



Machine Learning in Health Care

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REJECTION. DESTRUCTION. FRUSTRATION.

We do not often associate these words with technological innovation, unless the technology we are using is malfunctioning. Stepping into spaces where we as nurses can contribute to the advancement of workplace technologies may be equal parts rewarding and disorienting. An innovative mindset often requires nurses to step outside the status quo and embrace ambiguity to move on from frustration toward solution seeking. Creative destruction of the status quo, often through the naming and understanding of frustrations, is one of the greatest sources of innovation in health care technology. Originality and creativity are highly valued in our culture, but it may often seem that only the most radical risk takers and industry shapers are the true innovators. Adopting an innovative mindset begins with realizing that smaller innovations coming from frontline nurses are often the most valuable and viable.

Any discussion of innovation must begin with an important differentiation of an *innovation* from an *Innovation*. The notion of a big, disruptive, and industry-changing technology or practice is most often what is envisioned when the word *Innovation* is used. These capital *I* innovations are seen in service companies like Uber and Google or with technologies like three-dimensional printing and artificial intelligence. Disruptive and radical Innovations are not typical in health care because of the associated costs, regulation, training, and process of proving efficacy in cases of large-scale changes. What is more common, but perhaps less glamorous, are the lower case *i* in-

novations. These innovations are the great ideas that arise after a challenging clinical event, a lunch-table discussion, and the notes scribbled down about how to simplify a process or to improve a product. These kinds of smaller innovations may be timesaving adjustments to workflows or enhancements to the electronic health record that saves a few clicks. They may be smaller in scale, but are also more likely to be infused across a care unit or a practice environment, especially when they come from a fellow nurse. Incrementally, these smaller innovations may be even more important than disruptive or large-scale innovations. Their power is in their representation of a collective clinical understanding of how to do work better, smarter, and more efficiently.

Nurses have a unique view of how multiple members of the team interact, weaknesses in links of the safety and quality chain, and the impact of these issues on patient outcomes. These insights lend themselves to really understanding the root of a problem that requires innovative thinking in the first place. Unfortunately, there may be many challenges to bringing an innovation forward. There is, for example, a light bulb mythology around the birth of a good idea. One can picture the feverishly sketched solution on a napkin, which mystically transforms into the next big thing. Refining, designing, and implementing any type of innovation may require tremendous professional and organizational work. Focus, research, perseverance, and an openness to failure and feedback are critical to bringing that scribbled note or sketch to fruition. What also is lost in the romantic notion of a grand Innovation is that the quantity of ideas is often more important than just being satisfied with a single solution. The road to success traveled is littered with the trials and failure of the greatest thinkers, inventors, and artists of our time. A willingness to take the risk in the first place and the ability to recover from a failed attempt can be roadblocks for those who may try to bring their ideas forward. In addition, comfort with disrupting the status quo, learning the best way to socialize an

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Conflict of interest: None to report.

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1089-9472/\$36.00

<https://doi.org/10.1016/j.jopan.2018.07.001>

idea, and having the grit to see it through can be challenges that may deter a nurse from making their innovation a reality.

Disrupting the Status Quo

Discovering, nurturing, and delivering on small-scale innovations require the same mindset as work toward large-scale disruptive Innovations. Those who study and work in the change management space have adopted the term creative destruction from economic theory. Creative destruction is a paradoxical term used to describe the almost continual process of upgrading or replacing existing systems. The term's genesis in economic theory was partially from the notion that the continual evolution of an industry can sometimes require dismantling of its current work processes or notions and that some people will be worse off as a result.¹ A simple example is the greater use of automation and artificial intelligence for helplines and call centers. As automated chatbots and voice commands become quicker and more human like, they are able to handle a wider range of issues that a human used to have to address. The implication of moving to the cheaper innovation of automation implies that call center businesses and the human operators who work at them may lose their jobs. Creative destruction may not always be required to implement an innovative idea, but as the scope and impact of innovations grow, challenges to the status quo and destruction of norms becomes progressively inevitable. Those whose roles are challenged because of an innovation may be the first to object to or undermine the effort to adopt something new.

One of the biggest hurdles to getting oneself or others into a creative mindset is the recognition that there is great comfort and safety in the status quo. Adam Grant and Sheryl Sandberg² in their book *Originals* noted, "to drive people out of their comfort zones, you have to cultivate dissatisfaction, frustration, or anger at the current state of affairs." Many facilitators of workshops on creative thinking will drive an exercise with this goal in mind. They create a space of discomfort for participants by having them envision the negative aspects of the status quo long term. A good story about an innovative

idea may sometimes need this type of persuasive argumentation, which may seem initially counterintuitive because of the use of negativity. Having a variety of ways to explain and persuade, though, can ultimately help others rally around an idea.

Defining the Problem

Two of the most important steps to nurturing an innovative idea are problem definition and storytelling. Digging to the center of a problem helps everyone involved understand how well an innovative solution might solve it. It also helps to get a sense of what success looks like. Problem definition requires that a nurse moves past venting and frustration and begins to define and understand the source. It is all too easy to call out flaws with processes or technologies, especially if they have been exposed because of a patient safety issue. On a less dramatic scale, anything that makes the work day more challenging or makes completing a task more complex than it needs to be might be fertile ground for innovative problem solving. Defining and understanding the why and what beneath a concern requires approaching the problem with curiosity and openness to the ideas from peers and research.

The research into the nature of the problem begins with embracing the discomfort of recognizing what one does not know. For example, a nurse may need to learn how to speak new languages within different domains of knowledge, particularly when the work is within the technology domain. Learning at least part of the language of another discipline is when the creative mindset can become equal parts exciting and disorienting. It is important to imagine someone outside the health care discipline trying to learn the nuances of health care language, the culture of the care environment, and even the many acronyms that are a part of health care. Immersion into the new discipline is a key part of building a nurse's ability to successfully tell their innovation story to a new audience. Immersion in a new domain is where a nurse can begin to find spaces for even deeper creative thinking and where intellectual risk leads to greater problem definition and understanding. Storytelling is the next part of driving innovation

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