Keynote Speech

Professor Ben Shneiderman
University of Maryland
Department of Computer Science
The Next 25 Years of HCI Research: Technology-Mediated Social Participation

Ben Shneiderman  ben@cs.umd.edu
Twitter: @benbendc

Founding Director (1983-2000), Human-Computer Interaction Lab
Professor, Department of Computer Science
Member, Institute for Advanced Computer Studies
Interdisciplinary research community
- Computer Science & Info Studies
- Psych, Socio, Poli Sci & MITH

(www.cs.umd.edu/hcil)
Design Issues

• Input devices & strategies
  • Keyboards, pointing devices, voice
  • Direct manipulation
  • Menus, forms, commands

• Output devices & formats
  • Screens, windows, color, sound
  • Text, tables, graphics
  • Instructions, messages, help

• Collaboration & Social Media

• Help, tutorials, training

• Search

• Visualization
HCI Pride: Serving 5B Users

Mobile, desktop, web, cloud

→ **Diverse users**: novice/expert, young/old, literate/illiterate, abled/disabled, cultural, ethnic & linguistic diversity, gender, personality, skills, motivation, ...

→ **Diverse applications**: E-commerce, law, health/wellness, education, creative arts, community relationships, politics, IT4ID, policy negotiation, mediation, peace studies, ...

→ **Diverse interfaces**: Ubiquitous, pervasive, embedded, tangible, invisible, multimodal, immersive/augmented/virtual, ambient, social, affective, empathic, persuasive, ...
HCI Futures

Micro-HCI → Computing, Psychology & Ergonomics

- Single user interfaces, technology-centered, narrow guidelines
- Short-term controlled studies & usability tests: speed & errors
- Clear requirements, benchmark tasks, self-efficacy, human performance measures, predictive models
HCI Futures

**Micro-HCI → Computing, Psychology & Ergonomics**

- Single user interfaces, technology-centered, narrow guidelines
- Short-term controlled studies & usability tests: speed & errors
- Clear requirements, benchmark tasks, self-efficacy, human performance measures, predictive models

**Macro-HCI → Business, Sociology & New Media**

- Social participation, motivation, trust, empathy, responsibility, privacy, collaboration, affective experience, morals, ethics
- Open tasks, long duration, novel user goals, community efficacy
- Voluminous logging data, case studies, ethnography
- New measures: giga-hellos, tera-contribs, peta-thankyous
Goal

Apply social media to transform society

- Reduce medical errors, obesity & smoking
- Promote energy & water conservation
- Prevent disasters & terrorism
- Increase community safety
- Improve education
- Facilitate good government
- Resolve conflicts
Social media
From Wikipedia, the free encyclopedia

Communication
- Blogs: Blogger, LiveJournal, Open Diary, TypePad, WordPress, Vox, ExpressionEngine, Xanga
- Microblogging / Presence applications: Twitter, Plurk, Tumblr, Jaiku, fmylife
- Social networking: Bebo, Facebook, LinkedIn, MySpace, Orkut, Skyrock, Hi5, Ning, Elgg
- Social network aggregation: NutshellMail, FriendFeed
- Events: Upcoming, Eventful, Meetup.com

Collaboration
- Wikis: Wikipedia, PEwiki, wetpaint
- Social bookmarking (or social tagging): Delicious, StumbleUpon, Google Reader, CiteULike
- Social news: Digg, Mixx, Reddit, NowPublic
- Opinion sites: epinions.com, Yelp

Multimedia
- Photo sharing: Flickr, Zoomrr, Photobucket, SmugMug, Picasa
- Video sharing: YouTube, Vimeo, sevenload
- Livecasting: Ustream.tv, Justin.tv, Stickam
- Audio and Music Sharing: imeem, The Hype Machine, Last.fm, ccMixter

Reviews and Opinions
- Product Reviews: epinions.com, MouthShut.com
- Business Reviews: customerlobby.com, yelp.com
- Community Q&A: Yahoo! Answers, WikiAnswers, Askville, Google Answers

Entertainment
- Media & Entertainment Platforms: Cisco Eos
- Virtual worlds: Second Life, The Sims Online, Forterra
- Game sharing: Mniclip, Kongregate

Other
- Information aggregators: Netvibes, Twine (website)
- Platform providers: Huzu &
Challenges

- Malicious attacks
- Privacy violations
- Not trusted
- Fails to be universal
- Unreliable when needed

- Misuse by
  - Terrorists & criminals
  - Promoters of racial hatred
  - Political oppressors
A National Initiative for Social Participation

The transformative power of the Internet is more accessible than ever. It is increasingly about contributing, collaborating, and participating. Metaphors based on information highways are giving way to community visions that capture the remarkable enthusiasm for user-generated content and social media. At the same time, President Obama is calling for civic service and personal responsibility to rebuild America. These ideas could promote the shift from playful, discretionary Internet usage to larger, more serious projects aligned with national priorities such as health care, community safety, education, and innovation.

The good news is that there are many promising social action networks, but these recent explorations could be greatly accelerated by an organized research program. The program would systematically study the emerging phenomena, determine the sources of success or failure, and disseminate best practices. The payoffs are large enough to warrant an intense national effort akin to NASA's space program or the National Institutes of Health.

Health care groups have already been part of the Internet's success stories. Now, clever entrepreneurs are exploring new social participation ideas with projects such as www.PatientsLikeMe.com Web site, which captures user's medical experiences. As more people join, the hope of learning about treatment outcomes will grow.

Innovation itself is getting unburdened by going social. Open-source software projects are now taken seriously by big companies who claim greater reliability for programs that have been tested and reviewed by many eyes. Open innovation is gaining similar credibility as corporate research directions who post their problems on www.innoventive.com get hundreds of serious solutions from diverse contributors.

http://iparticipate.wikispaces.com
# Technology Mediated Social Participation

U.S. National Science Foundation sponsored workshops

<table>
<thead>
<tr>
<th>conferences and publications</th>
<th>About TMSP</th>
<th>Advisory Committee</th>
<th>West Coast Workshop</th>
<th>East Coast Workshop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Books</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Courses</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research Groups</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>International Efforts</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bibliographic resources</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TMSP Google Group</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

All around us, technology-mediated social participation has been harnessed for remarkable social benefits. New thrusts in basic research and engineering are likely to move beyond existing socio-technical media to produce new participatory systems spanning people, computation, communication and action. These developments could produce profound transformations in health care, community safety, disaster response, life-long learning, business innovation, energy sustainability, environmental protection, and other spheres of important national priorities.

**Workshop Information**

The west-coast workshop will be held on December 10-11, 2009, at the Palo Alto Research Center (PARC), Palo Alto, California.
Cyberinfrastructure for Social Action on National Priorities

- Scientific Foundations
- Advancing Design of Social Participation Systems
- Visions of What is Possible With Sharable Socio--technical Infrastructure
- Participating in Health 2.0
- Educational Priorities for Technology Mediated Social Participation
- Engaging the Public in Open Government: Social Media Technology and Policy for Government Transparency
International Efforts

Community Informatics Research Network

Page stewards: Aldo de Moor, Larry Stillman

About the CIRN Living Knowledge Base
UN Millennium Development Goals

The eight Millennium Development Goals (MDGs) – which range from halving extreme poverty to halting the spread of HIV/AIDS and providing universal primary education, all by the target date of 2015 – form a blueprint agreed to by all the world’s countries and all the world’s leading development institutions. They have galvanized unprecedented efforts to meet the needs of the world’s poorest.

"We will have time to reach the Millennium Development Goals – worldwide and in most, or even all, individual countries – but only if we break with business as usual. We cannot win overnight. Success will require sustained action across the entire decade between now and the deadline. It takes time to train the teachers, nurses and engineers; to build the roads, schools and hospitals; to grow the small and large businesses able to create the jobs and income needed. So we must start now. And we must more than double global development assistance by 2015."
Vision: Social Participation

1) Focus on National Priorities & Impact
   • Disaster response, community safety
   • Health, energy, education, e-government
   • Environmental awareness, biodiversity

2) Develop Theories of Social Participation
   • How do social media networks evolve?
   • How can participation be increased?

3) Provide Technology Infrastructure
   • Scalable, reliable, universal, manageable
   • Protect privacy, stop attacks, resolve conflicts
Vision: Social Participation

1) Focus on National Priorities & Impact
   • Disaster response, community safety
   • Health, energy, education, e-government
   • Environmental awareness, biodiversity

2) Develop Theories of Social Participation
   • How do social media networks evolve?
   • How can participation be increased?

3) Provide Technology Infrastructure
   • Scalable, reliable, universal, manageable
   • Protect privacy, stop attacks, resolve conflicts
911.gov: Internet & mobile devices

- Residents report information
- Professionals disseminate instructions
- Resident-to-Resident assistance

Professionals in control while working with empowered residents


www.cs.umd.edu/hcil/911gov
Reporting: Earthquakes & Storms

Earthquake Hazards Program

Did You Feel It?

Community Internet Intensity Maps

To view a map or report a felt earthquake, select your region from the map or the list below the map.

USA
World
EQ Notification Service
Feeds & Data Animations

Recently
Earthquakes Last 9-30 Days

Historic Earthquakes
"Top 10" Lists & Maps
Significant EQs
Earthquake Search
EQ Summary Posters
Scientific Data
About EQ Maps
Did You Feel It?
Earthquake Tectonics
Media Info
PAGER
Seismogram Displays
ShakeMaps

earthquake.usgs.gov/eqcenter/dyfi

weather.kimt.com
Reporting: Local incidents

watchjeffersoncounty.net ➔ nationofneighbors.net
Disaster Response: Wildfires

Yahoo! News California Wildfires

From ma4jah
From cpm73
From cpm73
From cpm73
From cpm73
From cpm73
From cpm73

From biorniken
From cpm73
From cpm73
From cpm73
From cpm73

Twitter

#sandiegofire Harris fire now 50 percent contained 08:21 AM October 27, 2007 from web
#sandiegofire Witch Creek fire now 60 percent contained 08:21 AM October 27, 2007 from web
#sandiegofire Rice Canyon fire now 80 percent contained 08:21 AM October 27, 2007 from web
@pinguino that's really cool. Thanks! 09:20 AM October 27, 2007 from web
#sandiegofire All Del Dios residents may return to their homes, county officials say
Community Safety: Abducted Children

www.ncmec.org
www.missingkids.com

www.amberalert.gov
Health & Healthcare

Find Patients Just Like You
Do you have a life-changing condition? Learn from the real-world experiences of other patients like you.

Join Now! (It's free!)

Google health beta
Take charge of your health information
It's safe, secure and free

- Organize your health information all in one place
- Gather your medical records from doctors, hospitals, and pharmacies
- Share your information securely with a family member, doctors or caregivers

Microsoft HealthVault
Welcome to Microsoft HealthVault
Take charge of your family’s health and make more informed health decisions for yourself and your loved ones. Learn more

HealthVault lets you...
- Organize your health information, with everything in one place
- Simplify your life: enter health info once, use it in many ways
- Gain insight with data that helps you make informed decisions

Create a free HealthVault account
Doctor-to-Doctor Networks

Sermo is where physicians collaborate on challenging cases, share clinical insights and improve patient care in real-time. To date, they've generated over 30,000 discussions and sparked over 3,000,000 comments. Add your voice to the conversation.

Register now to join the doc2doc community.

Welcome to doc2doc
Connecting doctors worldwide - doc2doc registration is free and connects you to colleagues around the world.

Get answers to your clinical questions from a community you can trust.
Energy Sustainability

Energystar.gov

Microsoft-hohm.com
Biodiversity: Encyclopedia of Life

Explore

Typhoid spiculates L.
Narrow-leaved catfish

Pseudomeryx semicollis
(Emenee, 1890)

Philippines porcelli
Linnaeus, 1758

Hymanes monopterus
(Hew, 1793)

Hyalomma dactylopii
(Linnaeus, 1758)

Sargocentron seychellense (Smith)
Yellow-topped squirrelfish

EOL Announcements

Follow us on Twitter at http://www.tweeter.com/eol.

For more information on becoming a curator or contributor, see how to help build EOL.

Do you have photos you'd like to contribute to the Encyclopedia of Life? Start adding them to the EOL Flickr group directly or by using the iPhone application (available via iTunes) and we'll periodically pull them into EOL. Watch the "How to" slideshow or visit the Flickr group home page for more information.

EOL has released its plan for a Curator Network. We welcome your comments and suggestions in the forum.

Learn about the EOL Fellow Program.

Featured

Premnas aquilus (L.) Kuhn
Braconid

What's New

08/27/2009 - A nature
08/13/2009 - L aptenorrhinus insects
08/10/2009 - A and automatic web page. And
08/05/2009 - T vulnerable and extinctions occur.
08/03/2009 - C Winneka

PHYSICAL DESCRIPTION

Max. size

Category

eol.org
Serve.gov: Voluntary service

Register Your Project & Recruit Volunteers
Find a Volunteer Opportunity
Read Inspiring Stories of Service & Share Your Own Story
Open Data.gov + Recovery.gov
Vision: Social Participation

1) Focus on National Priorities & Impact
   • Disaster response, community safety
   • Health, energy, education, e-government
   • Environmental awareness, biodiversity

2) Develop Theories of Social Participation
   • How do social media networks evolve?
   • How can participation be increased?

3) Provide Technology Infrastructure
   • Scalable, reliable, universal, manageable
   • Protect privacy, stop attacks, resolve conflicts
Network Theories: Evolution models

- Random, preferential attachment,…
- Monotonic, bursty,…
- Power law for degree (hubs & indexes)
- Small-world property
- Forest fire, spreading activation,…
- Matures, decays, fragments, …

Network Theories: Social science

- Relationships & roles
- Strong & weak ties
- Motivations: egoism, altruism, collectivism, principlism
- Collective intelligence
- Collective action & governance
- Social information foraging

Moreno, 1938; Granovetter, 1971; Burt, 1987; Ostrom, 1992; Wellman, 1993; Batson, Ahmad & Tseng, 2002; Malone, Laubaucher & Dellarocas, 2009; Pirolli, 2009
Network Theories: Stages of participation

Wikipedia, Discussion & Reporting

- Reader
- First-time Contributor
  (Legitimate Peripheral Participation)
- Returning Contributor
- Frequent Contributor

Preece, Nonnecke & Andrews, CHB2004
Forte & Bruckman, SIGGROUP2005; Hanson, 2008
Vassileva, 2002, 2005; Ling et al., JCMC 2005; Rashid et al., CHI2006
From Reader to Leader: Motivating Technology-Mediated Social Participation

aisel.aisnet.org/thci/vol1/iss1/5/
## Motivating Readers

<table>
<thead>
<tr>
<th>Usability</th>
<th>Sociability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interesting &amp; relevant content presented in attractive, well-organized layouts</td>
<td>Encouragement by friends, family, respected authorities, advertising</td>
</tr>
<tr>
<td>Frequently updated content with highlighting to encourage return visits</td>
<td>Repeated visibility in online, print, television, other media</td>
</tr>
<tr>
<td>Support for newcomers: tutorials, animated demos, FAQs, help, mentors, contacts</td>
<td>Understandable norms &amp; policies</td>
</tr>
<tr>
<td>Clear navigation paths → sense of mastery and control</td>
<td>Sense of belonging: recognition of familiar people &amp; activities</td>
</tr>
<tr>
<td>Universal usability: novice/expert, small/large display, slow/fast network, multilingual, support for users with disabilities</td>
<td>Charismatic leaders with visionary goals</td>
</tr>
<tr>
<td>Interface design features to support reading, browsing, searching, sharing</td>
<td>Safety &amp; privacy</td>
</tr>
</tbody>
</table>
## Motivating Contributors

<table>
<thead>
<tr>
<th>Usability</th>
<th>Sociability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low threshold interfaces to encourage small contributions (no login)</td>
<td>Support for legitimate peripheral participation</td>
</tr>
<tr>
<td>High ceiling interfaces that allow large frequent contributions</td>
<td>Chance to build reputation over time while performing satisfying tasks</td>
</tr>
<tr>
<td>Visibility for users’ contributions &amp; impact - aggregated over time</td>
<td>Recognition for the highest quality &amp; quantity of contributions</td>
</tr>
<tr>
<td>Visibility of ratings &amp; comments</td>
<td>Recognition of a person’s specific expertise</td>
</tr>
<tr>
<td>Tools to undo vandalism, limit malicious users, control pornography &amp; libel</td>
<td>Policies &amp; norms for contributions</td>
</tr>
</tbody>
</table>
# Motivating Collaborators

<table>
<thead>
<tr>
<th>Usability</th>
<th>Sociability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ways to locate relevant &amp; competent individuals to form collaborations</td>
<td>Atmosphere of empathy &amp; trust that promotes belonging to the community &amp; willingness to work within groups to produce something larger</td>
</tr>
<tr>
<td>Tools to collaborate: communicate within groups, schedule projects, assign tasks, share work products, request assistance</td>
<td>Altruism: a desire to support the community, desire to give back, willingness to reciprocate</td>
</tr>
<tr>
<td>Visible recognition collaborators, e.g. authorship, citations, links, acknowledgements</td>
<td>Ways to develop a reputation for themselves &amp; their collaborators; develop &amp; maintain status within group</td>
</tr>
<tr>
<td>Ways to resolve differences (e.g. voting), mediate disputes &amp; deal with unhelpful collaborators</td>
<td>Respect for status within the community</td>
</tr>
</tbody>
</table>
## Motivating Leaders

<table>
<thead>
<tr>
<th>Usability</th>
<th>Sociability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leaders are given higher visibility &amp; their efforts are highlighted, sometimes with historical narratives, special tributes, or rewards</td>
<td>Leadership is valued and given an honored position &amp; expected to meet expectations</td>
</tr>
<tr>
<td>Leaders are given special powers, e.g. to promote agendas, expend resources, or limit malicious users</td>
<td>Respect is offered for helping others &amp; dealing with problems</td>
</tr>
<tr>
<td>Mentorship efforts are visibly celebrated, e.g. with comments from mentees</td>
<td>Mentors are cultivated &amp; encouraged</td>
</tr>
</tbody>
</table>
Vision: Social Participation

1) Focus on National Priorities & Impact
   • Disaster response, community safety
   • Health, energy, education, e-government
   • Environmental awareness, biodiversity

2) Develop Theories of Social Participation
   • How do social media networks evolve?
   • How can participation be increased?

3) Provide Technology Infrastructure
   • Scalable, reliable, universal, manageable
   • Protect privacy, stop attacks, resolve conflicts
Technology Infrastructure

- Mobile, Desktop, Web, Cloud
- 100% uptime, 100% secure
- Giga-collabs, Tera-contribs
- Universal accessibility & usability
- Trust, empathy, responsibility, privacy
- Leaders can manage usage
- Designers can continuously improve
Footprints of Human Activity

Footprints in sand as Caesarea
SocialAction

• Integrates statistics & visualization

• 4 case studies, 4-8 weeks (journalist, bibliometrician, terrorist analyst, organizational analyst)

• Identified desired features, gave strong positive feedback about benefits of integration

www.cs.umd.edu/hcil/socialaction
NodeXL: Network Overview for Discovery & Exploration in Excel

www.codeplex.com/nodexl
casci.umd.edu/NodeXL_Teaching
NodeXL:
Network Overview for Discovery & Exploration in Excel

www.codeplex.com/nodexl
NodeXL: Import Dialogs

www.codeplex.com/nodexl
Tweets at #WIN09 Conference: 2 groups
Oil Spill Twitter Community

St. Bernard Parish fishers work to protect fragile Biloxi Marsh from Gulf oil spill http://bit.ly/97tNVE
Twitter discussion of #GOP

Red: Republicans, anti-Obama, mention Fox
Blue: Democrats, pro-Obama, mention CNN
Green: non-affiliated

Node size is number of followers
Politico is major bridging group
WWW2010 Twitter Community

Vint Cerf has about 2k bottles of wine in his wine cellar. Nice! #www2010
WWW2011 Twitter Community: Grouped
CHI2010 Twitter Community

RT @danarotman: Israel is the only part of the world where there's parity between TV and internet consuming. Geneva Bell #CHI2010
Flickr networks
Flickr clusters for “mouse”
Flickr commenters on Marc Smith’s pix
Figure 7.11: Lobbying Coalition Network connecting organizations (vertices) that have jointly filed comments on US Federal Communications Commission policies (edges). Vertex Size represents number of filings and color represents Eigenvector Centrality (pink = higher). Darker edges connect organizations with many joint filings. Vertices were originally positioned using Fruchterman-Rheingold and hand-positioned to respect clusters identified by NodeXL’s Find Clusters algorithm.
Analyzing Social Media Networks with NodeXL

I. Getting Started with Analyzing Social Media Networks
   1. Introduction to Social Media and Social Networks
   3. Social Network Analysis

II. NodeXL Tutorial: Learning by Doing
   4. Layout, Visual Design & Labeling
   5. Calculating & Visualizing Network Metrics
   6. Preparing Data & Filtering
   7. Clustering & Grouping

III. Social Media Network Analysis Case Studies
   8. Email
   9. Threaded Networks
   10. Twitter
   11. Facebook
   12. WWW
   13. Flickr
   14. YouTube
   15. Wiki Networks

http://www.elsevier.com/wps/find/bookdescription.cws_home/723354/description
We are a group of researchers who want to create open tools, generate and host open data, and support open scholarship related to social media.
Let’s get to work!

• Do great research!!!! → Inspirational

• Universities
  • Add courses & degree programs
  • Help Federal & Local governments

• Industry
  • Offer researchers access to data
  • Develop infrastructure and analysis tools

• Government
  • National Initiative for Social Participation
  • Develop Federal & Local applications