

# Sparks Fly

**Can imagination be taught? Evidently, because the d.school's innovation hothouse is changing the way people think.**

**By Mike Antonucci**

**Photography by William Mercer McLeod**



**IT'S A BLUR:** Students from all seven schools converge at the Hasso Plattner Institute of Design for what founder David Kelley calls "radical collaborations."

A first-year graduate student in the management science and engineering program, Asha Gupta had barely started Design Garage, a course aptly characterized as an "imagination dunk tank"—and she was getting soaked. Gupta and her classmates were challenged to develop a prototype that would improve the gift-giving experience. They had 54 minutes.

The students—an eclectic group with a budding musicologist, a neuroscientist, a journalist and two future lawyers—paired off to interview each other about anything that made them unhappy when giving gifts. Before long they were whirling in a melee of

ideas summoned on the spot. Why not a button that glows whenever the recipient uses the gift?

"Ah, so the gift involves magic!" deadpanned instructor Perry Klebahn.

In nine rapid-fire stages, the students lobbed questions, exchanged answers, sketched out multiple solutions and then frenetically hacked together crude 3D mockups from materials seemingly stolen from a kindergarten playroom: pipe cleaners, yarn, spaghetti, glue, aluminum foil, construction paper.

Plunged into this and similar exercises, "you kind of feel like you should be intimidated . . . that it's going to be hard," Gupta says. "But then, you're just forced to do them, and do them in very short time frames—two minutes to 20 minutes. And I'm just shocked by the quality of the results that are produced."

Such exuberant activity is the essence of the d.school, or, formally, the Hasso Plattner Institute of Design at Stanford. Housed in a renovated building not far from the Main Quad, it's an offshoot of the Engineering School. Though just 6 years old, it already has a mystique as a teaching center others want to imitate. Graduate students from every division of the University, plus the occasional undergrad infiltrator, compete fiercely to get into the courses. Multidisciplinary pools of teachers then immerse them in a system of innovative thinking, with specific goals for solving practical problems. Bundled into project teams that blur all the traditional academic lines, the students who converge here focus first on reinventing themselves, then maybe the world.



**TEAM TEACHING:** Students join Kelley and Klebahn in a Design Garage studio.

The d.school's defining mission is to foment personal transformation. Founder David Kelley, a guru of ingenuity and intuition, loves any scenario in which students are collaborating, the more radically the better, and prototyping their imagined solutions using everything from mallets and pliers to cameras and laptops. It all falls under the rubric of "design thinking." Students who absorb that method, says Kelley with a gregarious twinkle, can apply it to nearly any part of their lives, from finding a suitable spouse to throwing a killer dinner party.

"I think everybody's creative," says Kelley, who has taught in Stanford's venerable product design program since 1975. "I just always felt like they had blocks, that they

weren't being allowed to be creative. So it became more and more clear to me that this was something that was pent up inside of people."

The d.school is his ultimate solution to that problem. Despite the institute's relatively short history, its tangible achievements—inexpensive, solar-powered lamps for the rural poor in the developing world, for example—are impressive. But Kelley prefers to emphasize the process rather than the products. What really matters, he says, is the creative confidence students acquire as they connect with their inner inventor.

During decades of work inside and outside of Stanford, Kelley honed an array of techniques for spurring innovation. What often sounded fuzzy to others—a process for unlocking dormant creativity—was coalescing in Kelley's mind like a coach's playbook. "I started to see," Kelley recalls, "that we could teach this as a methodology that everyone else could pick up on."



**ALL TOGETHER:** Students brainstorm solutions in a rapid prototyping exercise.

The fundamental nature of an assignment has been overhauled: Rather than asking a class to grapple with somebody else's idea of a problem that needs solving, the d.school approach is to designate squads of students as investigators of social or institutional conditions that pose challenges for human beings. A recent example: studying the everyday struggles of parents with young children, from installing car seats to negotiating day-care drop-off to preparing dinner. Through direct observation and interviews, student teams seek to identify what needs fixing and how to go about it.

"We want to try to develop empathy for people, see what they value as humans and try to use that to come up with big ideas, so we call our method human-centered design," Kelley explains. "There's a creative act in trying to decide what problem is worth working on in the first place."

Armed with that understanding and a definition of the problem, students then engage in ideation, a robust exercise in imagining possibilities, similar to the gift-giving crucible of Gupta and her classmates. Finally, they select a potential solution, develop a prototype and test it. Then it may be time to redo the entire cycle. And then redo it again, perhaps rearranging the sequence of steps as they go, or ping-ponging back and forth between them. The outcome might be a physical product, a virtual product, a service or a reinvented activity.

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Not every course is as consuming as the two-quarter Design Garage, but all hew to the d.school's jump-in-and-swim style of learning. They immerse students in a constant churning of rethinking, repurposing and recommitting, even when they've been battered by a series of early failures. The courses can spring from the institute's acuity about contemporary business and social issues or input from any slice of the University. They can be about fostering democracy (Designing Liberation Technologies); aiding individuals with threatening medical profiles (d.health: You've Been Warned); or paving the way for the next great startups (LaunchPad: Design and Launch Your Product or Service). Many times, the environment percolates with all the different perspectives drawn from the students' core disciplines. Many times, just inhabiting the institute's vibe can be keenly invigorating.

Indeed, much of the attention garnered by the d.school has focused on its physical environment, the most striking manifestation of the institute's founding money, a \$35 million gift from German software magnate Hasso Plattner. After bouncing among some temporary homes, including a dilapidated doublewide trailer, the school settled into the Peterson Building, a 1900-era structure on the hill behind the Geology Corner.

The restored sandstone exterior gives no hint of the dramatic interior renovations. Classes meet in rooms configured to avoid a sense of hierarchy. (A professor doesn't stand front-and-center, commanding rows of eyes from floor-bolted seats.) Spaces can be rearranged endlessly with sliding partitions or furniture on wheels. The second-floor Bay Studio is full of rolling stools and pushed-together tables, manipulated in whatever way come-and-go batches of students need, and is accessible 24-7. Students from one project may slap a drive-by Post-it suggestion on another group's whiteboard notes. One nearby prototyping room has six Macs; an adjoining area features two walls of wrenches, drills and other hand tools.

Exactly how these quirky nooks and diverse materials are used is up to the students who need to demonstrate ideas to one another. "Build to think," Kelley exhorts. If someone's creative energy gets drained, there's a shoes-off white room to retreat to, where scrawling on the floor and walls may stir a breakthrough.



**D.SCHOOL 2.0: Kembel and Greenberg will carry the torch forward.**

Ask about the impact of all this, and the answers compose a litany of successes, "millions of lives" affected by the collective efforts of student teams, especially in the developing world. Entrepreneurial Design for Extreme Affordability, a course closely identified with business professor Jim Patell, has made a profound international impact. In 2006, for example, a team went from project inception to product sales in 19 months while redesigning a water pump that has sharply improved the ability of farmers in Myanmar to irrigate their land. Perhaps the most celebrated innovation to come out of the class: the Embrace low-cost baby incubator, a pouch-like warmer that potentially can reduce the large number of hypothermia-related infant deaths around the world.

Word is out. The d.school averages about five inquiries every week from parties interested in creating similar educational programs. Its staff have helped construct curricula, demonstrate classes or offer workshops in more than 30 countries, including China, Kenya, the Netherlands, Singapore and Taiwan.

The d.school offers no degree. Rather than a credential, students are imbued with a mindset and a problem-solving approach that augments the knowledge and skills they acquire in their degree programs at Stanford's seven schools. There are, however, master's degrees offered to students in the mechanical engineering department's design program, which dates to 1958. That program operates in conjunction with the art department and dedicates itself to innovative and/or socially beneficial products. It's also the program where Kelley, MS '78, was a graduate student and teaching assistant before becoming a professor, as well as where he hit on the concept of the d.school.

The d.school further benefits from an extraordinary network extending from IDEO, the design firm Kelley founded in 1991 and whose reputation for creative flair has made it a household name in the international business world. Its clients have included Microsoft,

PepsiCo, Procter & Gamble and Eli Lilly. When Plattner, the co-founder of the SAP AG software corporation, sought out IDEO because of his similar interests in innovation, Kelley found an eager benefactor for the d.school concept he then convinced the University to launch.

As pivotal as Plattner's funding was, the d.school couldn't have been established without extensive administrative backing. Engineering Dean James Plummer, MS '67, PhD '71, and his school provided the organizational and planning support that enabled everything from cross-departmental interactions to moving into the Peterson building. (For more on Plummer's view about broadening technical education, particularly through an interdisciplinary mindset, see "[Breaking with Tradition](#)," Farm Report, July/August 2010).

As the d.school grows—and keeps reflecting on itself—Kelley is intent on maintaining a fresh outlook with the help of two younger staffers. Executive director George Kembel, '94, MS '97, instrumental in helping Kelley launch the institute, is charged with preserving the culture of ceaseless innovation. Managing director Sarah Stein Greenberg, MBA '06, is a former d.school student and fellow, with experience that includes the Myanmar water-pump project. "Her vision will take us forward," Kelley says. "I'd rather have her vision than mine. She represents d.school 2.0."

There's interest, too, in deploying the d.school's teaching model across the University. "Creativity represents an important characteristic that we would seek to inculcate in our students, and obviously one that's harder to put a firm framework around," President John Hennessy says. "It's unlike teaching some analytical method. Will a bridge stay up? Well, we know what to teach. You teach physics, you teach some mathematics and you can do the analysis.

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"It's much harder to teach creativity. [It involves] multiple routes, multiple approaches and, obviously, it's virtually impossible to test whether or not you've succeeded. The measure of success is likely to come long after, not unlike many of the other things we try to teach: To prepare students to be educated citizens, to prepare them for dealing with people from diverse and different walks of life. Those are things that play out over a long time, whether or not we've done a good job."

Students are attuned to the track record Kelley established outside Stanford. Understanding that the d.school has the same intellectual roots as IDEO is a bit like being tipped off to a lucky blackjack table. And that can't-lose feeling becomes more pronounced when students realize the depth of the d.school's teaching talent.

Consider the Design Garage teaching team: Kelley, Bill Burnett and Perry Klebahn. Burnett, '79, MS '82, is a graduate of the design program, its executive director and someone whose résumé includes working on Apple computers and *Star Wars* action

figures. Klebahn, MS '91, designed a high performance snowshoe, built and sold a company (Atlas Snow-Shoe) and later served for a time as CEO of Timbuk2 Designs, a manufacturer of messenger bags.

Asha Gupta first saw them when Design Garage projects were showcased for prospective participants late last year. She succeeded in joining the Move Together project, which hopes to spur increased carpooling among young professionals. Adventurous immersion exercises like the gift-giving critique set the tone, and after repeating the rapid prototyping sequence multiple times—one involved exploring ways to improve pedestrian and bike safety on campus—Gupta began to see the process blossom. "Basically, the results are extremely innovative solutions for something, and in some cases they approach a finished product that you could almost implement."



**IMAGINATION WORKSHOP:** Rooms are equipped with wheeled furniture, movable walls and materials ranging from power tools to pipe cleaners.

The core of what the students learned—interviewing, observing, suggesting, tinkering, reviewing and then perhaps completely restarting two, three or four times—guides the process of attempting to fully realize the Design Garage projects. They include Project Goldfinger, which aims to remedy male mid-life crisis; Culture Kitchen, an effort to help recent immigrant women by monetizing their diverse cooking knowledge; and Project Amplify, about crowd-sourced micro-investments in emerging musical artists.

But whatever happens to the projects, the exposure to this kind of thinking-and-doing savvy can be life altering. When students are dunked in the design experience, says



Burnett, "some of them say, 'I'm not going to go back to business school, I'm not going back to law school.' "

Alums of the d.school's still nascent influence talk passionately about the lasting changes they sense in themselves. Jacob Klein, '01, MA '10, is the co-founder of Motion Math, an educational game company. Its first game, an iPod-iPhone-iPad product also called Motion Math, originated as a project at the School of Education. Bolstering that work, says Klein, was his exposure to the d.school. He took two courses, including d.media: Designing Media that Matters, which "radically changed my expectations for how much innovation you can accomplish."

Ankit Gupta (no relation to Asha), MS '10, recalls how "I really wanted to forget about my computer science degree and just take d.school classes." He took three, and one, the LaunchPad course specifically geared to starting a business, was enough to rocket Gupta and a partner to national notice after they created a mobile app, Pulse, that allows users to aggregate news from their choice of publications and blogs. The company formed by Gupta and his co-inventor, Akshay Kothari, MS '10, announced late last year that it has raised \$800,000 in venture capital.

Gupta says the d.school gave him an appreciation "for small things that you do that make a huge difference in the end." But even more fundamentally, he found a specific new confidence—a comfort level when speaking publicly to large audiences—that has been valuable in all his interactions.

Kelley has seen many similar transformations, some emotionally intense. "We have these people who just start crying [when describing] how 'I used to be the kind of person who didn't have that much fun' or 'I used to be the kind of person who was purely analytical.'

"They've flipped," Kelley says, "to some place [where] they just feel different about themselves."