Three Ways to Retain Critical Knowledge Before Your Expert Leaves

A Maverick Institute ebook
by Todd Hudson

Eliminate, Automate or Transfer:

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Introduction

Help! Your expert is leaving!

Whether they're retiring, finishing up a workout or simply moving to another career opportunity, departing experts leave behind "knowledge holes" that replacement "next-perts" can't immediately fill.

Naturally, you want to retain as much of that critical knowledge as possible and your first instinct will be to transfer it to others in your organization. But which knowledge is truly critical to retain? And is transferring all of it to other people really the best action?

Your expert's departure might also a be a huge opportunity to:

- Solve or remove long-standing headaches.
- Move customers to better products or processes.
- Embrace new concepts and methods.
- Make processes more stable and reliable.
- Embrace new technologies to exceed what your expert is capable of doing today.

In this ebook I'll share with you three highly effective methods for dealing with the impending loss of an expert. I call it the "E.A.T." method:

- **Eliminate** - Can you remove the need for the expert's knowledge or remove your sole reliance on them?
- **Automate** - Can you automate the knowledge with artificial intelligence?
- **Transfer** - Once you've eliminated the need for some of your expert's knowledge and/or automated some of it, then you can transfer the remaining knowledge to others.

With these three options, you can make a solid plan to capture the most critical parts of your expert's knowledge and make it available in ways that will do your organization the most good.

As you read, if questions pop up for you, jot them down and give me a holler. I'm always happy to talk.

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First Things First … What Exactly IS Expert Knowledge?

In addition to the nuts and bolts of their subject matter/technical expertise, experts also bring an incredible diversity of other knowledge to bear.

During their years on the job your experts have walked around your company's buildings, interacted with equipment, tools, IT systems and suppliers. They've talked with employees, vendors and customers. They've sat in meetings and poured over data sets and reports. All that while, they've been creating a complex mental web of contacts, resources, experiences and facts.

It's this often-unrecognized diversity of knowledge that makes them so valuable and the loss of it is what creates the most problems after they leave.

Every knowledge management pro has their own definition of what constitutes expert knowledge. Here's the list that I use, which is abbreviated from one by knowledge expert Dorothy Leonard in her excellent book ***Deep Smarts***. (See my "Recommended Reading" end notes for the full reference.)

1. **Technical Expertise** -– Deep technical knowledge as well as your organization's (and sometimes your customers') processes, products and services.

2. **Systems Perspective** – A grasp of the web of interdependencies and interactions of processes and the ability to anticipate consequences when someone or something tugs on – or breaks – a strand of that web.

3. **Judgment** – Wise decision-making in gray areas and or changing conditions.

4. **Context Awareness** – The ability to take context, conditions and emotions into account and change products, services and presentations to fit.

5. **Pattern Recognition** – Being able to rapidly distinguish signal from noise and determine what's important out of a flood of information.

6. **Business Relationships** – "Know-who" both inside and outside the organization including suppliers, customers and industry leaders.

These categories make a good checklist you can use while planning your knowledge capture process to make sure you don't miss anything critical. Keep in mind that there are specific techniques for capturing each type of knowledge.

Preliminary Work - Inventory and Prioritize Your Expert's Knowledge

What does your expert know and where/how are they using their knowledge? How important is that knowledge to your organization?

Inventory

Before you can decide whether to **eliminate**, **automate** or **transfer** your expert's knowledge, you'll need to make an inventory of the knowledge you want to deal with.

It may be tempting to go immediately to the WHAT (technical knowledge), but the place to focus on first is the WHERE, as in *where in your organization is our expert having an influence*?

You want to start with "where" because chances are excellent that your expert is exerting influence well beyond their narrow area of expertise. Experts become experts partly because they don't stay in their lanes. They fill gaps you didn't know existed.

BUT…asking them what they're working on and who they're working with can be harder than catching a greased pig. The phone rings, they share their expertise, hang up and forget the call ever happened. They pop into a meeting, make a single comment so brilliant it floors everyone and minutes later they're in the hall having been waylaid by someone with a question.

They also tend to downplay their influence, saying things like, "I don't really do much in that group" or "they've got it handled over there."

If doing the knowledge inventory proves difficult, you can use methods such as Social Network Analysis (SNA), which uses data like email records to build graphs of your expert's interactions, and Value Stream Mapping, which shows the detailed steps that products and services go through from the time an order is placed until it's delivered to the customer.

Prioritize

Once you've made an inventory of your expert's knowledge, your next step is to prioritize it.

First, it's important to know how often your expert is working in an area or on a topic.

I like to categorize their involvement this way: daily, weekly, monthly, quarterly, semi-annually and annually. These categories cover the spectrum and align nicely with corporate calendars. For example, conferences and budgeting happen annually, board meetings happen semi-annually, financial results are published quarterly and production meetings happen daily. The more frequently they're involved, the more likely their sudden absence could result in havoc.

Second, what strategic importance do your expert's activities/knowledge play?

- **High Importance** - This knowledge directly supports the creation of new products, services and capabilities or expansion into new markets. It supports the company's strategic plan and has strict requirements and deadlines associated with it. Continuity of this knowledge is paramount.

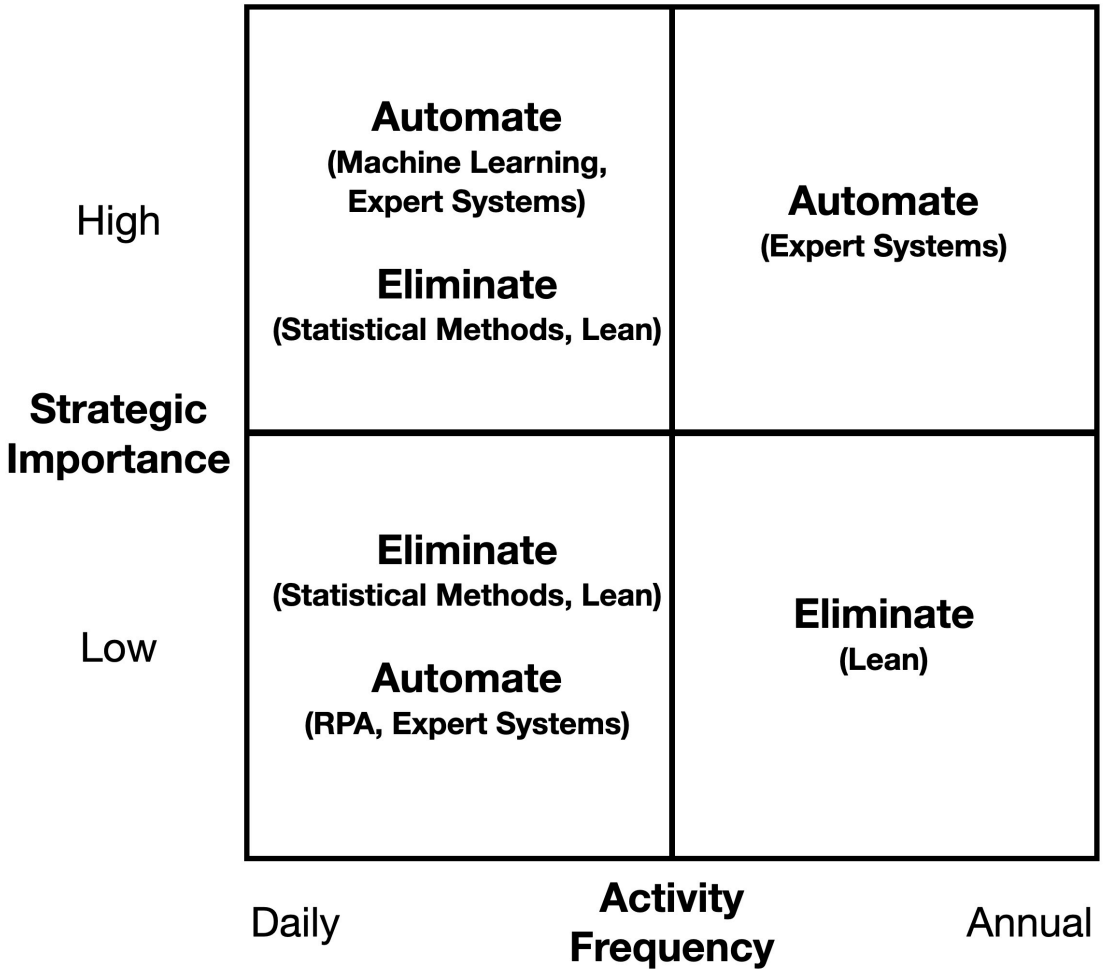
- **Medium Importance** - This knowledge maintains current capabilities and market share. There will always be incremental improvements and growth, but the knowledge is not essential to the organization's future success.

- **Low Importance** - This knowledge supports out-of-date or obsolete technologies and products, and declining markets. It's amazing how often experts get roped into, or rope themselves into, supporting these! Some experts love to play hero; keeping a process running with innovative band-aids or rushing in to save the day when it fails. Again.

By the end you should have a table that summarizes your expert's current contributions to your organization. Here's an example of a prioritized knowledge inventory:

Areas of Involvement	Work Role/ Activities Performed	Frequency	Strategic Importance
Scanning Electron Microscope	adjust, calibrate, troubleshoot	Daily	High
SR7600	Adjust sensors	Weekly	Low
Order Entry	Resolve conflicting specifications	Weekly	Low
Epitaxy	Create recipes, review equipment performance data	Weekly	Medium
LPCVD	Down equipment escalation	Monthly	Low
MRB	Review unusual defects for disposition	Monthly	Low
Sales Warranty and Returns	Analyze unusual claims	Quarterly	Medium
Board Meetings	Update technology roadmap	Semi-annually	High
Marketing	Write capability descriptions	Annually	Medium
Supply Chain	Define new requirements for suppliers	Annually	High
Industry Conference	Competitor analysis, potential suppliers	Annually	High

You may also find it helpful to refer to my 2x2 matrix of knowledge management options. It shows your likeliest options by looking at combinations of activity frequency against strategic importance.



Now you're ready to decide which knowledge you want Eliminate, Automate or Transfer!

ELIMINATE (the Need For) Expert Knowledge

We start with “Eliminate” because the more you eliminate, the less knowledge you will need to automate or transfer. Quite simply, it lightens the load of automating or transferring your outgoing expert’s knowledge.

Why is it so useful? Because an expert’s presence and intervention frequently allows ineffective or out-of-date practices, technologies and products to remain in place well beyond their “use by” dates.

If your knowledge inventory shows that your expert is supporting an out-of-date process, their departure is a great opportunity and motivator to clean up and modernize these long-time nuisances. You’ll gain efficiency AND you’ll have freed the organization from needing to transfer, automate or otherwise retain the expert’s related knowledge.

You have four options for eliminating:

Option #1 - Remove the Need

Let those troublesome products, components, equipment and processes follow your expert out the door. Your expert’s exit could be the perfect time to:

- Obsolete products and services
- Remove or replace components
- Replace equipment and tools
- Upgrade processes and software

These may require redesign and/or recertification or getting new approvals from government agencies. Who best to help you deal with these than the expert before they leave?

Option #2 - Redesign for Robustness

The last thing you need after your expert leaves is a finicky process that needs frequent troubleshooting and tinkering by your overwhelmed next-pert. This might be an excellent time to apply methods like statistical design of experiments to make the process be less sensitive to variations that can’t be easily controlled.

Manufacturing examples might be things like chemical concentration, ambient temperature, or cooling water pH. Service examples might be things a brittle software program that frequently crashes or street traffic that causes delays.

Robust processes are steady, reliable and trouble free. They won't require intervention that requires your outgoing expert's knowledge.

Option #3 - Simplify to Be Mistake Proof

Mistake-proofing is a process of ensuring that errors cannot occur. It uses simple, and frequently clever, methods to physically prevent people from doing something incorrectly. For example, if a process always requires a specific amount of a chemical, only provide a measure of the exact size so there can be no mistake about the amount.

Option #4 - Improve Stability

The last line of defense is to closely monitor equipment and processes for stability and determine whether observed variations are naturally occurring or are the result of a special cause that requires intervention.

Experts have an incredible ability to separate signal from noise to find that needle in a haystack. Methods like statistical process control (SPC) mimic this ability and allow you to monitor and react quickly so that small deviations don't turn into large problems that only your outgoing expert can solve.

AUTOMATE Knowledge

When your outgoing expert has very specific knowledge that you want to get into the hands of many different people, consider automating some or all of it.

Artificial intelligence (AI) technologies can deliver incredible knowledge transfer value. AI can emulate expert abilities and make them consistently available across business units, time zones and even continents. AI also allows organizations to go beyond what their expert is doing today in terms of scale, speed and insights.

You should consider an AI solution if your departing expert is consistently doing any of these things:

- Analyzing huge data sets and building models.
- Examining images and physical objects.
- Troubleshooting complex problems.
- Evaluating multi-faceted situations.

AI is also an opportunity for your organization to expand its analytical capabilities beyond what your outgoing expert – or any human for that matter – can do. Your expert can only review so much data in the course of a work day, but machines can analyze millions of data points 24 hours a day, 7 days a week.

Machine Learning

Machine learning is a category of artificial intelligence that automates the process of building analytical models. It enables machines to take a data set and use it to identify patterns, discover insights, and/or make predictions. It's the most popular AI technology today.

Machine learning systems analyze data to do three things very well:

- Describe what happened.
- Predict what will happen.
- Suggest what actions to take.

The data they analyze can be numbers, photos or text, for example, account transactions, pictures of people or objects, repair records, sensor data or sales reports. The data is gathered and used to "train" the machine's learning algorithm.

When automating knowledge, it's imperative that your outgoing expert be available to review the algorithms's results and make adjustments for better accuracy

Deep Learning

Deep learning is machine learning on steroids! It relies on algorithms that are layered to replicate the structure of the human brain. As a neural network, it's able to check the accuracy of its own results, learn from them and make adjustments on its own. It can get better at a task over time without humans providing it with feedback.

Deep learning has contributed to rapid advances in computer vision systems, natural language processing and speech recognition. If your expert's value involves inspecting objects, viewing images or recognizing speech, then deep learning may be the right technology to retain their expert knowledge. It may also allow you to go beyond what your expert is doing today in terms of scale, speed and insights.

Again, your expert will need to work with a programming team to train, verify and improve the accuracy of the deep learning algorithm.

Expert Systems

What's the difference between machine/deep learning and expert systems? Machine and deep learning analyze millions of data points or bits of information against an objective function and outcome. They then create rules that can quickly analyze new incoming data to assess what's happening, draw conclusions and make decisions.

Think of machine learning and deep learning as "bottoms up" technologies. They start with raw data and create rules.

Expert systems capture **existing rules** that experts have created over their decades of observing, collecting and analyzing highly diverse data and information such as numbers, sounds, smells and visual clues.

Based on a list in ***Building Expert Systems*** by Hayes-Roth, Waterman and Lenat (see "Recommend Resources, page 14, for full reference), here are some things expert systems can do to make expert knowledge widely and always available:

- Monitor - Compare observations to plan vulnerabilities.
- Interpret - Infer situations from sensory data.
- Predict - Infer likely consequences.
- Diagnose - Infer malfunctions from sensory data.
- Debug-repair - Prescribe remedies and create plans to fix malfunctions.
- Control - Manage system behavior.
- Explain - Describe the reasoning behind its recommendations and actions.
- Design - Configuration under restraints.
- Plan - Design actions under contracts.

Once rules are encoded in expert systems, they can easily be updated as conditions and needs change.

AI As Teacher

The explanation facilities embedded in machine learning and expert systems make them invaluable “teaching companions.” As the system is thinking (asking questions or making deductions) users can ask the system why a question is relevant at this time or how it came to a particular conclusion.

The system will then list the data or evidence that it’s considering or has used up to this point. Users may not have thought of all the factors the AI did or didn’t see their relationship and importance. And so the AI teaches them to think like your expert.

TRANSFER Knowledge

One of the biggest benefits of E.A.T. is that applying Elimination and Automation reduces the knowledge you need to transfer to a more manageable amount. This allows you not only to reduce time and resources, but also gives you the ability to really go in depth with the knowledge you're transferring.

There are effective techniques for knowledge transfer, too many to go into here, so I'm going to focus instead on giving you my five success factors for knowledge transfer.

5 Success Factors for Knowledge Transfer

1. Clear Knowledge Topics
Remember that prioritized knowledge inventory from page 4? Your knowledge transfer topics should come straight from that inventory. You'll want to break your topics down into very clear and definite skills that your expert can teach.

Examples might be having your expert show your next-pert how to create and present a technology roadmap to your board of directors. Or how to formulate a new recipe for a commercial baking process. Or how to vet suppliers. Choose the topics carefully and make sure they are of the highest priority.

2. Time-Bound Goals
Everyone – and I mean *everyone* – grossly underestimates the amount of time it takes to teach a topic. In my decades of experience, I've learned that teaching a knowledge topic takes about 40 hours when you include prep, teaching time, questions and follow-up coaching to make sure the next-pert is performing correctly.

Some topics will take less and some will take more, but 40 hours (1 work week) is a good estimate in general.

If your goal is to have your outgoing expert teach your next-pert five topics, at 40 hours per topic, that's 200 hours of transfer time. And if you figure that your expert will devote on average 20 hours a week to knowledge transfer, that's about ten weeks total.

The best way to make sure you have enough time is to create a dedicated knowledge transfer calendar. Start by adding in upcoming date-based events such as board meetings, supplier summits, fiscal year end, budget cycles…any date-based events that will involve your knowledge transfer topics. Then, using the above 40-hour-per-topic planning goal, schedule specific topics to coincide with those date-based events. Then, you can schedule your non-date-based topics around and after those.

3. Ample Dedicated time

To help you even more, make a graph of how much time your expert should be spending mentoring and coaching their next-perts. You should be consciously pushing your expert to move work onto the next-pert as soon as possible, and your outgoing expert should devote more and more of their time to coaching and mentoring until by the final month(s) your expert should only be coaching and mentoring. This will give your next-perts plenty of time to try and fail and discover holes in their knowledge while your expert is still there to coach and support them.

4. Proven Teaching and Learning Methods

Do NOT sit your expert down in a conference room to randomly chat with the next-pert and think that knowledge transfer is happening. Do NOT think that because your next-pert is nodding and agreeing that they get it. They aren't. They're likely intimidated and/or overwhelmed. They don't know what they don't know. There are many proven techniques by knowledge transfer experts that can get people to teach and learn very effectively. Use them!

5. Management Visibility and Support

Strong management visibility and support throughout the knowledge transfer process makes a HUGE difference to success. Create a simple and easy-to-update score card that clearly shows:

- Are you meeting your time-bound goals (see Item 2, above).
- Are you allowing for ample dedicated knowledge transfer time?
- Is weekly progress on track?
- Is your expert spending more time each week on transfer/coaching/mentoring?
- Status of each topic being transferred: Not started? 50% done? Complete?

Your score card should summarize the knowledge progress and very quickly alert you to issues that need extra management support. Remember, your expert is leaving and may never be available again. Every week that gets wasted is a week you can never get back. Staying on top of progress is critical to knowledge transfer success.

I also highly recommend collecting success stories throughout the knowledge transfer process that you can share with higher ups. It makes everyone in the process look good and creates reassurance that the transition to your next-perts will be a smooth touchdown instead of a crash landing.

A Few Final Thoughts

For your expert, a smooth hand-off to the next-pert can be the cap on an already fantastic career. Handing over a well managed process and setting the organization up for future success would cement their legacy and be a point of great satisfaction.

Applying the right option uses everyone's time and skills well, sets up your next-pert for success, and even extends their abilities.

This is a different approach to knowledge management and it takes planning and coordination. You will need to start much earlier than you think. The sooner the better!

Whatever choices you make, I'd love to hear more about your experiences. What worked and what didn't? Any smash breakthroughs? Take good notes because someday the expert giving their knowledge to a next-pert just might be YOU.

Recommended Resources

1. Dorothy Leonard and Walter C. Swap ***Deep Smarts: How to Cultivate and Transfer Enduring Business Wisdom***. 2005

2. Richard Bakken, Ph.D., James Dobbs, Ph.D., The Relevance of Four Types of Knowledge for Leader Preparation in Radically Different Settings: Reflections on data from a case study in Qatar and teaching at a United States military academy, ***Creighton Journal of Interdisciplinary Leadership*** Vol. 2, No. 2, November 2016, pp. 17 – 23.

3. Hayes-Roth, F, Waterman, D, and Lenat, D. 1984. **Building Expert Systems** United States.

4. Steve Trautman, ***Teach What You Know: A Practical Leader's Guide to Knowledge Transfer Using Peer Mentoring.*** 2006.

5. Jennifer Smith, Fatemeh Yazdanpanah, Rebecca Thistle, Mashrura Musharraf and Brian Veitch, Capturing Expert Knowledge to Inform Decision Support Technology for Marine Operations, ***Journal of Marine Science and Engineering***, September 2020

6. Douglas Montgomery, ***Design and Analysis of Experiments***, 10th edition, 2020

7. Shigeo Shingo, ***Zero Quality Control: Source Inspection and the Poka-Yoke System***, 1986

8. Donald Dinero, ***The TWI (Training Within Industry) Facilitator's Guide***, 2016

9. Christopher Surdak, ***The Care and Feeding of Bots: An Owner's Manual for Robotic Process Automation***, 2020

10. John Paul Mueller, ***Machine Learning for Dummies***, 2nd edition, 2021

About Todd Hudson

Todd Hudson is head of the Maverick Institute, a consulting firm for operations excellence and knowledge management/transfer.

An industrial engineer with a Six Sigma black belt and extensive experience in Lean, statistical methods and other improvement techniques, Todd managed operations for large and mid-size high-tech manufacturing companies.

While managing these facilities, he quickly realized that *"machines = easy, humans = hard*." He could make rapid process improvements but teaching an entire 24/7 operation how to do it correctly was a huge problem.

He began experimenting with methods for effective, efficient knowledge transfer and eventually founded The Maverick Institute to bring a complete package of process improvement, Lean and knowledge transfer services to clients – large and small – around the world.

Over the years, he has worked with Microsoft, Taiwan Semiconductor, Siltronic, Planar, St. Jude Children's Hospital, Honda, Honeywell and many more companies of all sizes.

Todd also pioneered the application of Lean to the process of learning/training. His green- and black-belt Lean Learning program consistently delivers huge results for companies big and small.

He is co-author of ***Mindful Habits for 7 Lean Practices***, as well as ***Eliminate, Automate or Transfer? Three Ways to Retain Critical Knowledge Before Your Expert Leaves***, and two books on employing Lean methods to accelerate onboarding of new hires: ***My Personal Onboarding Plan: The New HIre's Guide to On the Job Success*** and **Not a Moment to Lose: The Step-by-Step Guide to Internship Success**.

Todd is also a popular speaker at conferences and a prolific writer whose articles have appeared in ***Chief Learning Officer*** magazine, the ***New York Times***, the **Portland Business Journal,** and many other business media, podcasts and webcasts.

Todd holds an MS in Industrial Engineering and Operations Research from the University of Massachusetts and a BA in Chinese and Economics from Connecticut College and a certificate from Stanford University's Executive Program in Strategy and Organization as well as a Six Sigma black belt from the Motorola program.

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Want to learn more about
how the Maverick E.A.T. method
can help your organization
with knowledge management and transfer?

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