ASK talks with

DR. GARY KLEIN

GARY KLEIN, PH.D., IS CHIEF
SCIENTIST OF KLEIN ASSOCIATES INC.,
A COMPANY HE FOUNDED IN 1978
TO BETTER UNDERSTAND HOW TO
IMPROVE DECISION MAKING IN
INDIVIDUALS AND TEAMS. THE
COMPANY HAS 30 EMPLOYEES
WORKING ON PROJECTS FOR BOTH
GOVERNMENT AND COMMERCIAL
CLIENTS. DR. KLEIN IS ONE OF
THE FOUNDERS OF THE FIELD OF
NATURALISTIC DECISION MAKING.
HIS WORK ON RECOGNITIONAL
DECISION MAKING HAS BEEN
INFLUENTIAL FOR THE DESIGN OF
NEW SYSTEMS AND INTERFACES,
AND FOR THE DEVELOPMENT OF
DECISION TRAINING PROGRAMS.
HE HAS EXTENDED HIS WORK
ON DECISION MAKING TO
DESCRIBE PROBLEM DETECTION,
OPTION GENERATION, SENSE
MAKING, AND PLANNING.

In order to perform research on decision making in field settings, Dr. Klein and his colleagues have developed new methods of Cognitive Task Analysis. Klein Associates has used Cognitive Task Analysis methods to study decision making in more than 60 domains, including firefighting, command and control, software troubleshooting, healthcare, and consumer purchasing. Dr. Klein has presented workshops on Cognitive Task Analysis to more than 300 professionals in the U.S. and abroad, and has presented seminars on naturalistic decision making to a wide variety of groups such as the Smithsonian Associates program.

As a researcher and storyteller, you preach about the power of stories as learning tools. How can project managers harness this power in their work every day?

To start, we need to stress the importance of intuition—following your hunch, trusting your years of experience to lead you in the right direction. Intuition, in and of itself, is extremely undervalued. Why? Because it's fallible. It's only a first step; it needs to be checked by analysis. But we have lots of tools and mechanisms for strengthening our analytical capacities, and we don't have a similar repertoire for strengthening our intuitions.

How then, do we use stories to strengthen and apply our intuitions?

We use stories when we make recognitional decisions. Most of our decisions are based on recognition. We use stories to map situations and say, "I've seen that before." In this way, I can call up incidents that I've seen myself, or that other people have told me they've seen. Then I can use the stories to evaluate my intuition. We also use stories to make sense of events. We start with basic scripts, we build onto them with the knowledge we've collected, and we turn them into stories.

Can you give an example?

Sure, I have an example in the form of a story:

A friend of mine was a highly experienced Colonel in the Marines. He was part of an exercise at Camp Pendleton called "Hunter-Warrior." Marines—noncommissioned officers—would go out in the field as forward observers to look for enemy tanks and equipment. They would radio back what they saw so that those tanks and other targets could be attacked.

My friend wasn't part of the exercise, but he got permission to go along. At one point, the unit spotted

a tank. The non-commissioned officer in charge of the unit saw the tank once it was in plain view and sent back to headquarters the message, "I see a tank," along with the grid coordinates.

My friend was thinking, "Anybody could see the tank by now, because it was out in the open." So he watched it closely as it came down the valley, and then took a defensive position. He said to himself, "There is never just one tank. Nobody ever goes out all by himself. There has got to be at least one more tank."

He kept watching, but he didn't seeing another tank come down the valley. So he realized that the second tank must already be in position. He started looking in the shadows to see where the other tank would be positioned to support the first one, and he found it. He said to himself, "Tanks usually travel in platoons of four. If there are two tanks, maybe there is another one or two." He looked deeper into the shadows and found the other two.

Then he thought, "These guys are just sitting there, and the position they've taken up is a defensive position. So, what are they defending?" He decided that there might be a command post, and he looked in the likely places for a command post. Then it got a little windy, and he noticed the glint of an antenna. Instantly, he found the command post.

It was interesting to compare what my friend could see versus the non-commissioned officer, because the NCO was only reporting the tanks when they came into plain view. My friend wasn't just reporting what he was seeing. He was going beyond. He was looking for things.

He was building a story based on his prior experiences.

Exactly. He was looking for things, because he had a storytelling technique that told him what to look for. That's how this story-building activity helped him to make sense and to build a better account of this situation. Stories can help sharpen our intuitions by helping us with sense making, with anticipating a result, and with decision making.

Are there key questions that we ask ourselves when we create these stories?

Sure, for example, "What's the logic of this story?" Or, "How does this story work?" This is an important question, because a story works in a couple of different ways.

One, it works sort of like an efficient experiment. When we conduct a standard experiment, we typically

manipulate one variable. That's the independent variable, and we measure changes in the dependent variable. Our research tends to only look at one or two variables at a time, which is unfortunate, because it is like looking at the world through a soda straw. We can't see all of the variables and how they are interacting.

When we build a story, we take into account several independent variables at a time. A story shows all of those variables as they interact. What we lose is the ability to control the independent variables, because we can't set up the values. But what we gain is the sense of how these are interacting and working together. That's a source of hypotheses.

So a story is a basis for discovery?

It's a natural experiment that we use to our advantage; then we compile these experiments, accumulate them, and try to learn from them. That's just one of three aspects of the logic of stories.

And the second aspect?

The second aspect has to do with mental simulations. During a mental simulation, you are constructing a story in your head. You say to yourself, "I know how this starts. Let me work out the continuation." Or you also might say, "I know how this ends. Let me work out the beginning." Or there also might be a situation where you say, "I know both how it starts and how it ends. Let me work out the middle."

Can you give an example of a mental simulation?

Sure, and I can use one based on a story from *ASK*. You remember there was a story in *ASK* 13 by Tom Rivellini? He talked about the airbags on Pathfinder. We got to see that great picture of the Mars landscape, the equipment looking great, a picture of him looking at the airbags, and we heard how everyone did their jobs.

We all know that it worked. But he said, "It wasn't that simple. It wasn't trivial to get those airbags configured so that they would do their job. Here is what really happened..."

We're suckers for stories like that because, we want to know the inside part of what happened. He led us through it, including the emotional ups and downs. We heard how he became discouraged as attempt after attempt failed. The story got us to the point where we asked, "How did he ever get it to work?" He started with a story that we all knew the ending to, but he said the interesting part is how we got there.

Then what is the third aspect to the logic of stories?

This aspect deals with how you make sense of a situation by combining its components. You're compiling the data, the events, and what you observed into some sort of frame that holds it all together.

For example, the frame can be a map made up of the details of various places that shows how they connect. Or it could be something like a script that shows all the people involved in something and the part they play. Or it could be an outline of a routine of some sort.

Which comes first, the data or the frame?

That's an interesting question, because the fact is that neither of them comes first. You need the data to tell you which frame is appropriate, but you need the frame to tell you what counts as data and which data to use. You create the framework and compile the data simultaneously.

The story becomes a blend of the data and the frame. As you work through the story, the frame gets richer and richer, because you're deepening the account. A story allows you to do both simultaneously: Make the frame richer and identify new types of data.

It sounds like an extremely effective way of evaluating and acquiring new information.

It is. The problem is that while stories are often important, they're not sufficient. When I fly in an airplane, I don't want my pilots' training to have been only hearing stories about how to take off and land.

I want them to have checklists. I want them to follow procedures, because I know that people forget things. But I don't want them to just know procedures, which are designed for situations that continuously repeat themselves, because sometimes the procedures don't work for unique situations.

So, you need the procedures, but a story might help you know how to handle a situation that they don't cover? And presumably as the world becomes more dynamic, these situations become more prevalent?

Right. However, some organizations don't want to buy into that. They think that they can come up with procedures so exhaustive that there is never a need to go beyond them.

Researchers who have looked at this have never found that procedures alone are very successful. Yet, it is often an organizational quest to write them so they are. I can give you an example of an incident where

the organization refused to believe in the power of stories. I got this from Kim Vicente, a researcher at the University of Toronto.

There was a crack nuclear power plant in Canada where the controllers were really, really good. All nuclear power plants are regularly inspected and tested. A day came for one of the periodic tests for this control room team.

These guys had always scored really high in the past, but they had one flaw: They didn't always follow the procedures. For this, they were always reprimanded. They knew what they were doing, and they knew when they could do shortcuts, but they were tired of getting dinged for not following all of the procedures. Before the next test, they all banded together and made a pact. They said, "Whatever comes, hell or high water, we are going to follow the procedures."

So the test comes, and they're given a tough situation. They're working on it, and they get into a loop. They take action-A, which produces situation-B. They respond to situation-B, which gets them to C. They follow the procedures, and the procedures get them right back where they started at situation-A. They just look at each other like, "This is amazing!" They follow the procedural loop around again and again, and each time they end up right back at the beginning. They are just loving the heck out of this—having a great time.

The controllers finally stop them. In the end, the inspectors were so irritated that they wrote them up anyway, this time for "malicious procedural compliance."

It's a funny story, but it shows that there are times to follow procedures and times not to, times to codify information and times when you need the context that goes beyond codification.

So stories help with the practical knowledge that goes beyond the checklists. What is another storytelling tool that can be used in a dynamic workplace?
Another tool is having people swap their stories in Lessons Learned sessions. The idea is that your peers can teach you valuable information, and you can teach them. Let me tell you another story that shows what I mean:

We put on a workshop for fire fighters in Los Angeles. We were talking to battalion commanders and captains about how they could improve decision-making through the use of stories.

I started by saying, "The purpose of this workshop is to improve decision-making skills." One of the fire fighters, a captain, asked, "But will it help with things like morale?" I answered that, "No, I don't see it helping with morale."

I came back a couple of weeks later when we had our next session. The same fire fighter said, "Hey, you were wrong about stories not helping morale." He told us the story of how he came to this conclusion.

Apparently, there was somebody in his company who was a real loser. This guy was always messing up, and they were constantly at each other's throats. After we finished the last workshop, the captain went back to his company. A few days later, the company responded to a fire call. This same guy in the company, again, does something really stupid. (The routine at this point was that the guy did something stupid, the captain goes over to him after the incident and yells at him. He asks him, "How many times have I told you not to do that?" And then he writes him up.)

But this time, the captain had just come out of the workshop. Instead of yelling at the guy, he said "When you handled things that way, I was kind of surprised. Can you explain your reasoning to me so that I can understand what you were you trying to do? What was in your mind? Give me your story." The firefighter explained what he was trying to do and why, and the captain was amazed because it made sense. Then they were able to have a dialogue about how he'd handle other situations, and it was the first time they'd ever had a real discussion.

The captain came back to our workshop and said, "I used to think this guy had an attitude problem. Now I realize that I was the attitude problem. When I let him tell his story before chewing him out, it changed the whole dynamic."

That's part of the power of stories—changing the dynamic of situations with knowledge and understanding.

That is what ASK Magazine *is attempting to do for the field of project management.*
There are some great stories in the magazine. Somehow you've been able to create a culture that not only collects stories, but you're also sensitizing people to those stories so that they are even experiencing their world slightly differently. That's what you want when people come out of a storytelling workshop, or when they finish reading the magazine. You are sensitizing people to the value of stories, because they are an effective vehicle for knowledge. You are helping to build the culture of storytelling that we are both a part of. •