

# **Cyberinfrastructure for Social Action on National Priorities**

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Time Magazine proclaimed in 2006 that their “Person of the Year” was “You” in recognition of the growing significance of online communities, social media, and user-generated content. We believe that this symbolic award is a harbinger of vast technological and societal changes that will unfold over many years—just as the proclamation of the Computer as Time’s 1982 Person of the Year foreshadowed the ubiquity of the personal computer in everyday life. As Internet and mobile technology have become increasingly ubiquitous, they have also become more social. As of Spring 2010, 40% of adults 30 yr and over, 72% of young adults, and 73% of teens use social network sites, with year-over-year time spent on facebook increasing by 566% [1]. As of Fall 2009, 19% of internet users reported using Twitter , up from 11% in Winter 2008 [2]. As of February 2010 [3], Twitter users were generating 35 million messages (tweets) per day. Wikipedia has over 12 million registered users and over 3 million content pages. Many examples of vibrant communities have emerged, as well as novel forms of social-computational systems such as prediction markets, collaborative filtering, social bookmarking, online auctions, and network-based peer-production systems. Something very powerful is evolving and, as the collection of authors and articles in this Special Issue attest, this phenomenon is attracting the attention of an astonishingly diverse set of researchers, practitioners, policy makers, and business people. At this moment, in the primordial stages of evolution, there is enormous opportunity to harness and shape technology-mediated social systems.

From early visions of social participation in cyberspace [4] to current discussions about open government, participation, and collaboration [5, 6] there is a growing awareness of a grand opportunity to transform personal communications, organizational worklife, and online communities. We believe that technology-mediated social participation can be harnessed for remarkable social benefits especially as related to national priorities. Existing social media technologies often designed for discretionary and playful activities can be redesigned and repurposed to produce profound transformations in healthcare, community safety, disaster response, life-long learning, business innovation, energy sustainability, environmental protection, and other important national priorities.

Current designs for social media such as wikis, blogs, micro-blogs, forums, social networking, media sharing, product/service reviews, and virtual worlds are an excellent starting point. However, extensive research is needed to build upon these media and

tools to foster wider participation, support increasingly sophisticated interaction and accomplishments, and deal with potential dangers. We believe that effective designs can improve usability and sociability to better engage people with diverse motivations, experiences, perspectives, skills and knowledge and to create the conditions for citizens to participate, connect, and undertake constructive action. The goal is to create new architectures for the online public spaces that energize the population to contribute to vital community and national projects.

New technologies, of course, often bring new dangers. For instance, the Simon Wiesenthal Center report on "Digital Terrorism and Hate 2010," indicates a growing number of Web sites and social networks used by people propagating hateful, racist, or terrorist ideas and activities, with about 11,500 different sites, networks, and forums that it categorized as hateful or terrorist--20 percent increase over 2009. Other potential dangers include privacy invasions, breakdowns during disasters and peak loads, malicious attackers, misguided rumors, undue influence from small groups, and failures to achieve universal usability. Research would help to alleviate these dangers as well as improve usability, engage a broad segment of residents, provide management tools for civic and local leaders, protect individual privacy and security, and raise reliability even in challenging situations.

At every point in developing technology-mediated social participation for national priorities there are deep science questions with profound theoretical impacts on the human use of technologies. Computer science challenges include scalable network analysis algorithms, effective visualizations that guide moderator decisions and community organizer activities, and universal usability to support diverse users and platforms. Then data driven visual analytics would enable tracking and ranking evolving networks, agent-based simulations, and searching for distinctive or common features in large networks. There are strong research opportunities on collective intelligence, collective action, social creativity, social dilemmas, and basic ideas such as privacy, freedom, and identity that influence design decisions and social participation. Extensive research is needed to identify social roles, building on recent work to find "answer people", "discussion people", "reply magnets", potential vandals, etc. Basic research is needed to develop useful metrics such as community efficacy, conversion rates from readers to contributors, intensity of engagement, degree of reciprocity, network density, small-world-ness, local/global connectedness, etc. A key notion is to expand on motivation for different participants and show how managers can influence outcomes with usability and sociability interventions, while addressing security vs freedom tradeoffs.

The collection of articles in this Special Issue emerged from the grassroots efforts of participants from academia, private industry, and government who have come together to propose an National Initiative for Social Participation. An initial meeting held at the

University of Maryland in the Spring of 2009 solidified a core group and report [7] that subsequently lead to National Science Foundation support for workshops hosted by the Palo Alto Research Center (December, 2009) and the University of Maryland (April, 2010). The aim of these workshops was to produce a roadmap for national research and development, education, and policy. The reports of this group have been tailored into the articles for this Special Issue on theory, design, infrastructure, health, education, ad government, and other domains. Because of the complexity of the technology and the phenomena the reports collectively argue for national-scale funding of a collaborative of distributed multidisciplinary centers. Just as NASA leads space research and NIH promotes medical research, we hope a National Initiative for Social Participation would invigorate online social media research. We believe that technology-mediated social participation deserves much greater attention from policy makers, research funders, corporate leaders, academics, and students.

## References

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