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Fix the knowledge: Gendered Innovations offers framework to evolve human knowledge

(STANFORD, Calif.) We've all heard that empowering women is the engine required to move our economies forward. But, what if that's not where it ends? New research finds that the benefits of women's participation and gender analysis extend far beyond the labor market, and can actually offer a major source of research, design and technological advancement.

Stanford University history of science professor Londa Schiebinger has coined this new framework--Gendered Innovations. Her approach develops methods of sex and gender analysis for research in science, health and medicine and technology. The idea is gaining steam. Major international organizations are watching closely and in some cases adopting Gendered Innovations as a tool to shape policy.

Take the United Nations: after Gendered Innovations was presented during a UN meeting on Gender, Science and Technology in late 2010, only months later a UN resolution called for, "gender-based analysis ... in science and technology," and for the integrations of a, "gender perspective in science and technology curricula."

In particular, the UN group's goal was to address women's decision-making power in science and technology. With Schiebinger's work in Gendered Innovations serving as a framework, experts from a dozen countries advised the UN on approaches to implement policy for achieving gender equality in science and technology.

Early this year, the European Union partnered with Schiebinger. The EU's move indicated that scientific funding agencies desire gender analysis to match the global reach of science and engineering but that these tools don't yet exist.

Gendered Innovations seems to have struck the right cord. Until now, other attempts have focused on increasing the number of women and transforming institutions for gender sensitivity. Gendered Innovations takes things a step further. Rather than focusing on the bias, Schiebinger considered a more productive strategy. To enhance scientific excellence, she's working to mainstream gender analysis into the far reaches of science and technology.

While taking into account the continuing need to fix the numbers and change the institutions, Gendered Innovations shifts the focus to use gender as a framework to create new knowledge and stimulate gender-responsible science and technology.

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Nationally, women hold more than half of all professional occupations in the U.S., but less than 24 percent of all computing-related occupations. Women's participation in technology doesn't seem to be increasing: in 2008, women earned merely 18 percent of all computer science degrees, while back in 1985, women earned nearly double that many.

Faced with such dismal statistics, Schiebinger realized that more was needed than simply recruiting more women into science and engineering—she needed a closer look at what those fields were trying to achieve and how they were going about it. Gendered Innovations look at the questions scientists ask, the things engineers design and the methods they use. The project hatched at the Clayman Institute for Gender Research at Stanford University, a unique platform for collaborative work across the disciplines.

Stanford and the EU will launch an online interactive website for Gendered Innovations on November 1. The site offers case studies highlighting innovations; step-by-step methods to conduct sex and gender analysis; policy recommendations; and solutions for transforming institutions.

To highlight concrete ways gender analysis produces Gendered Innovations, Schiebinger has built expert teams to bring together thought leaders and ensure cutting edge science and technology. The teams are comprised of professors from institutions including Stanford University, Harvard University, University of California at Berkeley, Carnegie Mellon University, Mayo Clinic, Max Planck Institutes, Technical University, Berlin, and Ministry of Research, Spain.

Schiebinger's case study of pregnant crash test dummies is perhaps the clearest example of the paradigm shift that occurs with Gendered Innovations. In the study, she found crash test dummies were first developed to model America's average male, meaning other swaths of the population were left out of the design's discovery phase. Inattention to humans of different sizes and shapes led her to realize conventional seat belts do not fit pregnant women properly. In fact, car crashes are the main cause of fetal death related to maternal trauma.

From the start, Schiebinger claims devices should be designed for the safety of men and women of all ages and sizes. In this sense, applying Gendered Innovations leads to greater creativity in science and technology and the development of pregnant crash dummies and computer simulations.

Gendered Innovations doesn't just benefit women. In a case study that looks at osteoporosis research, Schiebinger saw that men account for nearly a third of osteoporosis-related hip fractures in the U.S. and Europe, yet the disease is thought to plague primarily postmenopausal women.

Look at the problem through a framework of Gendered Innovations and it becomes clear that osteoporosis diagnostic models are generally developed for women, using bone mineral

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density norms of healthy young, white women. Criteria to identify risk in men are not well established. Researchers are improving these reference models and opening new areas of research by considering disease progression in both women and men, and by evaluating risk using sex-specific reference models.

To that end, Schiebinger is collaborating with the UN and the EU to develop internationally agreed upon framework for gender and sex analysis. As seen in various case studies, by training current and future generations in Gender Innovations, Schiebinger sees tremendous potential for untapped innovation.

Visit genderedinnovations.stanford.edu.

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The Clayman Institute on Gender Research at Stanford University was founded in 1974 and is one of the nation's most distinguished research organizations devoted to the study of gender. The Clayman Institute creates knowledge and seeks to implement change that promotes gender equality at Stanford, nationally and internationally.

Londa Schiebinger is the John L. Hinds Professor of History of Science in the History Department at Stanford University and Director of the EU/US Gendered Innovations in Science, Medicine, and Engineering Project. From 2004 to 2010, Schiebinger served as the Director of Stanford's Clayman Institute for Gender Research. Over the past twenty years, Schiebinger's work has been devoted to teasing apart three analytically distinct but interlocking pieces of the gender and science puzzle: the history of women's participation in science; the structure of scientific institutions; and the gendering of human knowledge.