What is Expertise?

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Do you know who your MVP is? You know, the one who can provide innovative, valuable solutions to your customers (whether internal or external). The one who knows the jargon, products and tools of your company, but who goes beyond that to really listen to the customer's need, and meet it in creative ways. The one who adds value to customer relationships by inventing new solutions, not just delivering products. The one who has been around for a long time, seen all the weird stuff before, and can find a way to do what the customer needs when others are stumped — and probably faster than anyone else could do it.

That's *expertise*, and it exists at every level of your organization. It's your most valuable competitive asset — and also your scarcest. Its scarcity is probably the greatest single factor limiting your growth. It also goes home every night, and it's what you lose when your MVP retires or goes over to the competition.

People usually think of expertise as a "black box" — something that is unknowable, and certainly not written down anywhere. McKinsey uses the term *tacit knowledge* to describe this most critical asset.[2] But breakthroughs in learning sciences research have shown how to make this knowledge explicit, where everyone can learn and use it. The research has shown that expertise derives from four types of knowledge: *ill-structured problem solving*, which is based on a rich understanding of *how things work*, and a mastery of *problem-solving* strategies that work within a specific *context*. Let's look at each of these in more detail.

What makes your MVP special is the ability to solve *ill-structured problems.* These are the problems that have something unique about them, whether it's designing a new solution strategy, or envisioning a new skyscraper. These problems are at the opposite end of the

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[2] Johnson, B.C., Manyika, J.M., Yee, L.A. (2005) The next revolution in interactions. *The McKinsey Quarterly,* 2005 (4). Note that the term *tacit knowledge* originated with the philosopher-mathematician Polanyi.

continuum from *well-structured problems*, which we all solve every day. What's the difference?

Any problem can be described in terms of a starting state (the inputs), a solution *process*, and a goal state (the outputs). In ill-structured problems, things aren't well defined. You know your starting state, but you may not know what a good solution looks like (there may even be many possible good solutions), and you probably need to invent a way to arrive at the solution (and there may be many of those, too). These problems are embedded in any business, at nearly every level beyond entry level.

For example, if you are a marketing expert and you want to help a customer with a new product introduction, then you probably know some things about how the customer is doing now, but all you know about the solution may be a target in revenue or market share. Furthermore, there are probably lots of new product introductions that might work, and your job is really to help the client pick the best one (by multiple criteria), and then to plan and execute the launch (all things that can be done lots of ways). And markets will surprise you: you can't know everything about how things work for that client in that market, so your predictions about how the market will react to a particular strategy aren't completely sure either: they're stated in terms of what will *probably* work, not what *will certainly* work.

So, new product introduction is ill structured because there are lots of potentially successful new products, and lots of ways to figure out which one is the best. Put a bunch of experts in a bar and feed them a few beers, and they will debate endlessly whether a particular new product, launched in a particular way, really was the best strategy for that particular client. Some solutions are clearly wrong, but there are many solutions that are "right" — and a few that are in between.

In practically any enterprise, and at almost any level of the organization, the real value added to the customer (whether internal or external) comes from ill-structured problem solving. For sales it's solution selling. For managers it's both the problem solving within the financial and technical sides of the business, and the problem solving within the organization (the people side of the business). For doctors, it's medical diagnosis. For architects and engineers, it's design. For advertisers, it's everything from conceiving an advertising campaign strategy to writing the copy. For service technicians, it's troubleshooting a new problem or a new piece of equipment.

But ill-structured problem-solving expertise doesn't exist by itself. It's based on three kinds of knowledge: *how things work*, *problem-solving strategies*, and *context knowledge.* Let's look at each.

How things work is the expert's understanding of the system that they manipulate when they solve problems. For example, a marketing expert knows how markets work in general, and how the specific market of interest to the client works. An expert financial analyst knows how the finances of a company work and how they interact with the market. A doctor knows how organ systems work. A service technician knows how the mechanical, electrical and hydraulic systems of a car work. And so on.

What's most important is that this understanding is a *working model* of the system: the expert knows the parts of the system and how they interact, both *when they work* as intended, and *when they don't work* as intended. Furthermore, the expert can *predict or explain* how the system is behaving, or how it will behave if he or she makes a change. For example, marketing experts can explain why a product's sales are declining, in terms of the way the market works. And, they can predict how the market will behave (with impact on product sales) if their customer makes a particular change in how the product is made or marketed. Service technicians can explain how a car works normally, and how the car would behave if a particular component failed in a particular way. Is this ability to predict or explain perfect? Probably not, unless the expert's understanding of the system is complete and perfect — rarely the case for complex systems — but it's still valuable.

Problem-solving strategies are the general rules an expert knows about how to solve problems of a particular type. For example, a marketing expert knows a general strategy for new product introduction. A service technician knows strategies for troubleshooting systems, and so on. But don't confuse these strategies with the content-free, problem-solving strategies advocated in the 1960s, and still sometimes taught today: research has shown that experts rarely use such general strategies. Instead, experts like to be efficient when they are solving problems. It's a lot of work to approach a problem as ill structured, so the first question an expert asks is, "have I seen this problem before?" If the answer is "yes," then solving the problem isn't ill structured *for that expert* — all he or she has to do is recall how it was solved last time, and do it again. Experts have lots of these problems in memory, from past experience. Being able to recall them

frees up mental resources for solving the genuinely new problems, which really are ill structured.[3]

The expert's strategies for problems that are genuinely new and ill structured can't be represented easily as a series of steps. Instead, the expert has learned some general rules that are helpful in figuring out how to solve a particular type of problem. These rules often vary in how specific they are, and — most important — they usually are not applied in sequence and they may even overlap and provide conflicting guidance in some circumstances. Consequently, they are called *decision rules*, or *heuristics.* Experts rarely articulate them directly, but if you listen carefully to the "war stories" experts swap, there is a good chance that what makes each "war story" interesting to other experts is the discovery of a new decision rule on which the story turns.

Experts also have a great deal of *context knowledge*. The marketing expert knows a lot about the companies in a category and how the market in that category has worked in the past. The manager knows a lot about his company's industry, lines of business, and how his organization has worked (or malfunctioned) in the past. The architect or engineer knows a lot about the particular requirements and design problems of a particular type of building or system, and its users, and how various designs have worked in the past. The doctor or the service technician knows a lot about the particular types of patients (or equipment models) he or she diagnoses, including where the common trouble spots are for each patient type (or equipment model) in the geographic area where he or she works. This kind of context knowledge is crucial to ill-structured problem solving, because it helps the expert figure out what the goal really is, and what the best solution path is to get there.

To summarize, it is the combination of all three of these types of knowledge that makes for expertise:
> How things work
> Context knowledge
> Ill-structured problem-solving strategies (decision rules or heuristics).

To make an expert ill-structured problem solver, all are necessary.

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[3] Incidentally, this kind of knowledge also creates a kind of mistake only an expert can make: incorrectly recognizing a new, ill-structured problem as a similar and familiar one (which is now well-structured). When that happens, the expert will merrily go along using the recalled well-structured problem-solving procedure, and then be astonished when it doesn't lead to the expected solution. Oops.

There's a good chance that these types of knowledge aren't written down anywhere in your company, nor are they part of your training or certification systems. But using special analytical techniques developed by learning science researchers, it is possible to make these types of knowledge explicit. Once you have done so, then the expertise of your company becomes a scalable and reproducible asset.