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How to Reduce Complexity for Better Processes

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Summary

In this exploration of process complexity in production and research, I underscore the pivotal role of effective processes in achieving our most critical goals. I delve into the common pitfalls of process improvement, attributing failures to the inadvertent introduction of complications through unnecessary features, drawing parallels from the software industry. I advocate for intentional efforts to simplify processes, proposing a systematic approach involving understanding the current state, collaboratively simplifying the future state, and rigorously validating changes to reduce complexity. I emphasize the importance of recognizing and optimizing for innate human abilities, such as adaptation and contribution. Ultimately, I highlight the need for resilience, collaboration, and proactive enthusiasm for positive changes to foster effective process improvement and contribute to a self-sustaining cycle of progress.

INTRODUCTION

Process complexity in production and research processes accumulates gradually and can prevent the achievement of our most important goals when not intentionally removed **(Fig. 1**).

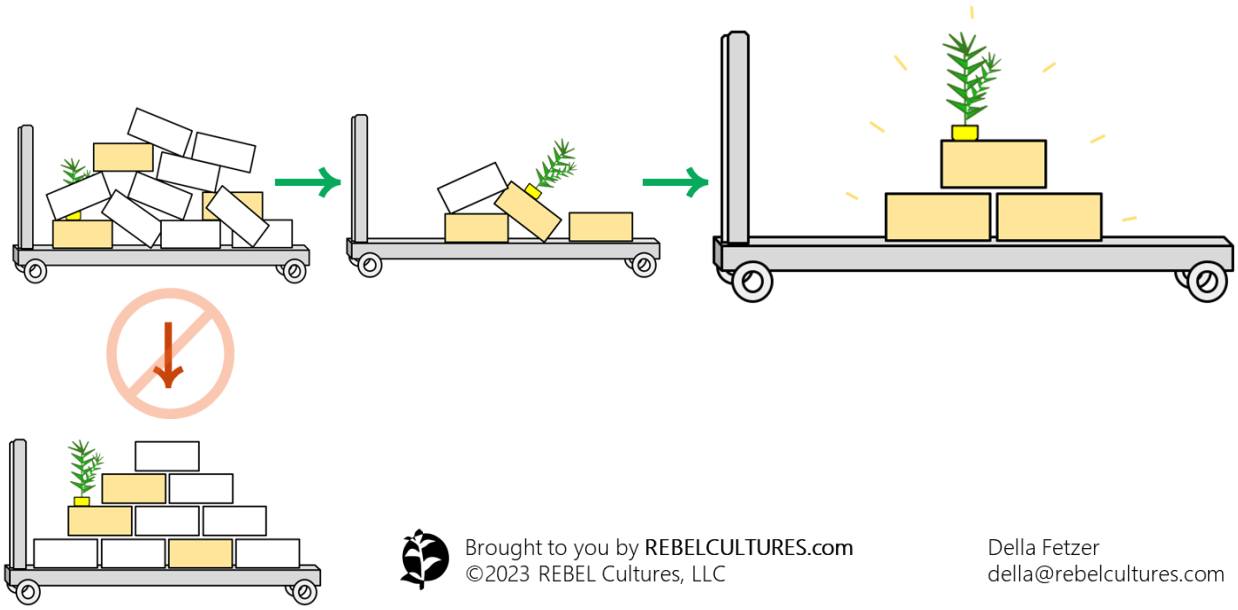

Figure 1. The result of organizing an overly complex process is an equally heavy process, which is difficult to maintain, in contrast to a dramatically simplified process that can continue to be improved and is more easily repeated and sustained.

Why does process improvement matter?

Every set of steps we do is a process, and processes are how we accomplish things. This means that without effective processes, we have no way of accomplishing key outcomes in our lives and careers; for our businesses; and within our industry.

Why does process improvement fail so often?

Process improvement fails when an implemented solution creates more problems than it solves. The likelihood of problems occurring increases as complexity is added to the process. Complexity is often disguised as features that appear useful, but are actually nonessential to the process. One example of this is evidenced by the gap between features developed by the software industry and used by end-users: Of all software features developed, launched, and purchased, 80% have been found to be rarely or never used by the consumer (Forbes, 2019). These features, often mislabeled as "improvements," actually create complexity instead of reducing it. This leads to less effective processes and failed process improvement efforts.

How can complexity be removed from processes?

Process complexity gradually accumulates as demands change and access to new tools grows over time. Very few processes remain exactly the same for long, even if people feel that a process has always been a certain way. In reality, every time that demands and tools change, the holistic process has also changed, even if some familiar process elements remain. The removal of complexity must start with the intention and readiness to simplify a process that has accumulated complexity over time. Once this readiness is achieved, the following progression of techniques may be used to guide a complexity reduction effort to improve a process **(Fig. 2**):

First, understand the current state (without solving any problems). Leaders who invest adequate time in understanding the current state are guaranteed to solve more problems and avoid more pitfalls than those who rush to implement solutions. They should exist where the work is happening, and observe without judgment until it is understood what, when, and why things are happening. Leaders should also ask the team performing the work questions about the process and listen to responses without judgment. They should also individually map information, supplies and tools, and product flows of the current state. And then they should map the process of a hypothetical future state where only steps that add value occur.

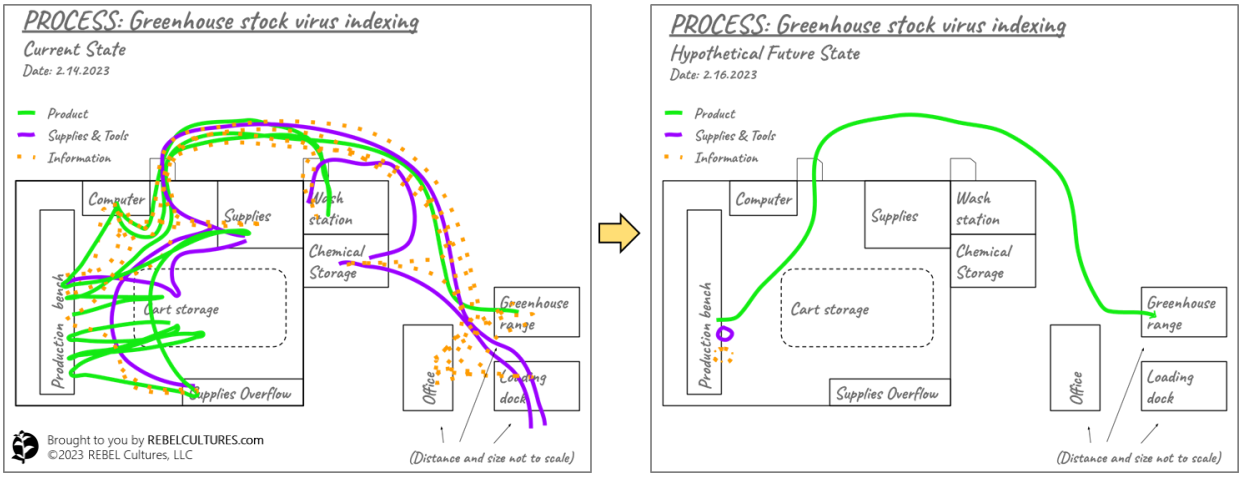

Figure 2. Diagrams of the current state of a process, including the flow of information, supplies and tools, and products in contrast with a hypothetical future state of the same process, focused exclusively on the highest value step(s).

Second, simplify the future state**.** This is where process change actually occurs. Leaders should discuss with process experts all requirements that would enable the hypothetical future state, recording all responses, even those which are not possible. All feasible requirements from this document can be pursued to reduce complexity and improve the process. Once a change is in place, check to validate that complexity was actually removed, rather than transferred elsewhere within or outside of the

process. Efforts should then be made to provide necessary resources and support to all team members throughout changes, especially as unexpected complications arise.

Third, understand natural human ability. While every human is unique, understanding broad patterns in natural human ability can inform how to sustain less complex processes and where future automation can provide the highest value. Humans do *NOT* naturally excel in repetition or reading. Quickly repeating tasks with low variation, either in physical motion or mental patterns, such as simple calculations or counting. Optimize for comfort and variation wherever possible, and consider automation after the process has been simplified as much as possible. Intake of written information translated to an output of material is complex and requires translation. Visual instructions which detail exactly when a task is complete and correct are superior to written instructions **(Fig. 3**).

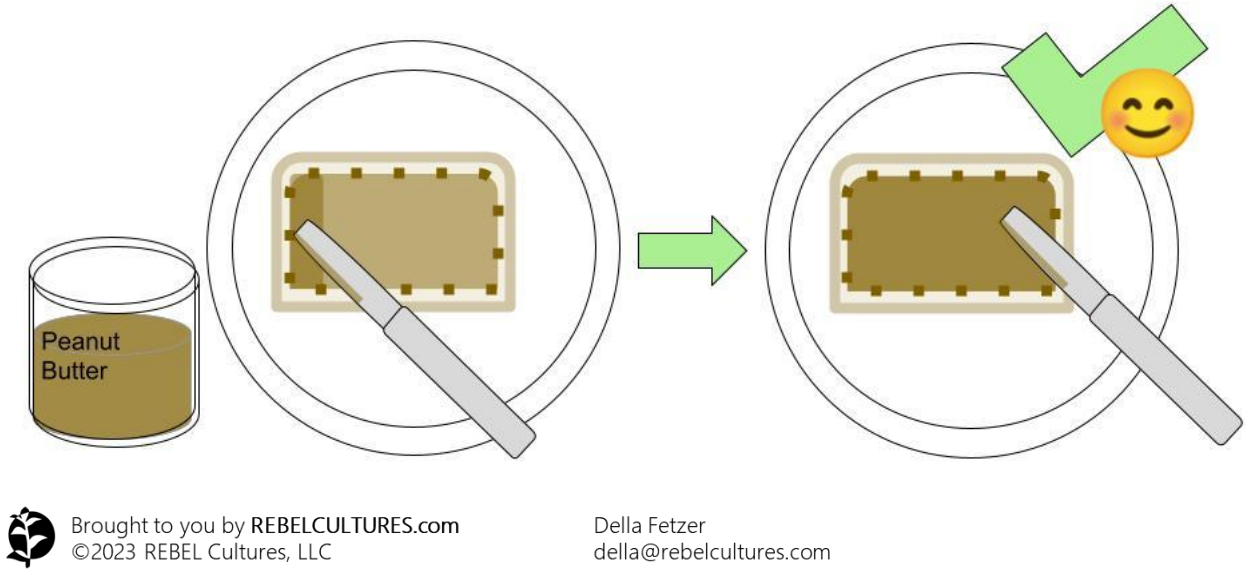

Figure 3: Visual instructions require no translation. They accelerate new employee training and cross-training. They are fast and easy for workers to reference, and are easy for others outside of the process to understand. This understanding enables higher-quality conversations and less misinterpretation with other managers, outside auditors, and even international suppliers and potential clients.

Humans *DO* naturally excel in adaptation and contribution. Like any living organism, humans adapt when changes in their process or environment occur. When teammates struggle to adapt, be sure to take extra time to understand the real source of resistance, which is often a fear that their effort in becoming equally proficient in a new method will not be adequately supported. Humans will adapt to a new process, but also have the power to inadvertently adapt any process to themselves. People are intrinsically motivated to contribute to solutions, which impact their work. Encourage mass participation and learn to value difficult conversations because difficult conversations lead to significant breakthroughs.

CONCLUSION

Effective process improvement requires a willingness to make many mistakes, so allow yourself to be wrong, but make it right, and allow others to do the same. A good team and good industry colleagues will be there to support you. The future of plant propagation depends on increasingly better practices. When we as leaders take steps toward making things better, more people who also care about making things better will want to work with us. This is the ultimate cycle of self-sustaining, continuous improvement. Lastly, think about what you want most out of your work. Let yourself be excited about simplifying and improving the process, and let your process make it real.