Introduction
One of the marvels of our time is the unprecedented use and development of technologies that support social interaction. Recent decades have repeatedly demonstrated human ingenuity as individuals and collectives have adopted and adapted these technologies to engender new ways of working, playing, and creating meaning. Although we already take for granted the ubiquity of social-mediating technologies such as email, Facebook, Twitter, and wikis, their potential for improving the human condition has hardly been tapped. There is a great need for researchers to 1) develop theories that better explain how and why technology-mediated collaborations succeed and fail, and 2) develop novel socio-technical strategies to address national priorities such as healthcare, education, government transparency, and environmental sustainability. In this paper, I discuss the need to understand and develop technologies and social structures that support large-scale, collaborative sensemaking.

Sensemaking
Humans can’t help but try to make sense of the world around them. When faced with an unfamiliar problem or situation we instinctively gather, organize, and interpret information, constructing meanings that enable us to move forward (Dervin, 1998; Lee & Abrams 2008; Russell, et al., 2008.). Individuals engage in sensemaking activities when we create a presentation, come to grips with a life-threatening illness, decide who to vote for, or produce an intelligence report. As collectives we engage in collaborative sensemaking activities at many levels of social aggregation ranging from small groups (e.g., co-authors of a paper) to hundreds (e.g., the scientific community developing a cure for cancer) to millions (e.g., fans of ABC’s Lost making sense of the complex show).

Understanding and addressing the major challenges we face in our complex and interconnected society requires that we become expert collaborative sensemakers. There is a great need for better social technologies and practices that will improve our ability to collectively gather, organize, validate, interpret, and explain the mass of data available to us. It is not enough to support the finding of information. We must also support the process of collaboratively making sense of that information once found. Only then can we make informed decisions and have enough of a shared understanding that we can move forward. Unfortunately, supporting collaborative sensemaking, particularly sensemaking by the masses, is a much more challenging goal that is currently not well understood.

Examples of Sensemaking by the Masses
While there are some ancient examples of collaborative sensemaking by the masses such as religious scholars’ studying, annotating, and debating the meaning of holy writ, they typically took place over generations and with relatively limited tools to support the activity. The pliability and connectivity of the Internet have made completely new forms of mass collaboration feasible in a timeframe never before imagined. Before listing some recent examples of mass collaborative
sensemaking, I want to make clear what does not fit in that category. Worthwhile, large-scale projects like Project Gutenberg and NASA’s clickworkers may require individual sensemaking activities, but the focus is not on collaboratively making sense of some phenomenon. Platforms like Facebook, Twitter, Flickr, Delicious, and Digg may enable collaborative sensemaking by subgroups, but are not explicitly designed for that purpose. In most cases the majority of activity occurring on them is more about sharing than about sensemaking. In contrast, the following examples are primarily about sensemaking that requires the involvement of the masses. They are chosen to demonstrate the breadth of topics that are engaging in large-scale collaborative sensemaking.

- **Lostpedia** – a thriving wiki community where millions of people come together to document and make sense of the highly complex and mysterious ABC show Lost. Lostpedia is one of thousands of similar communities making sense of entertainment-based products such as TV shows, multiplayer games, and books. As some of the most sophisticated and largest collaborative sensemaking communities, they provide an early look into social and technical strategies that can be adapted to other domains.
- **NewFamilySearch and Ancestry.com** – communities of hundreds of thousands of genealogists collaboratively creating a massive family tree one branch at a time.
- **Intellipedia** – The US intelligence community wiki used to help make sense of defense-related activities. The aim was to foster better collaboration among the many US intelligence agencies, combatant commands, and related organizations.
- **PatientsLikeMe** – Patient support groups that openly share personal data on symptoms, treatments, and side effects in order to help identify patterns that will improve research and coping. It is one of many patient-driven groups working side-by-side with researchers and in some cases pharmaceutical companies to actively search for a cure (e.g., see CureTogether).
- **Wormbase** – A collaboratory where scientists from across the globe collaboratively collect, share, and make sense of the biology and genome of C.elegans. This is just one example of many collaboratories where scientists with a common interest collaborate closely to solve problems and make sense of a phenomenon. Increasingly, citizen scientists are playing key roles in collecting data, although rarely in making sense of that data.

**Research Questions**

Although several successful examples of mass collaboration exist, we have little understanding of why some succeed while others fail. The following list of research questions, if addressed, would provide a foundation to build upon:

- How can computer-mediated activities be organized to coordinate sensemaking activities such as collecting, organizing, synthesizing, interpreting, and theorizing? (e.g., What communicative genres are useful? How can sensemaking activities be made into modular tasks?)
- How can people with different levels of expertise meaningfully participate together? What social roles are important to facilitate effective collaboration among the masses?
- What social norms and community policies support (or undermine) effective collaborative sensemaking?
- How can participants be motivated to contribute to large-scale sensemaking efforts? How do these differ based on the context and domain?
- How can different and/or competing perspectives and theories coexist in the same space? (e.g., Can competition between them be used to motivate contributions?)
- How can data visualizations be used to make sense of data and serve as a platform for more meaningful collaborations around data?
- How does scale impact the effectiveness of different collaborative sensemaking strategies?

**Research Strategies for Moving Forward**

Studying sensemaking by the masses presents both challenges and opportunities. The scale of the phenomena makes methods designed for understanding small-group behavior infeasible (e.g., lab studies). The relatively few examples of successful mass collaborative sensemaking may lead researchers to limit their focus to a small portion of the potential design space. For example, there have been hundreds of studies of Wikipedia, and relatively few of other major projects including other successful wikis. The technology-mediated nature of mass collaborative sensemaking requires an interdisciplinary approach that incorporates traditional social science theories with theories of design that are often at a much more detailed level of granularity (e.g., dealing with interface choices). Fortunately for researchers, significant portions of these efforts are conducted online, often leaving detailed traces of activity behind, offering exciting new data sources not available in the “real” world. Below I describe a few complementary research strategies that are particularly well suited for this environment.

*Learn from mixed-method, empirical studies of successful communities.* Such studies must examine both the underlying technology and the nuanced and situated practices that emerge around the use of that technology. Analysis of online behavior traces using network analysis and participation patterns can identify persistent structures and social roles, as well as identify interviewees and understand biases in community surveys. Genre analysis (Orlikowski & Yates 1994) and content analysis of community-created resources can characterize types of content in sufficiently abstract ways that others can learn from them.

*From Early Adopters to National Priorities.* The limited number of successful large-scale sensemaking projects makes selecting sites to study challenging. Studying early adopters of technology such as developers and gamers allows us to see possibilities we might not otherwise consider that can then be adapted to communities engaged in solving national priorities. For example, I am currently studying Alternate Reality Games (ARGs) to better understand how gaming and fan communities use social media and mobile devices to make sense of the constantly unfolding narratives that use the real world as the gaming platform. Findings will be adapted to other contexts such as generating content for the Encyclopedia of Life, promoting STEM education, and coordinating disaster response.

*Using Action Research to Make a Difference and Learn Along the Way.* Action research methods reject the idea that only disinterested observers can conduct research. It seeks to make a difference in the world by closely coupling research and practice, and in the process creating new, practical knowledge (see Sage’s Action Research Journal Manifesto available at [http://arj.sagepub.com](http://arj.sagepub.com)). To make this work effectively, academics must partner with...
government, corporations, and non-profits in more seamless ways. These collaborations, as well as our ability to work directly with large-scale projects are significantly enhanced by the fact that so much interaction now occurs online. Researchers can co-develop technologies and social interventions with communities, helping to validate their effectiveness in practice and leading to novel designs. My own experiences of rolling out novel interventions with patient support groups and developing an educational Facebook application about HPV have been among the most rewarding and insightful projects I’ve conducted.

_Develop Tools for Studying the Masses._ Researchers and practitioners are in need of tools that can help them explore and understand the wealth of data that is created from mass collaboration. I have recently been working with the NodeXL Team (http://www.codeplex.com/NodeXL) to develop a social network analysis and visualization tool and set of strategies for applying it to study social media interaction. Not only can these tools help researchers study mass sensemaking, as they become increasingly accessible to non-programmers they can be used by community organizers, government watchdog groups, and others to more systematically evaluate progress and create more self-reflective communities.

**Concluding Thoughts**

We live in an exciting time of constant change and endless possibilities. As researchers and professionals, we have the opportunity and responsibility to help improve the human condition through the effective use of social technologies that enable us to collaborate at a scale never before possible. Understanding the social and technical challenges before us and developing novel strategies to overcome them is of paramount importance. I am excited by the community of people coming together to address these important topics.

**References**


