

The **ergonomics** of innovation

A successful campaign to save 100,000 lives shows that efforts to make it easier for organizations to innovate can yield remarkable results.

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Josie King's senseless death started with a hot bath. The one-and-a-half-year-old girl climbed into a tub and burned herself in January 2001. Her initial recovery at a large hospital seemed promising, but then the toddler began experiencing insatiable thirst. Nurses told her mother not to let her drink and said that her vital signs were normal, even as she sucked washcloths to quench her thirst. Then, despite a no-narcotics order, a nurse gave Josie methadone, which led to cardiac arrest. Two days later, she died in the intensive-care unit.

Josie's mother, Sorrel, told this heartbreaking story in December 2004 at an event kicking off a campaign to reduce by 100,000 the number of patients who die each year in US hospitals because of preventable errors.¹ A small nonprofit called the Institute for Healthcare Improvement (IHI) was behind the 100,000 Lives campaign. By June 2006, the hospitals enrolled in it had accomplished this goal.² Although the organization lacked formal author-

¹The target of 100,000 represented about half of the number of people who died in US hospitals from 2000 to 2002 because of preventable errors. See "Patient safety in American hospitals," HealthGrades Quality Study, July 2004.

²The Institute for Healthcare Improvement (IHI) estimated that 122,300 lives had been saved by June 14, 2006. The 18-month campaign cost \$3.3 million. See Hayagreeva Rao and David Hoyt, "Institute for Healthcare Improvement: The campaign to save 100,000 lives," case study, Stanford University Graduate School of Business, 2008.

ity over the hospitals and operated with a tiny staff and modest resources, it helped save 100,000 lives by inspiring and guiding executives, physicians, nurses, and a host of other staff members in the 3,000 hospitals (representing over 75 percent of US hospital beds) that joined the campaign.

The challenges facing IHI—entrenched attitudes, conflicting stakeholders, stretched resources, a limited ability to rely on formal authority to achieve results—will sound familiar to many senior executives who have pressed for more effective innovation in their own companies. The lessons that we draw from this single case are tentative, but we are struck by a theme that surfaced again and again in the 100,000 Lives campaign and that receives scant attention in the innovation literature: IHI constantly found ways of making it easier rather than harder for hospitals to innovate. That simple idea, which might be called the ergonomics of innovation, helped save 100,000 lives.

Some lessons from IHI's experience may prove useful only for organizations that seek to influence networks where they have little if any formal authority—companies such as eBay, Facebook, and Mozilla. But many other lessons—such as the value of creating something new from a blend of old ideas, setting goals that galvanize action, starting with small steps, and developing tools that ease the burden on people attempting to promote innovation and change—are pertinent to most organizations.

The ergonomics of innovation

A basic idea from ergonomics is that physical and cognitive “affordances” can help people to think about, know, and use something more easily and to make fewer errors. The IHI campaign didn't use the language of ergonomics but nonetheless applied its logic in hundreds of ways by designing and spreading affordances that made it easier for the staffs of the participating hospitals to change.

For starters, to reduce the number of medical errors, IHI provided six simple, evidence-based practices, many of which empowered the frontline nurses:

- allow any staff member to call on a rapid-response team to treat patients showing signs of rapid decline
- provide evidence-based care, including the early use of aspirin and beta-blockers, for heart attack patients
- develop a list of steps to prevent bloodstream infections related to the use of central venous catheters

- take simple steps, including frequent and careful hand washing, to reduce the number of surgical on-site infections
- keep accurate records of the drugs patients take
- take steps to prevent ventilator-associated pneumonia

IHI emphasized these six practices because they are easy to understand and remember and have implications for the actions of so many people in hospitals. One of the most effective means of reducing the risk of pneumonia for patients on ventilators, for example, is to ensure that the patient's head is elevated at least 45 degrees. Staffs in participating hospitals drew a line on the wall behind the bed of every such patient and told everyone—families, orderlies, janitors, and other patients, not just doctors and nurses—that if the head dipped below that line, they should tell someone immediately to prop it up. As a result, the pressure to notice and prevent this error didn't fall entirely on a few overburdened doctors and nurses.



To help hospitals implement the six practices, IHI provided a variety of tools. Its staffers suggested strategies for getting a hospital's board of trustees engaged with the movement, for example. Newly participating hospitals were linked with mentor hospitals to spread tips on implementation. IHI's staff provided advice and direct assistance for recruiting nurses and physicians who could serve as champions for change. The organization chartered a campaign bus that drove from coast to coast to celebrate the accomplishments of participating hospitals and to find and disseminate new ideas. A weekly conference call proved to be an especially efficient and lively forum for sharing ideas—as many as 800 hospitals participated each week.

Many writings on innovation emphasize the importance of flexibility and of thinking widely and broadly. The case of IHI, along with research on creativity, shows that constraints are also essential for developing and implementing new ideas. For example, peer-reviewed medical journals provide hospitals with thousands of practices they might use to reduce the number of preventable deaths. Yet asking each hospital to review the medical literature and then select its own practices would have been a huge burden for many of the 3,000 participating institutions. By focusing on six basic practices, IHI reduced the burden on hospitals, which were encouraged to

devote their energy and creativity to implementation and, once they became expert, to helping other hospitals that joined the campaign.

Constraints helped IHI find ways of reducing the cognitive and emotional load not only on physicians, nurses, and supporting staff in hospitals but also on its own staff. That is important for all manner of innovation efforts, as they can be so mentally taxing. Learning how to do something new is far more time consuming than doing what you already know; it requires far more mental effort to be in the “mindful” state required for learning and experimentation than in the “mindless” state required for ingrained actions. Moreover, people who are learning and innovating tend to make mistakes and experience setbacks, which are often upsetting and lead to inefficiency.

IHI reduced the burden on participating organizations by imposing very few rules and requirements. It was easy to join the campaign, for example; all a hospital had to do was send a fax from its CEO saying that it wanted to participate and was willing to provide mortality data. Participating hospitals weren’t required to implement all—or indeed any—of the six basic practices.

Affordances like these made it possible for IHI staffers to focus on recruiting those doctors, nurses, and other staff members who were most motivated, skilled, and respected to lead the campaign in each hospital. IHI’s staff also concentrated on developing efficient ways of transmitting lessons (on IHI’s Web site, through mass e-mails, and during weekly conference calls) and promoting interaction among the employees of hundreds of participating organizations. From the outset, IHI’s staff emphasized that the campaign’s success would depend on cooperation among participating hospitals. The more effort that each hospital devoted to helping other institutions use its expertise—and to asking for help when it needed another hospital’s expertise—the more rapidly unnecessary deaths could be prevented throughout the network of 3,000 hospitals.

In short, the IHI case teaches us that innovations spread quickly when organizations focus relentlessly on selecting and spreading ideas in ways that ease the burden of thought and action for everyone involved. This mind-set differs from the one that burdens most organizations, where innovation is seen as difficult, expensive, and protracted. The IHI staff’s ergonomics-of-innovation mind-set focused on making things easier and cheaper for everyone, including the staff itself.

Lightening the load

The 100,000 Lives campaign, along with academic research and examples from other sectors, suggests several concrete steps that leaders can take

to ease the challenge of innovation for their companies and for other people and organizations whose creative energies they wish to harness. First, they can think constantly about how to develop the most successful blend of existing ideas rather than the newest and most radical ones. They can also set a public, inspiring, and difficult goal and then break it down into manageable chunks. Finally, they can boost the odds that innovative ideas will spread, by encouraging their organizations to identify affordances that help people learn about, understand, and apply new products, systems, and procedures.

Create a new blend of old ideas

Each of the practices that IHI stressed had its roots in a large body of peer-reviewed medical research. IHI's new twist was to select practices that behavioral-science research suggested were more likely to spread and stick. The organization borrowed its ideas about designing effective change programs from political campaigns and social movements.

IHI's brilliant stroke was to create an original “brew” especially likely to attract attention, to spread, and to have an impact on the whole US health care industry. As Andrew Hargadon shows in *How Breakthroughs Happen*,³ old ideas lie behind most innovations—for instance, Ford's assembly line (based, in part, on the practices of slaughterhouses), the first Apple iPod (built primarily from off-the-shelf parts), and the Toyota Motor production system (an amalgam of existing management, statistical, and manufacturing techniques). Because the borrowed elements have already been shown to work under some conditions, companies that focus on creative recombination reduce the effort required to develop new ideas and increase their chances of success.

The lesson for would-be innovators is that they don't have to invent brand-new ideas or even implement ideas largely unknown in their industries. A great deal of successful innovation happens when ideas that haven't been widely applied in an industry or a market become dispersed throughout it. Several online booksellers did business before Amazon.com came along, for example, yet Amazon is rightly seen as the successful innovator because it was the first company to persuade large numbers of people to use its service.

Set goals that count

At the campaign kick-off event, IHI's CEO, Donald Berwick, said, “Here is what I think we should do. I think we should save 100,000 lives. And I think we should do that by June 14, 2006—18 months from today. ‘Some’ is

³ Andrew Hargadon, *How Breakthroughs Happen: The Surprising Truth about how Companies Innovate*, Cambridge, MA: Harvard Business School Press, 2003.

not a number; ‘soon’ is not a time. Here’s the number: 100,000. Here’s the time: June 14, 2006, 9:00 a.m.”

Hundreds of peer-reviewed studies on setting goals show that measurable, specific, and somewhat (but not absurdly) difficult ones are best for motivating effort.⁴ An effective goal doesn’t have to be about anything as important as saving lives. If the goal can grab attention and people believe that it serves a worthy cause, it can move them to action. IHI extended this thinking by giving the problem it was trying to solve a specific name, which further fueled the will to act, and by centering its efforts on a few critical metrics.

Name the problem. In preparing IHI’s staff for the campaign, Donald Berwick invited feminist activist Gloria Steinem to visit IHI and discuss ways to bring about social change. Steinem emphasized that naming a problem makes it seem more tangible, focuses energy and attention, and generates pressure to deal with it. She cited the example of date rape, something that had long existed but wasn’t widely recognized as a problem until it was named.

Steinem inspired IHI to name the problem: preventable errors were killing too many people. Naming the problem generated emotion and focused efforts throughout the medical community. Naming the problem as lives unnecessarily lost put pressure on hospital leaders and other powerful players to act or, if they didn’t, to be seen as morally suspect. The head of a large Catholic health care system declared, “Frankly, ‘no needless deaths’ is fundamental to any health care organization, so I think CEOs should really worry more about not declaring commitment to this goal than to declaring it.”

Much sociological research suggests that the desire to avoid embarrassment, to maintain an acceptable public image, might be an even more powerful motive for human behavior than financial incentives.⁵ Organizations seeking to galvanize people to action—getting them to embrace new ideas or stimulating the personal initiative that often fuels innovation—should take this research and IHI’s experience to heart.

Get the “hard count.” In 2004, Donald Berwick visited one of his sons, then working in a political campaign. Berwick was impressed by its scale and professionalism and invited his son and several other senior campaign

⁴See, for example, Edwin A. Locke and Gary P. Latham, “Building a practically useful theory of goal setting and task motivation: A 35-year odyssey,” *American Psychologist*, 2002, Volume 57, Number 9, pp. 705–17.

⁵See, for example, the classic writings of sociologist Erving Goffman, such as *The Presentation of Self in Everyday Life*, New York: Anchor, 1959.

professionals to teach IHI's staff. In a day-long seminar on how a political campaign operates, they made an important suggestion: get the hard count, which in a political campaign means metrics such as the number of doors to be knocked on during a weekend or the number of voters to be driven to the polls on Election Day.

For IHI, the hard count was 400,000: the number of hospital beds the organization needed to attract to the campaign if it was to save 100,000 lives. In pursuing this target, IHI avoided the distraction of metrics that were less clear stepping-stones to the ultimate goal. It also reduced its intellectual burden by adopting an idea (the hard count) that had already proven effective in other settings.

The hard count illustrates a broader point: motivating people to action requires a blend of lofty aspirations (to be attained in the distant future) and concrete goals (to be accomplished in the near term). The virtues of aligning short- and long-term goals can be seen in the race to the moon. President John F. Kennedy's long-term aspiration was to place an astronaut there by 1970. It required the employees and contractors of the National Aeronautics and Space Administration (NASA) to focus on specific subgoals—developing powerful engines, perfecting space walks, devising techniques and equipment for docking spacecraft—that were necessary stepping-stones. As a group of NASA engineers and project managers told one of us, “If you weren't working on the next tiny step to get a man on the moon, you knew you were doing the wrong thing.”

Ask people to take small but effective steps

IHI focused on small things that had a big impact without placing a big load on hospital staffs (reducing the number of infections, for example, hinged on frequent and thorough hand washing). In this way, the organization adopted what Karl Weick calls a “small wins” strategy. In Weick's classic 1984 article,⁶ he asserted that big and daunting problems like energy use and pollution often discourage people. They respond to these seemingly insurmountable challenges by doing nothing, because meaningful progress seems impossible. But when such problems are reframed as a series of smaller ones that can be tackled through concrete and manageable steps, Weick shows, the reframing mobilizes people to act.

To combat climate change, for example, Wal-Mart Stores is taking action on hundreds of small things. It is working with the technology company NCR to develop a cash register that prints receipts on both sides of a roll and

⁶Karl E. Weick and Richard L. Daft, “Toward a model of organizations as interpretation systems,” *The Academy of Management Review*, 1984, Volume 9, Number 2, pp. 284–95.

thus requires 50 percent less paper; replacing all the conventional lights in its refrigerators and freezers with more energy-efficient LED lights; and pressing suppliers to ship products in smaller and lighter packages, which require less energy to make and transport. Given Wal-Mart's massive size, such small changes are adding up to huge energy savings.

Use affordances

Berwick and his team believed that simply asking hospital staffs to “try harder” to save lives wasn't enough; people need concrete, easily learned and implemented tools. IHI also thought that any practice placing additional demands on nurses and doctors—such as expanding their job descriptions to include more activities—would be less likely to be implemented and thus to save lives.

Marking the 45-degree angle for the beds of patients on ventilators was an extremely simple affordance. Another was the introduction of checklists for the medical staff. Checklists, though new to many hospitals, have been used in commercial aviation for years. Steven Tremain, a physician at a hospital in the IHI campaign, commented on the chasm between health care and aviation:

We are built on a 2,000-year-old culture, where we are expected as clinicians not to make mistakes. This was true with the FAA⁷ until the 1950s, when they started asking, “Why are we crashing so many planes?” If your safety systems are built on the expectations that your pilots and your doctors won't fail, then you are going to have no safety net when they do. The FAA figured out pretty quickly that they were better off designing a system that expects the pilots to fail and then prevents that failure from causing a disaster—the failure does not have to cause a disaster. We are just beginning that journey 50 years later in health care. I've gone around asking doctors if they would get on an airplane when a pilot says, “I don't use checklists. I've been doing this for 20 years.”⁸

Affordances that helped people get information in ways they could understand and use were also features of the 100,000 Lives campaign. The campaign, for example, mounted a radio show moderated by Madge Kaplan, the former health issues editor of National Public Radio. Hundreds of participants from facilities around the United States called in to learn how hospitals dealt with specific problems. The radio show's format allowed participants not only to share their experiences and insights but also to answer questions. People could learn about a wide variety of practices

⁷The US Federal Aviation Administration.

⁸Hayagreeva Rao and David Hoyt, “Institute for Healthcare Improvement: The campaign to save 100,000 lives,” Case study, Stanford University Graduate School of Business, 2008.



in a relatively short time as well. Madge Kaplan was unusually skilled at understanding what experts were saying about health care and making sure that these ideas were communicated in ways that neophytes could understand and apply. Her show helped counteract a classic problem called “the curse of knowledge”: those who have knowledge underestimate the difficulty of communicating it to others.

Many readers may find these examples of affordances—a line on a wall, checklists, a call-in show—absurdly obvious. We agree and would add that if an affordance seems obvious or even downright simplistic, that is a sign it will probably be effective: novices will find it easy to learn, and veteran employees won’t find it hard to implement.

One of our classes at Stanford, for example, undertook a project with Timbuk2, a small San Francisco–based company that sells tote bags and bags for bicycle messengers. The goal was to fix its disorganized, low-energy, weekly all-hands meeting. The students suggested having people wear name tags, introducing newcomers at each meeting, making clear who was responsible for running it, having an agenda, providing chairs so that people could sit down, and offering food. Both the Timbuk2 executives and the students were a bit skeptical that such simple measures would have much of an effect. Yet the executives reported a dramatic improvement in energy levels and enthusiasm after their implementation.

In short, when executives develop affordances, they should start with obvious problems and mundane solutions. Breakthrough ideas sound more exciting, and complex practices can make you look and feel smarter. But unproven and complicated solutions usually make for poor affordances.

Engaging the network

IHI had about 70 employees when the 100,000 Lives campaign started and only about 100 at the end, a year and a half later. Obviously, IHI’s people focused their attention not on expanding the organization but on scaling their external network.

Web-based organizations that depend on external communities resemble IHI in their emphasis on the size and activity of external networks. Mozilla

and Facebook, for example, remain fairly small organizations. Mozilla has about 120 employees (for 180 million users) and Facebook—as of this writing, for its staff is growing fast—about 500 (for 100 million users). For Mozilla, Facebook, IHI, and just about any other organization trying to leverage external networks, the intensity and frequency of the members' engagement is at least as important as the sheer numbers involved. People who sign up for Facebook but never use their accounts, for example, don't generate advertising income for the site. Similarly, hospitals that joined the 100,000 Lives campaign without engaging their staffs didn't save lives.

At Facebook, staffers have devoted much effort to linking new users to potential online “friends” quickly; the more such friends members have, the likelier they are to visit the site frequently. Likewise, the IHI campaign also took steps to stimulate engagement by tailoring its approach to the interests and needs of constituencies within its network—starting with the decision to encourage hospitals to choose which of the six practices they would apply and to customize those practices as they pleased.

Strategies such as describing the problem as “lives to be saved” rather than “errors” and creating a nationwide coalition were designed to increase the odds that hospital leaders would commit themselves to the campaign rather than feel threatened by it. To ensure that the culture of safety began at the top, IHI also engaged the boards of trustees of hospitals. When communicating with nurses and doctors, the campaign drew on evidence-based ideas—a crucial source of legitimacy—and stressed efforts to help these caregivers to be more successful and effective.

The nature of the constituencies may differ in other types of networks. Nonetheless, the principle of tailoring messages and interactions to the peculiarities of specific groups is becoming more crucial as networks surge in significance. Consider, for example, the needs of a company with an external R&D network. Clearly, its diverse membership—academic researchers, lone-wolf investigator-entrepreneurs, individual scientists and laboratory administrators in corporate R&D departments—would call for a variety of approaches.

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On December 12, 2006, just six months after the 100,000 Lives campaign ended, Donald Berwick announced a new effort, running through December 2008, to save five million patients a year from medically induced injuries, such as surgical errors and hospital-acquired infections. Building on the success of the earlier campaign, IHI developed a new list of practices and sought to enlist at least 4,000 hospitals. Whether the new campaign achieves its ambitious goals or not, business leaders should keep their eyes on it because it could yield valuable new lessons about how to make it easier for individuals, organizations, and networks to stimulate and embrace innovation on a grand scale. *Q*

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