured against theft. The actual practices under study can often neither be stolen nor constructively discussed. Only replicas and not the real thing are on display. The more educational technology is constrained to "essentials" and "individuals" the more it resembles a nugatory "delivery system," the more it risks becoming theft proof. If Tagore had had to survive on what was given in isolation, rather than what he took in company, he might never have learned as he did. A preferable goal, it seems to us, is to design technology that provides an underconstrained "window" onto practice, allowing students to look through it onto as much actual practice as it can reveal, to see to

increasingly greater depths, and to collaborate in exploration.  The closer such technology can come to making theft possible, the better it is likely to be.

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