

“Using Systems Thinking to Shift Mindsets - A Fortune 500 Company’s Multi-year Journey”

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Context

Organizations can be defined as any group of individuals and/or groups that have “organized” for a common purpose. That purpose could be to sell products, provide services, or even achieve a common good. This definition can apply to any organization – from Fortune 500s to community-based collective impact groups. Some are paid to participate; some volunteer. In all cases, the individuals and groups that participate do so because the collective effort is designed to achieve an objective.

This is the simplest way to think about what the “collective” is up to. It’s important for the organization to answer this question: “What are we up to?” That’s a simpler way of saying “Why do we exist?” But sooner or later – sooner if well organized and aware – the organization will notice that it is *up against something(s)*. It could be up against an unknown environment, entering uncharted waters. It could be up against forces, problems, issues, challenges, etc... that will make it difficult to achieve its objectives.

It’s for the desire to address what it’s up against that the organized collective will engage in a process of strategy exploration and development. Most individuals will relate to what usually happens next. They hear the dreaded words: strategic planning. (And often cringe.) The planning often follows a predictable pattern of interviews, off sites, goal setting, responsibility relegating, and performance monitoring. The word execution becomes bandied about.

Most strategies aren’t executed – remaining impotently printed and organized in binders relegated to the shelf – and those that are executed, rarely achieve intended results. Why?

Roger Martin claims that most processes aren’t intended to dive into the tough questions.¹ They tend to rely on the same thinking that got the organization to where it was. Improvement becomes a process of just barely changing a few deck chairs on the Titanic...when it might be better to reconsider the safety of the ship, or perhaps even making the voyage in the first place! Leaders prefer slightly tweaking what they’re doing as opposed to throwing out faulty assumptions and

¹ Martin, Roger. *The Big Lie of Strategic Planning*, Harvard Business Review, January 2014, blog at <https://hbr.org/2014/01/the-big-lie-of-strategic-planning>

starting anew. They like comfortable, don't rock the boat processes – they like familiarity.

Martin claims organizations need a better *theory of the business*, of *what they are up to* and *what they are up against*. But the theory they are currently using tends to be outdated, sometimes useless, and often counterproductive. And the familiar, comfortable, don't rock the boat planning processes they use are designed to avoid confronting what we cling to that may be contributing to the problem.

Why?

Because we tend to assume that all issues – what we're up against – are routine problems. By routine problem, we mean a problem that already has an answer. There's an expert that can come to our aid...the problem is just finding the expert.

In reality, many issues organizations are up against are more adaptive in nature. An adaptive challenge isn't well defined...there's little agreement on what the challenge is. There's no expert. No off the shelf solution.

In the case of a routine problem, there's little reason to just sit there, to think about it. The exhortation should simply be: Implement. Go do it. But in the case of an adaptive challenge, the exhortation must be: Learn. What's needed is an orchestrated process of learning. And to address adaptive challenges, that process must meet a few important needs.

1. Those participating must develop a *shared understanding of the challenge*. What's the issue? How can we pool multiple perspectives to better define and describe the challenge? To do this requires an openness to seeing different perspectives, a willingness to get up on the balcony and expand the boundaries of discourse beyond the typical bounds.
2. The group needs an ability to *develop the theory of the issue*. What's the cause? How does it work? And this theory needs to be operational – a “how it works” theory.
3. The group needs an ability to *build confidence* in the theory...and to refine and revise along the way.

The system dynamics methodology is ideally suited for adaptive challenges, precisely because it can contribute to each of the above needs. Here are three important components of the methodology. *Note: For the purposes of this paper when we refer to “system dynamics” we are also including “systems thinking” tools and methods such as causal loop diagrams, system archetypes and mental models.* The system dynamics *mind set* helps participants with different

perspectives to move onto the balcony, to expand boundaries, to look over longer periods of time and across a broader horizon.

1. The system dynamics *language* of stocks and flows is ideal for developing the operational theory. Its forte is building a “how it works” map of the issue.
2. The system dynamics *simulation* (sometimes mental, and often computer) capacity helps test the theory and identify places where it can be improved.

As a package, the above three components can turbocharge a process of adaptive learning. This paper will describe how a large company consciously developed the capacity to *think systemically*. This was the necessary foundation needed for the company to eventually be able to use the system dynamics methodology to address difficult, seemingly intractable adaptive challenges. We will also describe how other organizations (from private sector companies to collective impact groups) can build and apply this learning capacity based on our learnings from this sustained multi-year endeavor.

The System Dynamics Journey

The company’s journey to building this system dynamics-based learning capacity began in 2008 and continues today. The journey began with an introduction to systems thinking principles and causal diagramming. This eventually led to prototyping and then applying system dynamics modeling. Here is a timeline:

Years 0-2	Systems Thinking capacity development (causal diagramming, dialogue, mental models)
Years 2-5	Maturing Systems Thinking capacity (archetypes, more sophisticated causal diagramming)
Year 5-current	System dynamics projects

This progression was consciously chosen to improve the acceptance and application of the full system dynamics methodology. Building (first) the capacity to think systemically is key to leveraging more sophisticated tools such as simulation modeling (later). It demands building skills in the practice of dialogue versus the more common types of communication – discussion and advocacy. Principle to this is the skill of framing better questions in order to more deeply understand complex, chronic problems and ultimately discovering uncommon, enduring solutions. Typical problem solving methods derive from questions of “What” (is the root cause, implying a single linear connection from cause to effect) or “How” (do we modify the process or execute on low hanging fruit

activities that provide immediate perceived gains). System dynamics requires a commitment to “admiring the problem” which springs from questions that begin with “Why” or “How Come”. Framing the question becomes an important genesis for the learning journey. It sets the stage for building the following skills necessary to practicing dialogue: suspending judgment, listening to understand, reflection, and assumption identification (in oneself and in seeking to understand the assumptions that others hold).

This sets a foundation for the level of inquiry and commitment necessary to build and use causal loop diagrams effectively to “see” the system – enabling highly successful executives, middle managers and subject matter experts (SMEs) to stand outside of the system that they work in. This is critical to deep learning – understanding cause and effect through the lens of *multiple* feedback loops, building an appreciation for compounding effects and behavior over time. Especially the appreciation of delays in the system (which often mask unintended outcomes or positive results that take longer than expected to emerge.)

In our experience, deeper conversation leads to deeper learning. All of this enabled the company to move beyond a rich systems thinking practice steeped in the use of causal loop diagrams and archetypes to the rapid learning and decision-making that occurs through the use of system dynamics.

System dynamics can be a key ingredient to effective strategy formulation and execution. It does this by providing the antithesis to Roger Martin’s assertion that most strategy processes ask easy questions and search for easy answers. System dynamics is a rigorous, intensive, assumption questioning process that rarely asks easy questions or finds common solutions.

Lessons Learned Along the Way

Along the way, through a process of continual learning, the company has discovered several important lessons about how (and how not) to build system dynamics capacity.

1. Make use of the full range of system dynamics and systems thinking tools
2. The problem (issue) chosen matters
3. Surfacing and challenging mental models (human “software”) is very high leverage
4. *Less is more* generates better learning

We will now use a system dynamics modeling project as a case study to illustrate these lessons. The project concerns an issue that relates to nearly all organizations (from private to public): workforce development. The project was

designed to address several areas of workforce development that were not only applicable to a specific area within the company, but were relevant to all areas. And all organizations should see the relevance of the modeling work to an important adaptive challenge faced by all.

Case Study – Claims Administration

Last year, a team of executives, managers, and SMEs assembled to deeply explore the following question:

Why – despite our best efforts – are we challenged to attract, develop and retain a workforce capable of meeting varied and dynamic business needs, now and in the future?

The intent of this effort was twofold:

- Understand the underlying systemic forces that were impeding the company's ability to attract, develop and retain benefits staff and
- Identify high leverage approaches to address the issue.

The team identified the most important dynamics the model should generate. Staff learn on the job as well as through formal training. The staff's skills determine their productivity. However, work overload can build stress over time. Stress generates several negative consequences including:

- Reduced workforce learning
- Reduced productivity
- Increased attrition and
- Increased errors (potentially a huge risk)

A key dynamic in the model is that these consequences of stress further raise the level of stress in the staff, exacerbating the problem and generating a vicious cycle (feedback loop).

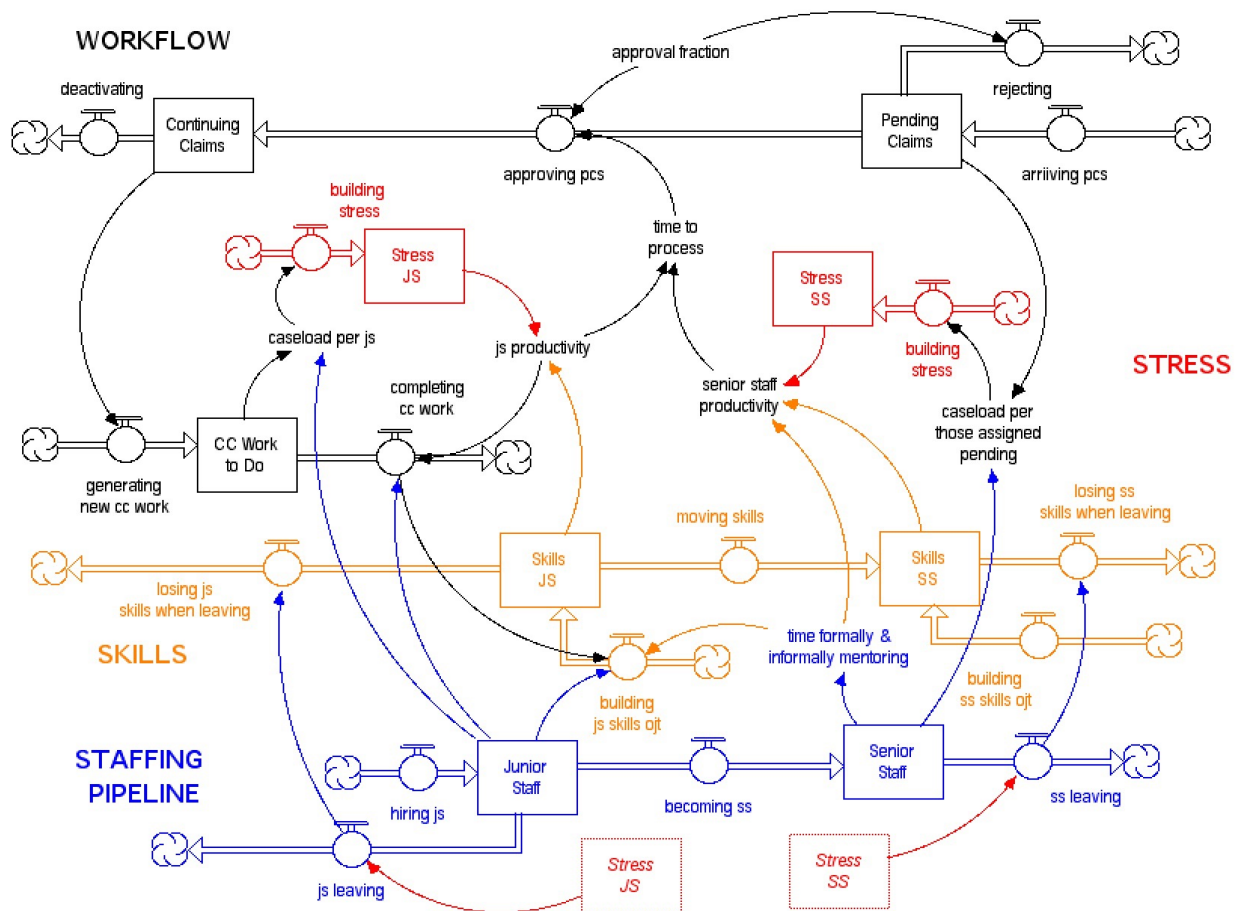
In order to generate these dynamics, the team developed a “general theory” (how the system works) of the Claims area that specifically links the following four core elements

- Workflow (Claims)
- Staffing (people)
- Skills (capabilities and productivity) and
- Stress (sources and impacts)

The model generates an array of output variables that unfold over time including decision times for claims, errors (growth opportunities) and stress levels among the staff.

Both the modeling process as well as the model itself generated some very powerful insights and sometimes “counterintuitive” results for the modeling team. We will now describe the general theory and then highlight the most interesting dynamics it generates.

General Theory of Claims Workforce Dynamics



Overview

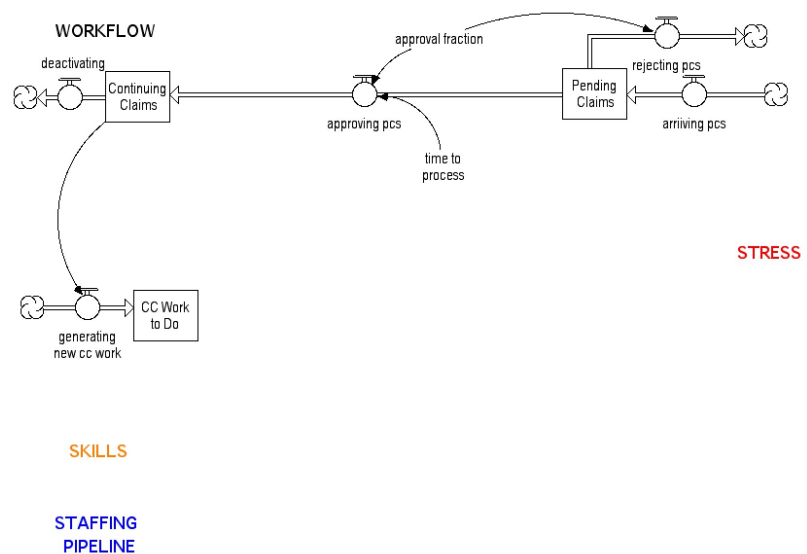
The above map represents the major assumptions built into the model. Below is a step-by-step build of this general theory to help develop understanding of these assumptions and their implications. The general theory necessarily simplifies the

detail complexity of the Claims process to maintain the simplicity required for ease of understanding. The actual model contains significantly more detail and data in order to run the required simulations.

The model includes four major elements: workflow, the staffing pipeline, skills, and stress. Based on their experience – and external research – the team proposed a set of relationships between these major elements that could generate the historical behavior experienced by the claims area.

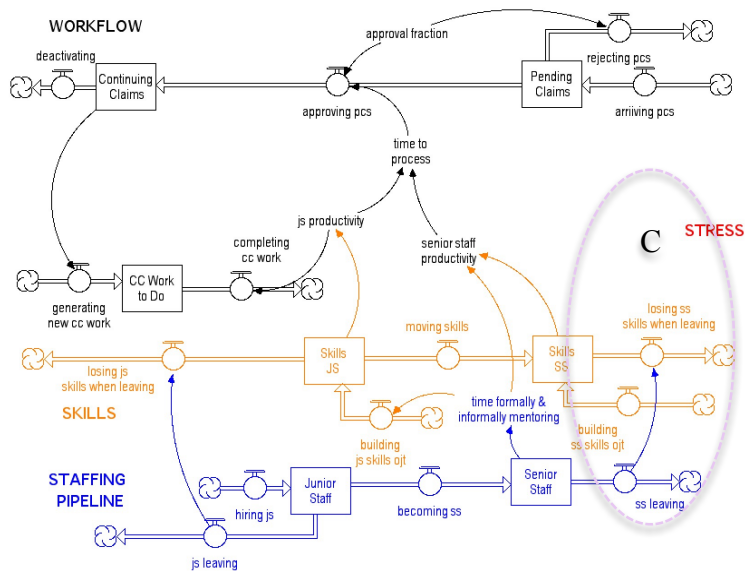
The workflow sector focuses on Claims: Pending (including Pending & Active), and Continuing Claims. The map shown here includes two stocks representing these claims. A stock is an accumulation that represents the current level of a variable “at a point in time”. Think of a stock as a bathtub containing “stuff”. For example, right now there is a backlog of *Pending Claims*

that could be counted. And just like bathtubs have inflows and outflows, the stock of *Pending Claims* has an inflow of *arriving pcs* (pending claims). These claims are then approved or rejected (*approving pcs* and *rejecting pcs*). Along the way, approved claims will be Active (not shown) and then become *Continuing Claims*. *Continuing Claims* generate additional work that needs to be done beyond the approval process. The workflow element of the simulation model also included an appeals process, complaints, and growth opportunities (errors).



Staff and their *Skills* determine the ability to process claims and complete other work (e.g. *completing cc work*). For simplicity, the general theory shows two classifications of staff (the simulation model included multiple levels of staff, each with different types of tasks and time allocations). The two classifications are: *Junior Staff* and *Senior Staff*.

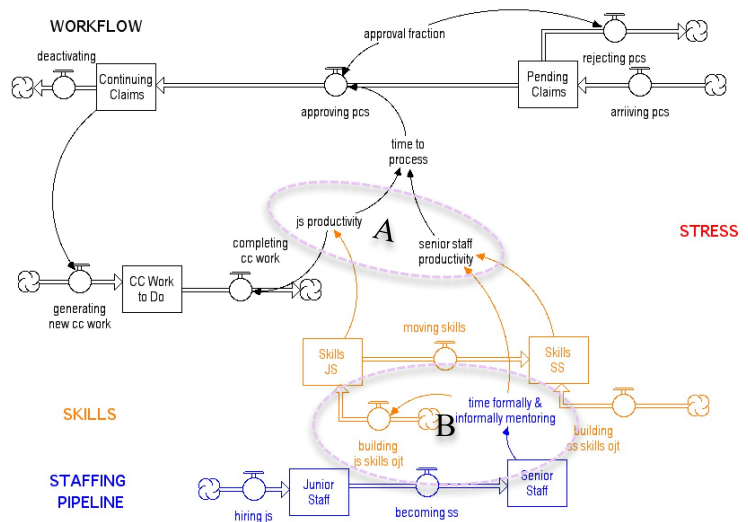
The general theory mapped here tracks people and their associated skills/capacities separately. The *Junior Staff* stock is the count of the people at that level; the *Skills of JS* represents the “total” skills of junior staff. Think of each person as having a briefcase of all their skills. If everyone classified as *Junior Staff* emptied their briefcases of skills into bathtub, this is the sum of all their skills.



Skills determine how productive these employees are [A]. For *Senior Staff*, their skills determine their productivity at helping with (mostly) *Pending Claims*. For *Junior Staff*, their skills also determine how productive they are at *completing cc work*.

As they do the work, staff build “on the job” skills (shown in the *building js skills ojt* and *building ss skills ojt*). The amount (and quality) of mentoring provided by *Senior Staff* can greatly influence the ability of *Junior Staff* to learn [B]. This is represented by the variable *time formally & informally mentoring*.

However, since time is limited, the more time mentoring, the less time *Senior Staff* can allocate to other work. And the reverse is true. The more work “that must get done” accumulates, the more time *Senior Staff* would allocate to that work – and there would be less time for mentoring. As workloads increase, the result is *Junior Staff* are likely to learn less because of reduced mentoring. When they leave, *Senior Staff* will take their skills with them. And the same is true of *Junior Staff*



[C]. One scenario the team wanted to understand was what would happen if they lost a few über mentors, who really could help the staff learn.

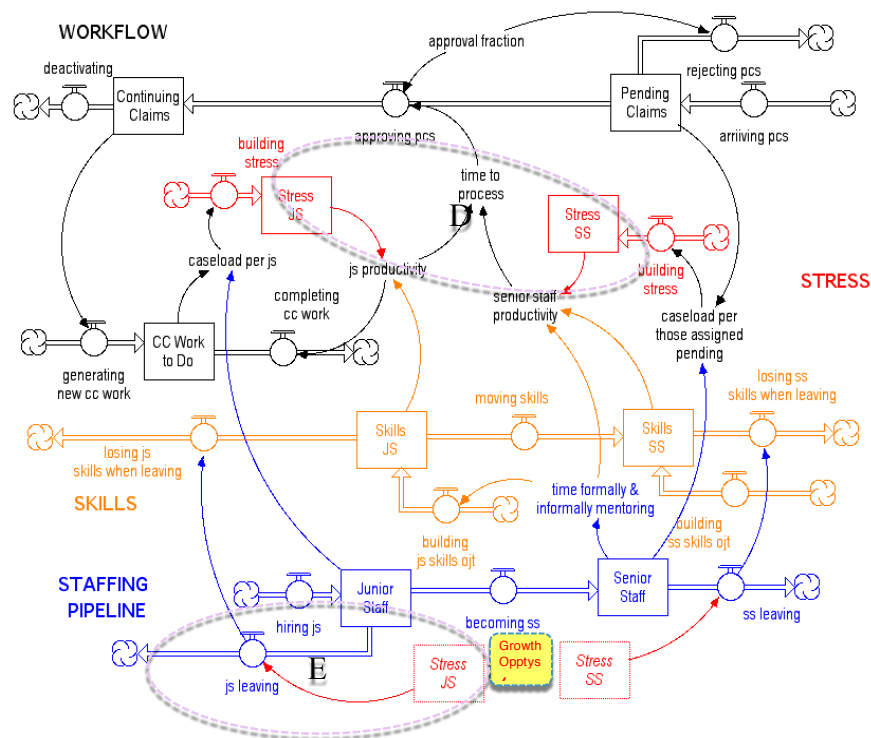
A very important type of skill that is also in the *Skills SS* bucket concerns emotional intelligence (EQ). EQ directly influences mentoring ability. Low EQ – even with high levels of skill at “doing the work” – makes for an ineffective mentor. The über mentors can be considered to have a high level of EQ, so their loss could be acutely felt.

EQ is also a skill that anyone can possess, and the greater that skill, the more capable they are at handling *Stress*, an important – and often overlooked – workplace element to be discussed.

As workloads increase, employees at all levels / positions can build up stress. *Stress JS* and *Stress SS* are stocks that impact system performance in multiple ways. [A more thorough explanation of the following points will be provided in the next section.] First, **stress can reduce a mentor’s ability to help others learn, as well as diminish the ability to retain new information.** Second, *Stress JS* and *Stress SS* can reduce productivity [D]. A stressed employee will be less productive – for an equivalent number of hours, a person who is stressed will process less work than if that same person wasn’t stressed. Third, *Stress* can cause employees to leave, shown in the *js leaving* and *ss leaving* flows. It will reduce average tenure time [E]. Fourth, *Stress* can cause employees to make errors,

measured as Growth Opportunities in Claims [Growth Opptys].

The team explored various ways to reduce *Stress* on the workforce. The model assumes that the greater the mentoring capacities (EQ) of *Senior Staff*, the more work *Staff* overall could handle without building up stress. Also, the



greater the EQ of *Junior Staff*, the less stress they would build up.

Summary

In summary, the high level “general theory” of Claims includes:

- Workflow
- Staffing Pipeline
- Skills
- Stress

Staff learn on the job, and their skills determine their productivity.

Overload can build stress; stress causes several negative consequences:

- Reduced workforce learning
- Reduced productivity
- Increased attrition
- Increased errors (potentially a huge risk)

EQ (through mentoring and personal self-management) can reduce stress.

An Important Structural Dynamic in the General Theory

Making Connections between Skills and Stress – and their impacts on “doing the work”

This map captures the main mathematical relationships in the model connecting work, staff, skills, and stress. For simplicity, it focuses on one type of work (e.g. Pending Claims) and one staff position within Claims.

The diagrams in this section will explain these relationships to better understand how the model represents stress and skills.

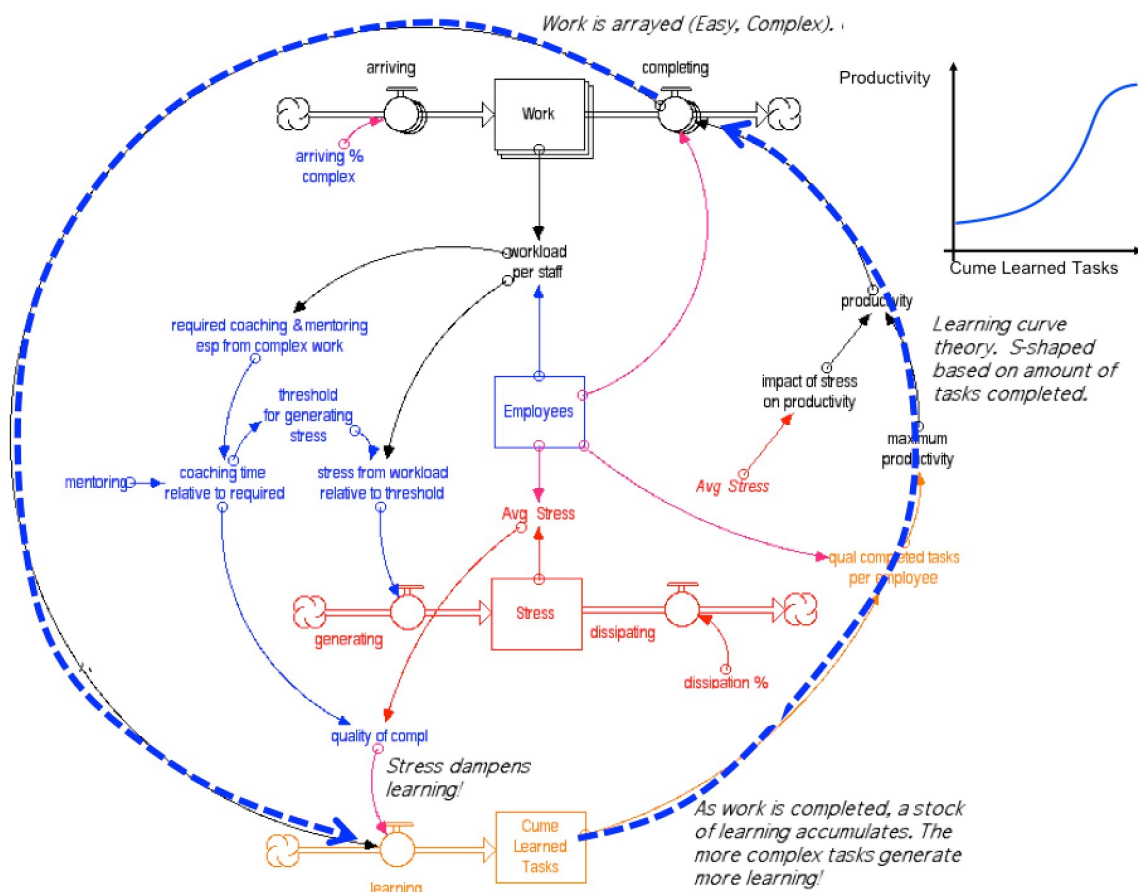
Productivity and Cumulative Learning

Work is arrayed to represent complexity. The stock of *Work* has a 3-D effect to represent that some types of claims are more complex than others.

As work is completed, it accumulates in a stock of *Cume Learned Tasks*. There's an s-shaped relationship between *Cume Learned Tasks* and *maximum productivity*. The complex work contributes more to staff learning.

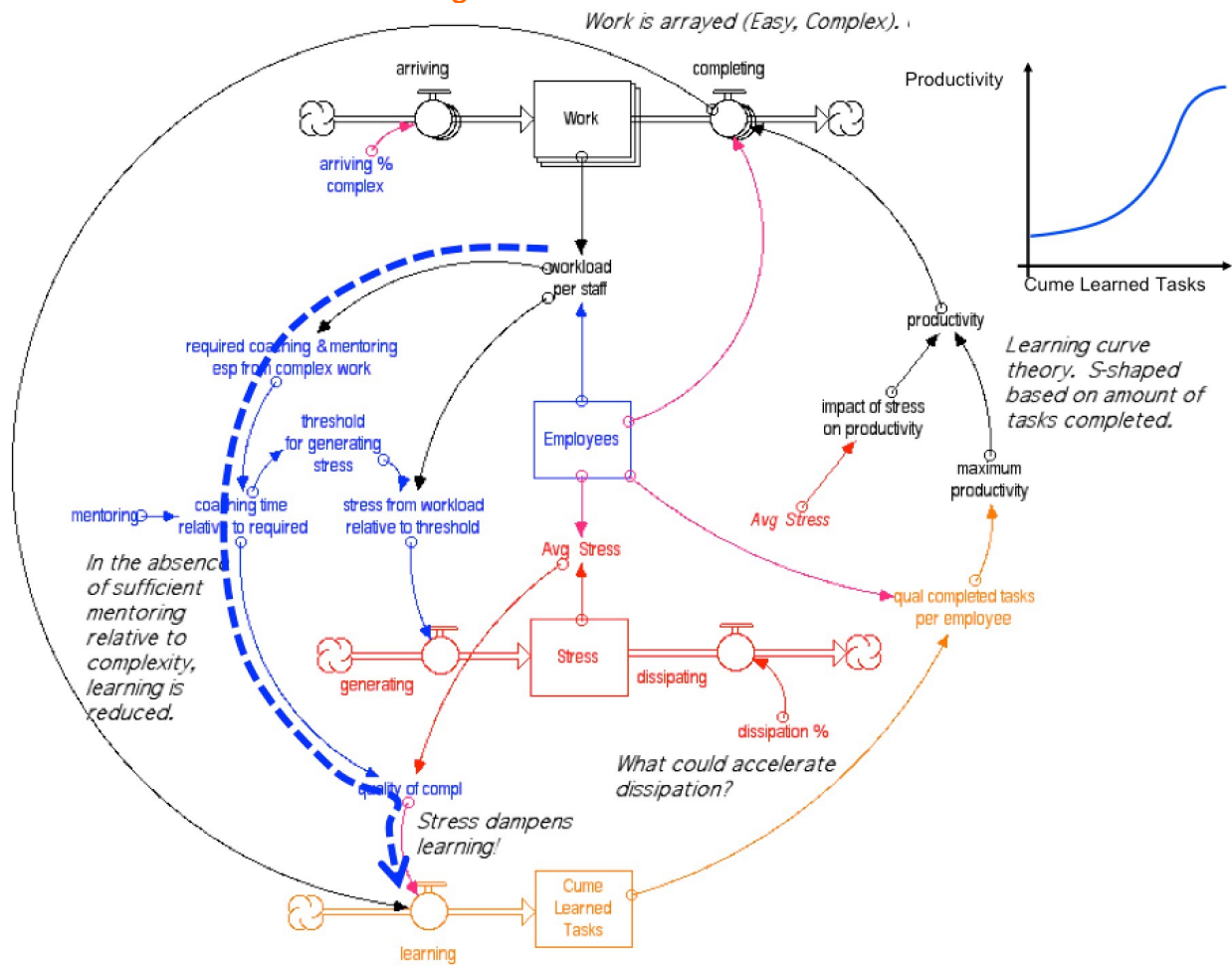
Initially, employees learn a lot with each task completed. Eventually, their learning "maxes out" [s-shaped growth "learning curve"] and they can't really become much more productive at a given task.

This is a powerful "productivity" dynamic.



Work Overload, Mentoring and Learning

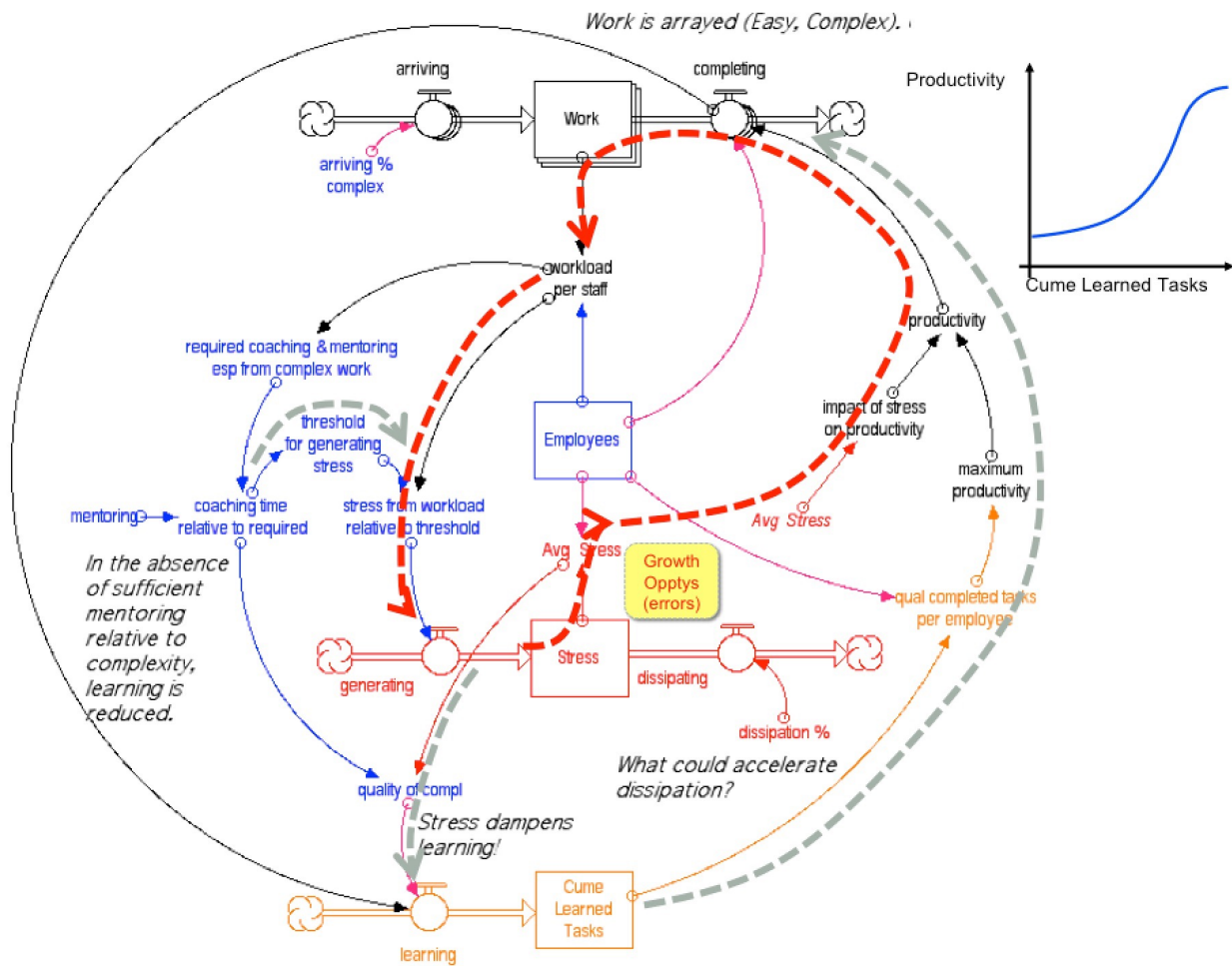
The more *workload per staff*, the greater the need for mentoring to learn (*required coaching & mentoring...esp. from complex work*). The amount of mentoring relative to the level required (*coaching time relative to required*) determines how much *learning* occurs.



Stress, Learning and Growth Opportunities (Errors)

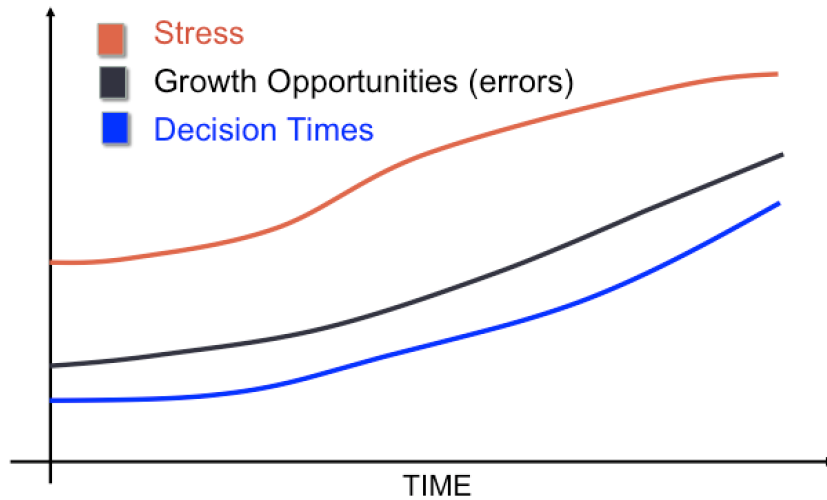
Additionally, the more *workload per staff*, the greater the need for mentoring to keep **Stress** from building. And **Stress** reduces **learning** and negatively impacts *productivity*. This can lead to a **vicious cycle (red)** where **workloads continue to build with more **Stress** resulting**. The reduced learning also contributes to more work accumulating and more stress (loop of grey arrows + red arrow to *generating*).

Additionally, **errors (Growth Opptys)** can result...creating more work.



Resulting Dynamics

The relationships previously shown can generate behavior similar to the chart here.



There's a confounding effect where rising stress can lead to greater decision times (due to decreasing productivity). Simultaneously, stress increases growth opportunities (errors). These two dynamics create a “perfect storm” – where they continue to worsen – as both greater *workload* (due to increased decision times) and *errors* generate *stress*. Stress then accelerates both dynamics.

These dynamics have been recently been experienced not only in the claims area, but across several other areas of the company. The team understood that a successful workforce strategy would need to take into account these dynamics.

Model Insights

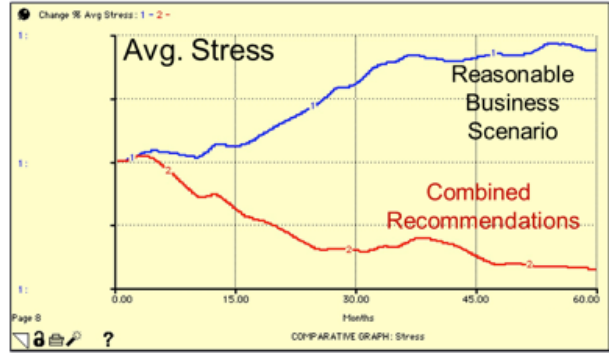
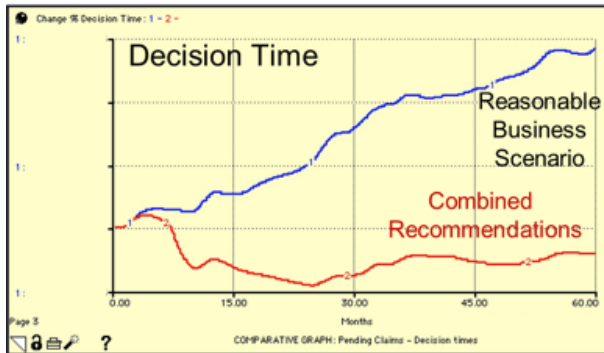
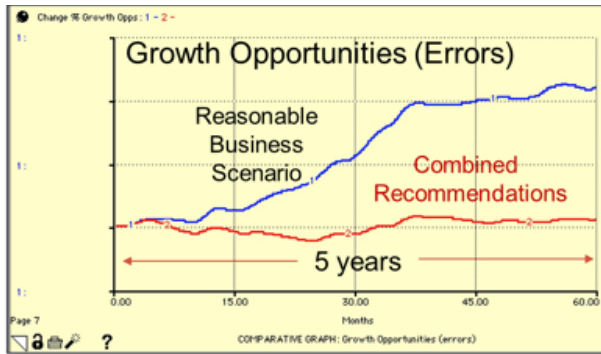
Among the key findings from the scenarios and interventions that were tested:

- o The modeling team established *the business scenario*. This business scenario was based on four “future world” assumptions – about the *internal* workings of the company *and* the *external* business environment – under which they would like to see potential dynamics of claims:
 1. The business environment will become more complex, requiring more time and resources.
 2. The business will continue to grow.
 3. It will be challenging to find the right people at right time.
 4. Demographics make it more likely to lose Senior Staff with high EQ

The business scenario generated by the above would see decision times, errors and stress all continue to rise over the next five years

- o Through experimentation with the simulation model, the modeling team determined that a highly effective response to the business scenario involved a combination of interventions:
 - ✓ Provide EQ training for Senior Staff to improve mentoring
 - ✓ Provide stress management EQ training to all
 - ✓ Implement process improvement

This combination of interventions directionally kept errors (growth opportunities) from rising beyond current levels over the next five years and actually reduced both stress and decision time relative to current conditions. The simulation graphs from the model are shown below.



Project Insights

Team members noted that having a simulation model where scenarios and a variety of interventions could be readily tested was a very powerful learning process. The modeling process provided important insights into not only why it was difficult to attract, develop and retain a capable Claims workforce but ways to most effectively respond to these issues going forward. The team members made the following observations

- *This method of problem solving combines data, experience, intuition and judgment. It results in a richer understanding of the problem and uncovers very different solutions.*
- *This process brought a different frame of mind and was eye opening.*

Specifically, the modeling team determined that

- *The current status quo is not acceptable – Doing more of what we’ve been doing is not enough to solve the problem.*
- *Hiring more people is not the answer. We need to stop “dabbling” in growing EQ.*
- *The model moved us from a linear, reactive approach to be more proactive. It enabled us to “see” the future.*

In addition the team recognized that the insights as well as process could be applied beyond Claims

- *This reinforces a broader focus on continued training and succession planning.*
- *The model raises the visibility of so called “soft” issues (e.g. stress) and the quantifiable outcome of addressing it*
- *The dynamics in this model are common across many organizations*
 - o *Dependence on the few best performers*
 - o *Observed high stress, lower productivity and attrition over time*
 - o *Lower capacity and fewer opportunities to grow staff with potential.*

Lessons to Guide Your Organization’s System Dynamics Journey

As mentioned previously, the company has discovered several useful and transferable learnings about the journey. Here they are again.

1. Make use of the full range of system dynamics (and systems thinking) tools
2. The problem (issue) chosen matters
3. Surfacing and challenging mental models (human “software”) is very high leverage
4. *Less is more* generates better learning

We will now describe these lessons in more detail and use the case study to illustrate.

1. Make use of the full range of system dynamics (and systems thinking) tools
Our multi-year experience at the company has demonstrated the value of using the whole range of system dynamics / systems thinking tools: the iceberg, causal loops, mental models, archetypes as well as stock and flow diagrams, simulation modeling and standalone flight simulators. These were all applied throughout the journey; this approach to capacity building continues as we write this paper.

The tools used have evolved over time, as the organization has developed a learning culture – with both an appetite and capacity to use the more sophisticated tools of system dynamics.

When systems thinking was initially launched, causal loop diagramming was introduced and used extensively. Introducing mental models and building capacity for dialogue was an integral part of this work. A few years later, the

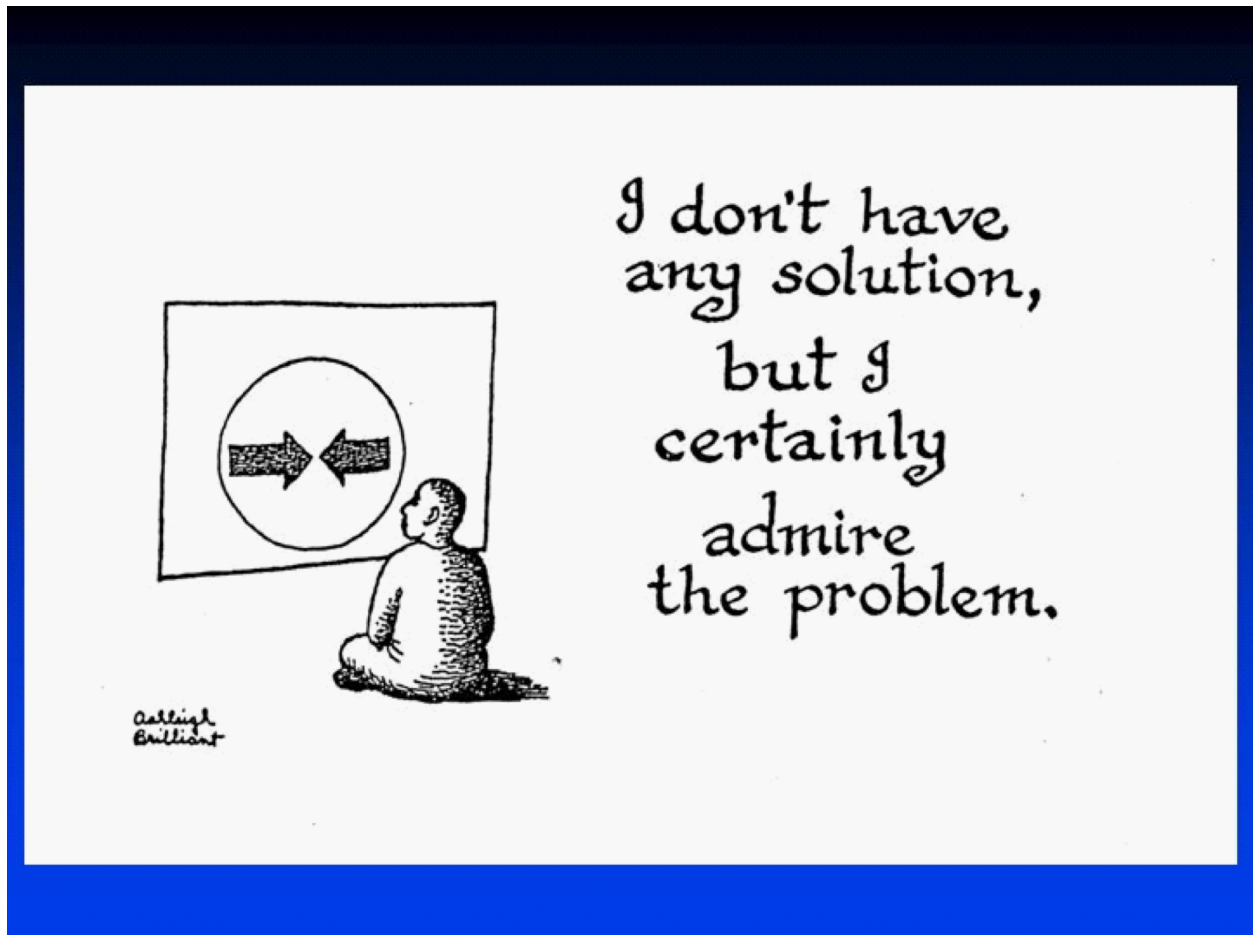
organization matured the use of systems archetypes (e.g. shifting the burden, limits to growth and accidental adversaries) in order to identify leverage and interventions more efficiently. Stock and flow diagramming was introduced a few years later which made possible another level of learning and insight. This was quickly followed by simulation modeling (using primarily *iThink*). Overall participants in this work were able to see how the systems thinking tools (e.g. causal looping and archetypes) are largely qualitative and descriptive tools and even when combined with data analysis, lack the ability to simulate results over time. Through the use of computer simulation, company leaders began to actually see how causal loop structure could generate behavior over time to allow them to test out “what if” questions and potential leverage points in a more rigorous way than was possible with causal loop diagrams. What was learned through this was that the core systems thinking tools - causal loop diagrams, archetypes, stock & flow diagrams and simulation - each have their role and in combination are very effective when in service of learning and capacity building to find uncommon solutions to complex, intractable problems.

The project described here made use of the full range of tools, from causal diagramming to simulation modeling.

2. The problem (issue) chosen matters

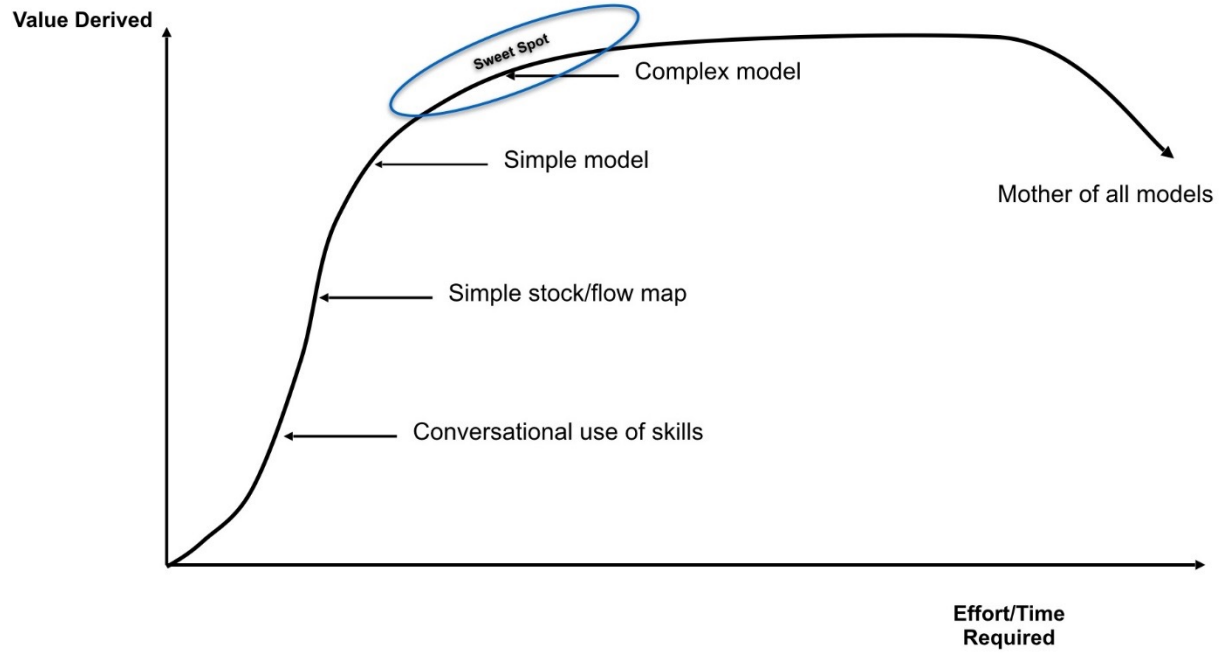
We have found that the systems framework and tools work best on highly “adaptive” (human, subjective) problems. At the company, leaders appreciated the issues they faced had intangible, subjective human and often qualitative dimensions that systems dynamics could easily address. Further, SD brought a reasonable level of rigor to the process not possible otherwise. We strongly believe that all the prior causal looping/mental modeling work established a culture of openness among company leaders to the criticality of qualitative dimensions when trying to model (understand) tough business issues.

With each modeling effort we made sure participants were truly committed to the focusing question. The focusing question is meant to be a clear declaration of what the modeling team is trying to understand - why were we investing our time and effort. This is typically stated in the form of a “why” or “how come” question. Hence the question mentioned earlier, “Why despite our best efforts are we challenged to attract, develop and retain a workforce capable of meeting varied and dynamic business needs? We made sure that the participants understood that the focus of the systems thinking work was to generate insights into *why* we were having the problem BEFORE putting our attention on “how” to fix it. We refer to this as “admiring” the problem. The intent here is to more fully “admire” the problem and not short-circuit the process by jumping to solutions.



The focusing question sets a reasonable and practical boundary on the modeling effort. A critical function of the facilitators with active support from the participants is to carefully manage the scope and detail of the model in order to produce a rich learning model and avoid the classic trap in modeling of adding more “stuff” that does not provide value to understanding the problem or identifying potential solutions. This is about finding the “sweet spot” between too simple and too much/too detail. We adhered to Barry Richmond’s value to effort graph. There’s a sweet spot on the curve where the amount of effort to apply system dynamics achieves an asymptote around a mid-sized complexity model.

Barry Richmond's
Value per Effort graph



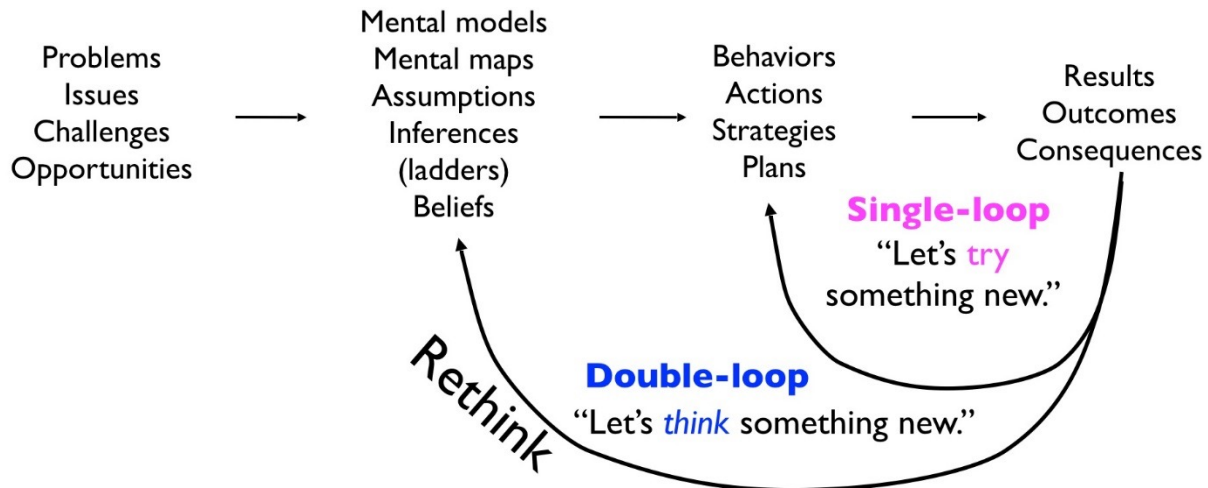
3. Surfacing and challenging mental models (human “software”) is very high leverage

The model and modeling process is the vehicle for challenging current thinking/assumptions not a replacement for thinking. In fact at some level, the learning process around modeling is more critical than the “product (model).” Our approach at the company was based on our deep seated belief born out of years of experience with clients from all sectors - both private and public that the primary focus of the process as well all the systems tools (whether causal loops or iThink models) is *ultimately to engage leaders in having different conversations than might be usual about important and often quite puzzling issues and to create conditions that enable mindsets to shift*. The bottom line for this long-term effort was about generating uncommon solutions to complex business problems by building collective (shared) intelligence (thinking) about how the system works. This enabled company decision makers to make wise choices about actions to take that will make a real difference.

Ultimately, the core of the modeling process we utilized facilitated a process of “double-loop learning” where the participants were active participants in the model building process. Developed by Chris Argyris, double loop learning is a framework that makes the case that changing thinking (“Let’s think something new”) is ultimately far more effective for bringing about change (or just better results) than simply redoubling efforts, relying on conventional actions or reacting (“Let’s try something new”). To oversimplify, the idea is that we shift from “reacting” (single-loop) to “re-thinking” (double-loop).

Two Types of Learning*

Single-loop Learning vs. Double-loop Learning



*Craig Weber, author of *Conversational Capacity*

Systems thinking and System Dynamics are highly suited to enabling people to see the differences in the two learning modes and appreciate the power of changing thinking in order to shift outcomes and performance.

One observation we have made in doing this work with clients over the years is that embedding double-loop learning is not a one-time event. Making double-loop learning stick requires repetition and sustained focused over time. The momentum for most of us is to naturally revert to conventional or habitual problem-solving (Old habits of thinking don't die quickly).

4. *Less is more generates better learning*

When it comes to the model building process itself, we typically started off with a simple causal map or simulation model versus building a bigger, more detailed model. For example, we augmented the causal looping work that was done during the first several years by using one or more of the classic system thinking archetypes such as shifting the burden or limits to growth. Additional causal looping work with the modeling teams generally then expanded on the core archetype by building it out based on the stories they were sharing about the issues.

In the more recent quantitative simulation modeling, we constructed a relatively simple high level stock and flow model very early in the modeling process that was intended to capture the essence of the “physics” of the issue we were focused on. This often became the “general theory” that was our 30,000 foot view of the issue. The follow-up modeling sessions then concentrated on highlighting as well as exploring different aspects of the issue that seemed to be dynamically important using the general theory map. We found that going slow and focusing on a few intriguing, but easily digestible puzzles or koans (riddles) was highly effective and engaging for the business leaders involved.

Conclusion

We were fortunate to be part of a long term process – still continuing – to build a culture of double-loop learning. Our experience is that it is possible for all types of organizations to undertake this process. The company has learned a few lessons along the way. It is our hope that by conveying these we will encourage and support other organizations as they undertake a similar journey.