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About the Author

Katherine Radeka has a rare combination of business acumen, scientific depth and ability to untangle the organizational knots to remove the barriers to change. Since 2005, Whittier Consulting Group, Inc. has helped some of the world's leading companies get their products to market faster.

She has a global reach with clients in Europe, North and South America, Asia, and Australia/New Zealand. She has worked with companies in pharma, biotech, medical device, high tech, consumer electronics, food and beverage, and consumer packaged goods, among others. She currently supports more than 75 implementations of the Rapid Learning Cycles framework through the Rapid Learning Cycles Certified™ Professionals Community.

Katherine is the author of two books. Her first book, *The Mastery of Innovation: A Field Guide to Lean Product Development* won the Shingo Research Award in 2014. This book contains 19 case studies of companies, including Steelcase, Ford, Novo Nordisk and Phillips Electronics, who have used lean ideas in product development to get their ideas to market faster.

Katherine's second book is *The Shortest Distance Between You and Your New Product: How Innovators Use Rapid Learning Cycles to Get Their Best Ideas to Market Faster*. This book summarizes Katherine's ground-breaking work to integrate Agile Development with her work on Knowledge Capitalization into a proven method for accelerating innovation.

Katherine has climbed seven of the tallest peaks in the Cascade Mountains and spent ten days alone on the Pacific Crest Trail until an encounter with a bear convinced her that she needed a change in strategic direction.



Three Types of Knowledge Gaps to Close

Learning Activities to Establish Facts, Develop Alternatives and Find Limits

By Katherine Radeka



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Key Takeaways

- **Some Knowledge Gaps ask questions to establish facts; others explore alternatives or seek limits and boundaries that constrain the solution.**
- **Each type of Knowledge Gap needs different learning activities to close them and different approaches to make the knowledge more reusable and extensible.**
- **For all types, it's important to capture the things that fail, as well as the things that work, because the failures help everyone build deeper understanding of the product design.**

When I decided that The Shortest Distance was ready for an update, two key design goals were to improve the quality of printing for our softcover books. It always makes me smile when someone brings in a copy of my book to a workshop, and I can tell it's been used: sticky note flags, highlighter and notes in the margins, and a cover that's worn. But some of those covers looked a little too worn out. I set out to try to solve that problem for the 2nd edition. That generated some Knowledge Gaps to close.

Knowledge Gaps Answer the Question, "What Could We Do?"

How could we improve the cover of the book without increasing the cost or the weight? Here are some of the Knowledge Gaps that emerged from trying to answer that one question:

- How does the weight of the paper used for the cover affect durability?
- What other suppliers could we use?
- What production methods do the major publishers use for their print runs?

If you look at this list of Knowledge Gaps, you'll see that there are three types. Some Knowledge Gaps establish the fundamental facts. (What do the major publishers do?) Other Knowledge Gaps develop options. (What other suppliers could we use?) Knowledge Gaps also establish boundaries around the solution. (How does the choice of paper affect durability?) These three types of Knowledge Gaps require different learning activities to close them.

Knowledge Gaps to Establish Facts

Some Knowledge Gaps ask questions to gather information and establish the current state of the facts. If this information exists somewhere in the world, then our mission is to find it and validate it. If the information does not already exist, our mission is to build it. We seek to avoid the waste of reinvention by leveraging as much knowledge as we can, and then extending the boundaries of that knowledge if it does not already extend far enough.

The types of learning activities we'll use include things like:

- Research to find out who has the answer, and what the answer is.
- Interviews with experts, functional partners, customers, end users and other stakeholders.
- Observations of customer behavior, including purchasers and end users.
- Experiments to gather data about the facts.
- Consolidation and analysis of conflicting answers to determine which one best fits our situation.

We can make these fact-based investigations more valuable by broadening the scope of our inquiry to pull in more facts. That makes the knowledge more useful to future teams by giving them more facts to work with. Certainly if the facts are right there in front of us, it makes sense to just grab the knowledge while we're there.

For my Knowledge Gap "What do the major publishers do?" Shivaun, my Operations Manager and I researched the production methods used in larger print runs, and by the suppliers that the major publishers use, information we found in just a few minutes with a Google search and a little reading. We learned quickly that most commercial publishers laminate the covers of their books to improve their appearance and durability, an option my current supplier didn't offer.

Knowledge Gaps to Develop Options

Other Knowledge Gaps ask questions that lead to a divergent set of alternatives. For these Knowledge Gaps, our mission is to go as broad as we can in the time we have to understand what possibilities exist in the world, and then analyze these options to narrow down to a viable set of alternatives that we can test. Our mission is to provide the decision makers with a vetted set of alternatives with a recommendation.

The types of learning activities include:

- Brainstorming to develop alternatives.
- Interviews to find out what options others have used.
- Competitive analysis to see what options our competitors have chosen.
- Experiments to understand the alternatives.
- Consolidation and analysis of the pluses and minuses of each alternative.

We can make these options more reusable and extensible by taking advantage of opportunities to capture information about alternatives that look promising but are not good fits for us. We also make this knowledge more valuable by capturing the analytical methods, test conditions and our own thought process about how we evaluated the alternatives. Often the evaluation methods are reusable even if the alternatives change too often to make the set of alternatives reusable.

For my Knowledge Gap "What suppliers could we use?" another Google search steered us towards a handful of printing companies that specialize in producing high-quality books in short print runs, Print-on-Demand services and two options specifically developed for self-publishers: CreateSpace and Ingram Spark. Over a period of a few weeks, we narrowed in on a small set of alternatives that would work together to meet our needs. But in order to finalize our decision, we needed to understand how the options they provided would affect the durability of our covers.

Knowledge Gaps to Establish Boundary Conditions

The final set of Knowledge Gaps seeks to understand the trade-offs between the alternatives, especially when alternatives represent a range of possible values. Paper suppliers offer cover stock in a variety of weights, and typical short-run print suppliers use lightweight covers to keep costs down. But as we learned, lightweight covers don't stand up well enough for a book that's intended as a reference. But how heavy did the paper need to be, and how much difference does the lamination make?

The types of learning activities to close these Knowledge Gaps include:

- Computational analysis with modeling tools to test ranges of possibilities in virtual space.
- Giving customers a set of alternatives to try, and observing their reactions.
- Testing sets of alternatives that represent the range of possibilities, such as a range of concentrations for a key ingredient.
- Getting samples from different suppliers and subjecting them to the same tests to see which ones hold up best.
- Testing options to failure to understand where and how they break down.

The knowledge we develop here is highly reusable, as long as we capture everything, including the things that don't work for the current program. Other programs may be able to make a selection by choosing different parameters along a trade-off curve that you have already established. They will already have some knowledge available to them about alternatives that don't work, and the physical limits in the system that cause failures. Even if a future program has different needs, they'll be starting with a much higher level of understanding about the basic science underneath their decisions.

We are still in this phase. We selected a print supplier that uses cover lamination for our initial print run, and we are very happy with the results. But we have also ordered samples from Ingram. We've made the book available for print-on-demand on a trial basis, and next week, we'll go to Powell's Books in Portland and have them produce one for us on their POD equipment, to see if the quality is good enough to make it available that way. If the samples look good, we'll keep all three print options for different customer cases.

Fit the Learning Activity to the Knowledge Gap and Capture As Much As You Can

Our investigations into printer suppliers has not only led to a much higher quality second edition of my book. It's also given me lots of ideas about how to improve the quality of our printed materials for workshops, how to improve distribution of our book internationally, and how to recognize when a book needs a different format. It even gave me the idea for my next book. 