

BizEd

A portrait of Cheryl Perkins, a woman with short, wavy, reddish-blonde hair, smiling warmly. She is wearing a dark, possibly black, top with a decorative, sequined or beaded detail at the neckline. The background is a textured, light-colored wall with faint circular patterns. The magazine title 'BizEd' is overlaid on the top half of the image, with 'Biz' in white and 'Ed' in black. The text 'FOCUS ON INNOVATION' and 'JANUARY/FEBRUARY 2011' is in the top right corner. The name 'Cheryl Perkins' is written in large white letters across the middle of her face. Below her name, the text 'On the Leading Edge of Innovation' is in white, followed by 'The Courses and Curricula That Foster Innovation' in orange, and 'New Approaches to Teaching' in white at the bottom right.

FOCUS ON INNOVATION

JANUARY/FEBRUARY 2011

Cheryl Perkins

On the Leading Edge of Innovation

The Courses and Curricula
That Foster Innovation

New Approaches to
Teaching

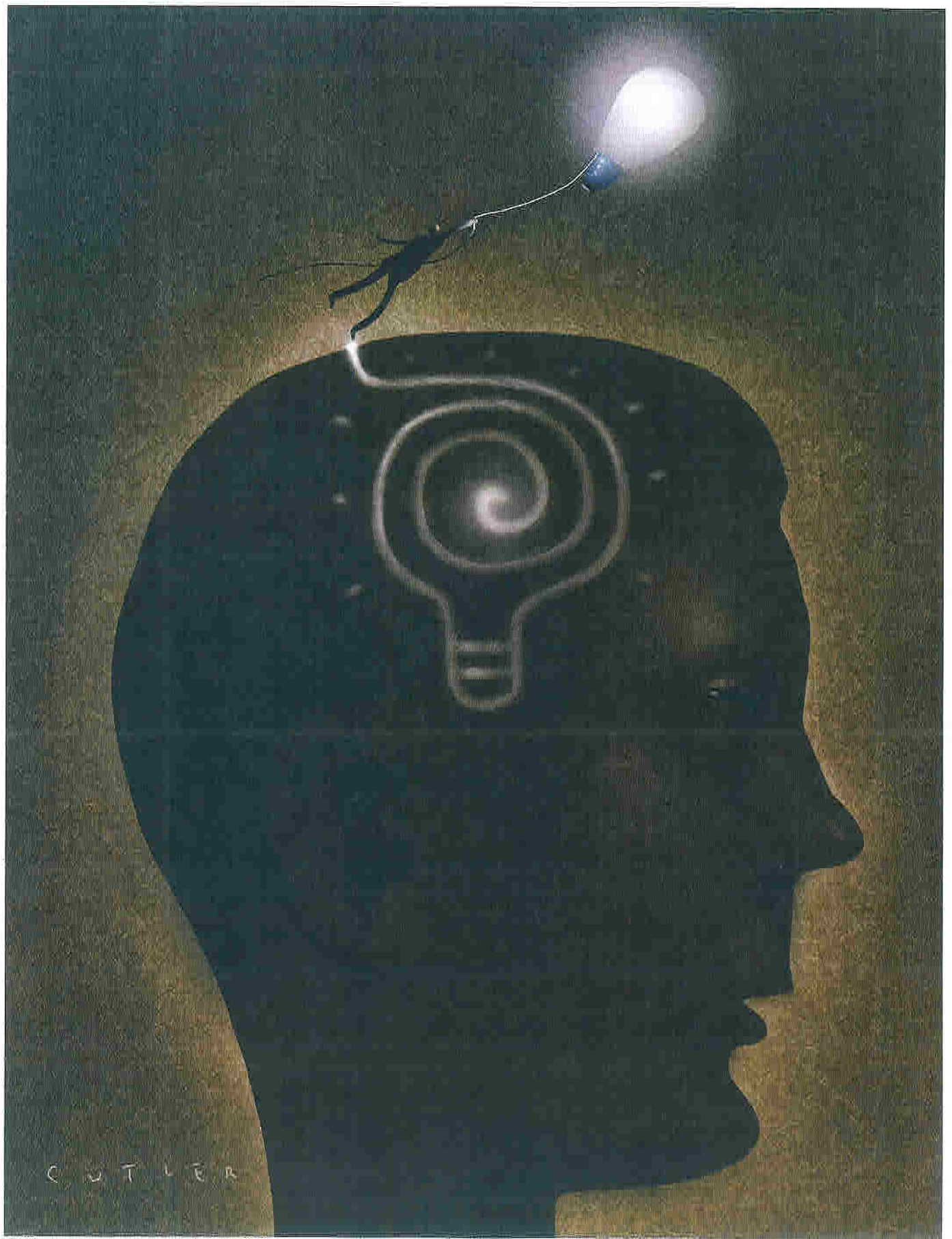
Innovation: A Leadership Essential

by Garth Saloner

By the time Jake Harriman, a U.S. Marine who had served as a special operations platoon commander in Iraq, landed at Stanford University in 2006, he had concluded that the way to fight terrorism was to fight the kind of extreme poverty he had seen in the Middle East. He wasn't sure how to tackle the problem, but two years in our MBA program gave him a good start. His degree equipped him with the financial, organizational, and managerial skills he needed to launch Nuru International, an African nonprofit that helps impoverished villages in high-risk conflict zones improve access to water, healthcare, education, agricultural solutions, and economic development. Today Harriman is completing his first project in Kenya.

At Stanford, innovative thinking is one of three critical leadership capabilities built into the curriculum.

Harriman's situation illustrates where management education needs to be today. It remains essential for students to learn how to use financial statements to uncover a company's underlying performance, identify an attractive industry structure, think holistically about the levers they can use to market a product, interpret statistical data about operations to spot production inefficiencies, and select the best options for raising capital. They also should learn many other ways to assess industries and companies, as well as ways to diagnose business problems. But, as Harriman's situation illustrates, such knowledge is not sufficient.





In Stanford's Biodesign Innovation class, students from business, engineering, and medical programs work together to create solutions to significant healthcare problems. Here, they're led by professor Stefanos Zenios (second from left).

Like Harriman, students must learn not only how to understand a problem, but also how to use new ways of thinking to generate innovative solutions.

What Is Innovative Thinking?

The “aha” moment is that elusive and invaluable instance when we suddenly see a forward path that's so logical and, in retrospect, so obvious that we wonder why it took us so long to identify it. We all have such moments. The questions are: How can we have them more frequently? How can we call them up? And how can we act on them once we experience them?

At the Stanford Graduate School of Business in California, we're teaching students how to take these “aha” moments and turn them into innovative solutions. Working with business, engineering, and other faculty who co-teach at Stanford's Hasso Plattner Institute of Design, we're developing knowledge in *design thinking*—the processes and methods that spur creativity and lead to quantum changes. Design thinking is an approach to problem solving that combines insights, ideas, and tools from the fields of engineering, design, business, the arts, and the social sciences.

Three elements underlie the design thinking process:

■ **Empathy**—Students must learn to go far beyond traditional market research to develop true empathy for the end users of products and services, striving to understand what consumers need and what they find truly meaningful. To do this, they must immerse themselves in the world of the user, watch what people do—not merely listen to what they say—and discover alternate ways of capturing information.

■ **Collaboration**—Harnessing many diverse perspectives through collaborative teamwork drives creativity. We create multidisciplinary teams and teach them the skills that will help them communicate, leverage their individual strengths and perspectives, and work toward a common goal. When

teams unlock their creative potential, they transform how their members interact and what they can achieve together.

■ **Iteration**—Design thinking turns typical business school thinking on its head. In design thinking, students don't perform deep analysis to determine the optimal solution; they engage in rapid prototyping and iteration. With this approach, they establish a user-oriented point of view, brainstorm about techniques, and distill ideas into feasible prototypes. A critical component is iterating—i.e., developing prototypes in quick succession, with each one being better than the last. We teach students methods for testing their ideas, soliciting feedback, and ridding themselves of preconceived notions or biases.

How Can Innovation Be Taught?

Design thinking cannot be taught through lectures or case studies; it must be learned by doing. Therefore, we have our students apply design thinking to distinct problems in several of our classes.

Entrepreneurial Design for Extreme Affordability—Co-taught by business professor Jim Patell and mechanical engineering professor David Beach, this intensive, hands-on, project-based, two-course sequence attracts students from departments across the university. Four-person interdisciplinary teams are formed to create comprehensive solutions for challenges faced by the world's poorest families. Midway through the course, two students from each team travel outside of the U.S. to gather information and get a firsthand look at the problem they want to address. Students have developed low-cost solar lights, human-powered irrigation pumps, corn shellers, devices that distribute vitamins through village wells and grain mills, and an asthma treatment device made from folded paper. (For details on one recent project, see “Extreme Creativity for Extreme Problems” on the following page.)

Biodesign Innovation—This course is co-taught by business professor Stefanos Zenios and medical school professors Todd Brinton and Paul Yock. Here, graduate students in business, engineering, and medicine work together to develop comprehensive solutions—typically medical devices—that address significant medical problems identified by physicians. Out of this class have come patented, commercialized technologies, such as an affordable device for home dialysis.

Designing Happiness—Taught by business professor Jennifer Aaker, this course focuses on increasing employee engagement and happiness. Relying on an iterative design thinking approach and armed with a happiness app that measures personal satisfaction, students uncover what real-

Extreme Creativity for Extreme Problems

Twenty million low-birth-weight and premature babies are born each year. Of these, 4 million die annually, and those who survive often face a lifetime of debilitating health problems. One of the biggest risks these babies face is hypothermia, because they are unable to regulate their own body temperatures, and incubators are expensive, complex to operate, difficult to maintain, and rare in the developing world.

In Stanford's Entrepreneurial Design for Extreme Affordability course, a team decided to tackle this problem by developing a product—ultimately called "Embrace"—that would increase the survival rate of low-birth-weight infants. The Embrace group started by researching user needs in Nepal. After spending several days observing the neonatal unit of the Kathmandu hospital, the students traveled to see how premature infants were cared for outside of the city. They learned that the overwhelming majority of premature Nepalese infants are born in rural areas, and most never make it to a hospital. The team realized that for an incubator to save the maximum

number of lives, it must be designed to function in a rural environment. It would have to work without electricity and be transportable, intuitive, easily sanitized, culturally appropriate, and—perhaps most essential—inexpensive.

The students returned to Stanford, where they began the process of rapid prototyping and iteration. They brainstormed ideas; used a laboratory space to develop actual prototype products; developed cost, revenue, and cash flow projections for the product; had their prototype reviewed by other teams; gained feedback from experts

and entrepreneurs who had launched ventures in the developing world; and iterated.

From this, the team developed an incubator that looks like a tiny sleeping bag. It keeps the baby's body at exactly the right temperature by employing a gel-like substance that, once melted, is able to maintain a constant temperature for hours. The Embrace incubator can be heated and sanitized in boiling water; it's small and light; and it conforms to the practice of holding a baby against a mother's skin. Most important, it costs less than \$100.



A baby incubator will help increase the survival rate of low-birth-rate infants in developing nations.

After graduating from Stanford, the Embrace team added new members and incorporated as a non-profit. The group has been conducting clinical studies in India and planned to launch the product in December 2010. In 2008, CEO Jane Chen and CTO Rahul Panicker were awarded an Echoing Green Fellowship, a prestigious award given to 20 social ventures selected from almost 1,500 applicants. They also won the BASES Social Entrepreneurship Challenge at Stanford. Since then, they have received support from the Packard, Mulago, Lemelson and Robertson Foundations, as well as from individuals around the world. Embrace has been featured in publications such as *National Geographic*, *Oprah's O Magazine*, *Time*, and *The Wall Street Journal*, as well as TED, a set of global conferences dedicated to "ideas worth spreading."

Through this course, our students not only transformed how they think, but also raised their ambitions about what is possible. By launching a product that could save thousands or even millions of lives, they will also change the world.



Students in the Entrepreneurial Design for Extreme Affordability class developed an efficient and low-cost pump to be used in poor rural areas of Myanmar.

ly makes them happy, versus what they think makes them happy. Then they come up with prototype solutions that will increase happiness.

Customer-Focused Innovation—In this executive education course for working executives, business professor Hayagreeva “Huggy” Rao and engineering professor Robert Sutton help participants understand how a deep knowledge of their customers can lead to breakthrough innovations. In one course, executives worked with Tesla Motors to create a new sales process for the company’s pioneering electric car. The class used an iterative approach and interviews with would-be car buyers to develop a thorough understanding of Tesla’s potential customers.

Why Do Leaders Need Innovative Thinking?

It’s clear that the ability to solve problems creatively and innovatively is one of the keys to success in business. But, as Jake Harriman’s story illustrates, it needs to be coupled with other skills to unleash leadership potential. Once Harriman had determined what he needed to do, he still had to *do* it, by building an organization, raising funds, developing partnerships, and continually measuring and refining his business model.

At Stanford, we work to help students develop the following key leadership capabilities:

■ **Critical analytical thinking**—In order to set direction, leaders must diagnose a problem accurately. They do this by looking objectively at problems, understanding the basic structure of arguments, and—most important—identifying assumptions, limitations, logical flaws, and the parameters

of what the evidence does and does not imply. Once they acquire this skill, graduates can analyze problems, think independently, and recognize trends and opportunities that others may not. To this end, all MBA students at Stanford take a required Critical Analytical Thinking course in the autumn quarter of their first year.

■ **Innovative thinking**—Once a problem is correctly identified, leaders must think radically and creatively about solutions. With the courses described above, such as Entrepreneurial Design for Extreme Affordability and Biodesign Innovation, we teach students to use innovative thinking to create novel solutions to old problems.

■ **Personal leadership**—After a solution is targeted, leaders must implement it, often with and through others. Students develop “followership” skills by developing a deep self-awareness of their own strengths, weaknesses, and even identities. At the same time, they examine a myriad of influence styles and learn how best to use them. This knowledge enables graduates to enhance their personal effectiveness and their ability to motivate and inspire others. All Stanford MBA students take a required Leadership Laboratories course, in which they work in small groups and are personally coached on these important skills.

It is worth noting that while these leadership capabilities must be firmly grounded in the canon of business knowledge, they extend far beyond its limits. Graduates not only must know what, they must know how. They must learn to *think* differently, so they are more analytical and innovative; to *act* differently, so they influence others more effectively; and to *dream* differently, so they set lofty and noble aspirations.

Preparing for an Innovative World

The world is changing at an astonishing and ever-increasing pace. New technologies are being rapidly developed and deployed, and information is available more readily than ever before. Entire industries and fields of study are being created just as others are growing obsolete.

We need to equip our graduates to succeed in this world. We do so in part by teaching them how to contribute to the innovation, to be part of the solution. We also do so by imparting ways of thinking, acting, and dreaming. We understand that the knowledge we give our students, no matter how well-intentioned, will eventually become dated, but the benefits they gain from personal transformation will endure. ☑

Garth Saloner is Philip H. Knight Professor and dean of the Stanford Graduate School of Business in California.

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