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SUSAN HOCKFIELD

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Numbers that can change the world

By Susan Hockfield | April 14, 2008

IN THE NEW movie "21," a fictionalized version of how several former MIT students used mathematical skill to win big at blackjack, being "pretty good with numbers" looks like a quick way to get rich in Las Vegas. Real life at MIT may seem less glamorous, but it's actually more exciting, because our students and faculty are using their gift for numbers and analysis to change the world.

Take, for example, the problem of global poverty. Over five decades, the world has spent upwards of \$2 trillion on development aid, without many lasting results. One reason is that, to a striking degree, aid funds are spent without understanding which interventions really work. It's as if a new drug could enter the market simply because some patients who take it get better. We've long understood that without a control group for comparison, there's no way to tell whether symptoms improve because of the drug or for some unrelated reason.

Today, 2.6 billion people struggle to survive on less than \$2 a day. Given the magnitude of the problem, it's imperative to identify which antipoverty efforts work best. That is exactly the aim of MIT's Abdul Latif Jameel Poverty Action Lab, headed by MIT economists Abhijit Banerjee and Esther Duflo, and including a growing network of researchers at institutions around the world. The Jameel Poverty Action Lab is leading a quiet revolution. The idea is simple: to identify the most effective ways to alleviate poverty by applying the same kind of rigorous, scientific, randomized trials routinely used to test new drugs.

For instance, if you wanted to prevent the spread of HIV to a new generation in rural Kenya, but had limited funds, would you teach schoolgirls about HIV? Or would you help girls stay in school by covering costs like required uniforms? Or inform girls that in Kenya, older men (particularly those 20 to 45) are more likely than younger men to carry HIV? Researchers at the Jameel Poverty Action Lab test the value of interventions like these by comparing a group that participates in a program with a similar group that does not. By evaluating the outcomes, they measure how well an intervention works. By comparing results from different interventions, they can determine cost-effectiveness, too.

Sometimes they reach surprising conclusions. In Kenya, Duflo, with colleagues Pascaline Dupas and Michael Kremer, found that keeping girls in school was more effective in reducing girls' risky behavior than teaching the standard HIV curriculum. Moreover, alerting girls to the higher HIV rate among older men dropped the rate of teen births with these older fathers by a stunning 65 percent. By reducing the spread of HIV to a new generation, these findings could help change the course of the epidemic.

The Jameel Poverty Action Lab is only one of many projects at MIT focused on fighting the ravages of poverty. Amy Smith, for instance, works with MIT students to engineer low-tech solutions to the day-to-day challenges of people in the developing world, from a low-cost grain mill that grinds flour 10 times faster than traditional methods, to an incubator for lab samples that requires no electricity, allowing doctors to diagnose tuberculosis in remote areas. This week, our students, through their own "Global Poverty Initiative," will host a conference that will bring to campus 1,000 young people dedicated to tackling poverty.

Yet perhaps the most powerful tool to offer people in the developing world is knowledge and analytical skills they can use to help themselves. Today, MIT's OpenCourseWare makes materials for virtually all of the institute's 1,800 courses available online, to anyone on earth, free (ocw.mit.edu). For many courses, translations are available in Chinese, Spanish, and Portuguese, with Arabic, Farsi, and Turkish versions on the way.

Since MIT launched OpenCourseWare in 2001, more than 40 million people around the world have used the site. We regularly receive e-mails from teachers, students, and self-learners, explaining how MIT

OpenCourseWare has improved their teaching or changed their lives. One woman from Latin America wrote a note of thanks, because, as she put it, OpenCourseWare opens "a window of knowledge for so many who are limited by economic or other reasons. It's truly a way to spread freedom to humankind." We hope she's right.

Susan Hockfield, a guest columnist, is president of MIT. ■

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