Chapter 10
The use of Electronic Brainstorming for Collecting Ideas in Scientific Research Teams:
A Challenge for Future Online Research

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ABSTRACT

The purpose of this chapter is to present an under-used technique for collecting ideas in scientific research teams, namely electronic brainstorming. This technique employs networked computer terminals and software designed to allow group members to communicate electronically during idea-generation tasks. A large number of studies have demonstrated that electronic brainstorming is a useful non-verbal technique for improving the efficacy of e-collaboration, but there are very few situations in which this technique has been used to collect ideas in scientific research teams. Writing articles, reports, white papers, and other scientific documents requires good ideas that can be generated through effective brainstorming. Brainstorming is also recognized as a problem-solving technique which can help researchers find solutions to complex problems by listing their potential causes. Although it is a simple technique that can gather ideas from a group of individuals rapidly by letting them express their ideas freely, it has not been widely used to collect ideas for complex research projects involving researchers working together or in geographically dispersed teams. After reviewing the literature in the field of (electronic) brainstorming, the challenges and opportunities for extending this technique to online research by scientific teams are discussed.

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INTRODUCTION

With the development of the Internet over the last few decades, online research methods have gained increased recognition in fundamental and social sciences, providing new research opportunities not only for psychologists (e.g., Birnbaum, 2004a, 2004b; Kraut, Olson, Banaji, Bruckman, Cohen, & Couper, 2004; Skitka & Sargis, 2006), but also for other scientists in various disciplinary fields. The development of the Internet has considerably changed the way that research is conducted, allowing the use of new (online) scientific methods for optimizing the collection of data on a large scale, and promoting collaborative work.

A number of researchers from different disciplinary fields have begun to use the Internet and the World Wide Web as a medium for online research, thereby expanding traditional research in laboratory and field settings. For example, in psychology, a review of the publications in the main American Psychological Association journals for 2003-2004 revealed that 21% of these journals published at least one article that used the Web to collect data (Skitka & Sargis, 2006). In psychological research, online methods are often used to recruit large heterogeneous or specialized samples rapidly and to standardize experimental research procedures making it easier to replicate studies.

The Internet has also changed communication, business and learning, as well as many other activities of social and professional life, including scientific research. Scientific research is based on various practices, but researchers often work in teams, collecting and analyzing ideas for complex projects through collaboration and brainstorming. The Internet has notably changed the way scientists collaborate by making it easier to work with geographically distant partners and promoting e-collaboration practices (e.g., Finholt & Olson, 1997; Walsh & Maloney, 2002). This type of distance work in scientific research based on communication technologies may at least partly explain the fact that the production of knowledge has increasingly become the domain of teams rather than sole authors (e.g., Levine & Moreland, 2004; Wuchty, Jones, & Uzzi, 2007). In addition to this trend toward collaboration in scientific research, it has become increasingly difficult to solve complex scientific problems in the social and human sciences based only on the advice of experts, including researchers.

Today, many research and innovation projects require the participation of several individuals, both experts and non-experts, who have to generate ideas, hypotheses or solutions to complex problems in the early stage of the project (e.g., Marín, Delgado, & Bachmann, 2008; Sengonzi, Demian, & Emmitt, 2009). The involvement of non-experts is important in the research process, because many problems challenge our conception of science and politics (e.g., Funtowicz & Ravetz, 1991; Ludwig, 2001). For example, conservation of forests and endangered species, climate change, nuclear energy, and urban overpopulation are complex issues that cannot be separated from governance, ethics and social justice, and thus involve more than the knowledge of researchers in a given specialized field. Nevertheless, it appears that there is very little collaboration between researchers and non-experts to solve complex problems, and little use of electronic brainstorming systems to facilitate the production and integration of ideas. Indeed, individuals are able to generate creative ideas (Hawkins, 1999), and it is a pity to be deprived of these ideas in scientific research projects and when developing new scientific proposals. Electronic brainstorming is one way of optimizing the collection of ideas.

The purpose of this chapter is to examine how electronic brainstorming can be used to collect ideas among experts, researchers and non-experts involved in collaborative projects, taking a participatory approach to solving complex problems. The first part introduces some examples of electronic brainstorming systems and then discusses the key advantages and disadvantages of these techniques