

# Improving Collaborative Convergence through Distributed and Parallel Sorting

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## ABSTRACT

This paper examines a convergence process of organizing ideas that are generated during collaborative idea generation activities. The method presented reduces the impact of organizing brainstorming ideas on individual participants by dividing the convergence activity into smaller, discrete tasks that can be completed individually, and in parallel, by the participants. The entire pool of brainstorming ideas is subdivided into smaller pools and each participant is then tasked with organizing one of the subsets of ideas. The results show that by dividing up the overall activity into subtasks, the subjects experienced a more favorable environment. Furthermore, the subjects were able to work through their subset of ideas and produce results that were similar to those performing the full sort of the entire pool.

## KEYWORDS

Convergence, Ideation, Parallel Sorting, Participant-Driven Group Support Systems

## INTRODUCTION

Advances in technology have yielded a wide variety of communication tools that enable groups to collaborate. These collaborative tools vary in sophistication from very complex to very lean (DeLuca, Gasson, & Kock, 2006). The tools also vary in the types of collaboration that are enabled. Despite the proliferation of tools, many challenges still exist in making collaboration a simple and reliable approach for broad use.

One salient collaboration challenge revolves around the ability of large groups to collaborate (Helquist, Kruse, Meservy, & Deokar, 2011; Kruse, Helquist, & Adkins, 2008; Thorpe & Albrecht, 2004). An increasing amount of research is currently underway on crowdsourcing various tasks and harnessing the wisdom of the crowds. Large groups often do not lend themselves to traditional collaboration tools and methodologies as their characteristics are different.

Two of the key characteristics of large group collaboration are the proximity of the participants and the synchronicity of the collaboration (Helquist, Kruse, & Nunamaker Jr., 2009). Traditional collaboration has focused extensively on synchronous, face-to-face interaction, often led by a facilitator. However, due to physical and logistical constraints, large groups often require the use of physically distributed and asynchronous collaboration (Helquist, Kruse, Deokar, & Meservy, 2013). The increased number of participants, geographic distribution of participants, and asynchronous interaction all increase the complexity of the collaborative engagement (de Vreede, Briggs, van Duin, & Enserink, 2000). These factors can lead to more content and complicate coordination among participants as they cannot easily communicate, focus attention or achieve group understanding as they might in a smaller face-to-face group.

Collaborative work can generally be grouped into two high-level activity types: divergence and convergence. In divergence activities, groups collaborate to brainstorm and generate content. These activities can largely be conducted while the participants work in parallel, each participant being able to submit ideas without direct interaction or coordination with others.

Convergence activities enable the group to synthesize the content by summarizing, combining, and organizing the brainstorming content. The overall effort of these activities is to focus and make the content more valuable or usable by structuring, synthesizing, and prioritizing the content. Typically, convergence activities present an increased challenge to the participants. Because the tasks involved in changing the organization or structure of the brainstorming content are not inherently parallel, there is a need for an increased level of communication and collaboration. Without increased coordination, the actions of the participants will tend to result in task collisions, confusion and wasted effort. Thus, existing convergence activities are also largely serial as the participants are forced to work together as a group, even with a facilitator, to avoid these collisions and reach some form of consensus with regard to the product.

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