Move over Galileo, it's Science 2.0

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In a provocative article in this week's Science Magazine, the University of Maryland's Ben Shneiderman, one of the world's leading researchers and innovators in human-computer interaction, says it's time for the laboratory research that has defined science for the last 400 years to make room for a revolutionary new method of scientific discovery.

He calls it Science 2.0., and it combines the hypothesis based inquiry of laboratory science with the methods of social science research to understand and improve the use of new human networks made possible by today's digital connectivity. Through Science 2.0, the societal potential of such networks can be realized for applications ranging from homeland security to medical care to the environment.

Recently honored by the International Journal of Human-Computer Interaction for his leadership in bringing scientific methods to the study of human use of computers, Shneiderman points to the effect that the World Wide Web and cell phones have had on building human collaborations and influencing society.

"eBay, Amazon, Netflix have already reshaped consumer markets. Web-based political participation and citizen journalism are beginning to change civil society. Online patient-centered medical information has improved health care. MySpace and Facebook encourage casual social networks, but they may soon play more serious roles in emergency disaster response, for instance.

"It's time for researchers in science to take network collaboration like

this to the next phase and reap the potential intellectual and societal payoffs. We need to understand the principles that are at work in these systems," said Shneiderman.

Francis Bacon vs. Science 2.0

Four hundred years ago, Francis Bacon promoted the research strategy that has ruled scientific quests ever since, what Shneiderman calls Science 1.0. As Shneiderman describes it, Science 1.0 is "reductionist thinking closely linked to controlled experiments," a method that, while successful in explaining natural phenomena "sometimes diverges from solving practical problems and only occasionally advancing broader goals."

"Science 2.0 is about studying design of rapidly changing socio-technical systems. These studies are not replicable in a lab," said Shneiderman. "You have to study social interactions in the real world. Traditional social scientists have tried to understand these systems by data collection, but more effective Science 2.0 research involves design interventions to rapidly improve e-commerce, online communities, healthcare delivery, and disaster response.

"Science 1.0 remains vital, but this ambitious vision of Science 2.0 will require a shift in priorities to combine computer science with social science sensitivity. It will affect research funding, educational practices and evaluation of research outcomes," Shneiderman says.

911.gov

Shneiderman and a number of colleagues at the University of Maryland are already on the frontier of applying Science 2.0 methods to the computer-based human networks that Shneiderman calls socio-technical

systems.

Disaster and emergency response – Shneiderman, Jennifer Preece and several other colleagues are developing 911.gov Community Response Grid, an emergency response system that would rely on the Internet and mobile communication devices to allow citizens to receive and submit information about significant homeland security community problems. More at www.cs.umd.edu/hcil/911gov/ .

Why do we trust MySpace? - Jennifer Golbeck is using Science 2.0 methods to understand how people come to trust technical communication networks, something that can't be studied in a laboratory, Shneiderman says. Her results can be applied to many applications of social networking including medical care, voting and homeland security.

Why We Respond - Philip Wu looks at motivation for participating in community response through information and communication technologies, and studying average citizens' information needs and behavior when they prepare for, respond to, and recover from large-scale emergencies and disasters.

Science 2.0, How-to - Shneiderman and Catherine Plaisant have developed strategies for creating socio-technical systems case studies, published in May, 2006.

University of Maryland Human Computer Interaction Laboratory – Founded by Shneiderman, the HCIL is on the forefront of studying how humans and technology interact and transforming the experience people have with new technologies. The International Children's Digital Library, comprising thousands of books, representing dozens of cultures and more than 30 languages. More on HCIL - www.cs.umd.edu/hcil/about/

University of Maryland Institute for Advanced Computer Studies (UMIACS) – an interdisciplinary center with faculty from Computer Science, Electrical and Computer Engineering, Linguistics, Geography, Philosophy, Business, Education, and College of Information Studies that collaborate to enhance interdisciplinary research and education in computing. More at www.umiacs.umd.edu/about.htm

Shneiderman is also a member of the National Academies Committee on Technical and Privacy Dimensions of Information for Terrorism Prevention and Other National Goals.

Source: University of Maryland

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