A Meta-Analysis of Group Size Effects in Electronic Brainstorming: More Heads are Better than One

Alan R. Dennis, Indiana University, USA
Michael L. Williams, Pepperdine University, USA

ABSTRACT

Electronic brainstorming (EBS) has been a focus of academic research since the 1980s. The results suggest that in most – but not all – cases, groups using EBS produce more ideas than groups using verbal brainstorming. In contrast, the results comparing groups using EBS to groups using nominal group brainstorming have been mixed: sometimes EBS groups produce more ideas, while in other cases, nominal groups produce more. This article examines the effects of group size on EBS, verbal brainstorming and nominal group brainstorming. We found that group size is a significant factor in predicting the performance of EBS relative to verbal brainstorming and nominal group brainstorming. As group size increases, the relative benefit of EBS increases. EBS groups outperform verbal groups when group size reaches four people. EBS groups outperform nominal groups when group size reaches 10 people.

Keywords: electronic brainstorming; group size; group support systems; GSS; nominal groups

INTRODUCTION

Communication is a fundamental element of group creativity. Researchers have long considered how to improve communication to improve group creativity, but unfortunately the general conclusion of this research is that people generate fewer ideas when they work together in groups than when they work separately and later pool their ideas (i.e., nominal groups) (Mullen, Johnson, & Salas, 1991; Paulus, Larey, & Ortega, 1995).

Electronic brainstorming (EBS) was introduced in the 1980s, with the hope of using computer-mediated electronic com-
munication to improve group creativity. With EBS, group members communicate by exchanging typed messages instead of speaking verbally. Initial research on EBS suggested that EBS groups could generate more ideas than verbal brainstorming groups (e.g., Gallupe, Dennis, Cooper, Valacich, Bastianutti, & Nunamaker, 1992) and as many or more ideas as nominal groups who work in the presence of each other but do not exchange ideas (e.g., Dennis & Valacich, 1993). Recent research has challenged these early studies, suggesting that productivity gains compared to nominal groups are an “illusion” (Pinsonneault, Barki, Gallupe, & Hoppen, 1999). This challenge has sparked a new debate over the “illusion” or “pattern” of EBS productivity compared to other approaches, a debate that has led different researchers to different conclusions (see Dennis & Valacich, 1999; Pinsonneault & Barki, 1999).

The goal of this article is to integrate the previous research on EBS using meta-analysis to draw conclusions about the effects of EBS relative to verbal brainstorming and nominal group brainstorming. We begin by examining the important theoretical underpinnings of EBS and then examine each of the important ways in which EBS may change traditional approaches to creativity, and how group size affects the impacts of these factors. We then present the methods and results of our meta-analyses. We close with a discussion of these results and draw implications for future research and practice.

**PROCESS GAINS AND LOSSES FROM EBS**

Much of the prior EBS research was guided by the processes gains and losses framework (Hill, 1982; Steiner, 1972). Simply put, communication among group members introduces factors into the brainstorming process that act to improve performance (process gains) and to impair performance (process losses) relative to individuals who work separately without communicating but later pool ideas (referred to as nominal groups). Several dozen plausible process losses and gains in verbal brainstorming and EBS have been proposed (see Camacho & Paulus, 1995; Mullen et al., 1991; Pinsonneault et al., 1999). Two process gains (synergy, social facilitation) and five process losses (production blocking, social loafing, evaluation apprehension, cognitive interference and communication speed) have received the most research attention and are the ones that we believe are most important (Dennis & Valacich, 1999; Diehl & Stroebe, 1987; Pinsonneault & Barki, 1999; Pinsonneault et al., 1999). See Table 1.

**Potential Process Gains**

Synergy is the ability of an idea from one participant to trigger a new idea in another participant, an idea that would otherwise not have been produced (Dennis & Valacich, 1993; Lamm & Trommsdorff, 1973). Synergy – or the “assembly bonus” (Collins & Guetzkow, 1964) – is perhaps the most fundamental potential
Socioeconomic Challenges and Opportunities of Urbanization in Nigeria
www.igi-global.com/chapter/socioeconomic-challenges-and-opportunities-of-urbanization-in-nigeria/206042?camid=4v1a