Chapter 8.2
Engineering for Interdisciplinary Collaboration

John D. Murphy
University of Nebraska at Omaha, USA

Alanah J. Davis
University of Nebraska at Omaha, USA

Justin M. Yurkovich
University of Nebraska at Omaha, USA

ABSTRACT

This chapter introduces Collaboration Engineering as an approach to developing more effective collaborative sessions for interdisciplinary teams. Collaboration is the foundation for success for many academic teams; however, the benefits of collaborative sessions can be lost when group processes are not well understood and the needs of interdisciplinary teams are not met. As such, this chapter will identify key facets of how interdisciplinary teams develop and evaluate potential solutions. Groupthink and disciplinary ethnocentrism are also presented, as these factors can negatively impact interdisciplinary teams, and techniques are proposed that can help teams avoid these potentially negative effects. The central position of this chapter is that Collaboration Engineering based on proven group processes and guided by design recommendations specific for interdisciplinary team collaboration can result in session designs that improve outcomes for interdisciplinary teams.

INTRODUCTION

Many interdisciplinary teams rely on group processes, and collaboration in particular, as a foundation for success. However, disagreements over a team's purpose and goals, lack of reliable information to base decisions upon, and poor communication are just a few of the challenges that collaborative teams face. These challenges are exacerbated when a team is composed of people from diverse academic disciplines. Despite

these drawbacks, interdisciplinary collaboration is commonly used in academia as the problems under study demand the skillful blending of the perspectives, concepts, and methodologies from diverse academic fields. As such, the goal of this chapter is to identify and examine issues that impact interdisciplinary collaboration in order to better understand how to design collaborative sessions for interdisciplinary teams. Blending this better understanding with the advanced capabilities of electronic Group Support Systems can help teams avoid potential pitfalls in interdisciplinary collaboration and lead to more synergistic solutions.

The chapter begins with a background of group processes, interdisciplinary teams, and Collaboration Engineering. An analysis of this background information then provides a theoretical basis for recommendations on ways to design better interdisciplinary collaboration sessions. Next, the chapter presents a discussion of possible research issues and future trends which when explored may offer potential for improving these results. The chapter concludes with an example of the approach presented.

BACKGROUND

A deeper understanding of the core processes that underpin collaborative initiatives can improve the process of designing successful interdisciplinary collaboration. This section will describe general group processes, aspects specific to interdisciplinary teams, and the emerging discipline of Collaboration Engineering.

Group Processes

Teams employ a number of processes and strategies to produce solutions to problems they face. Of specific interest here are the processes of brainstorming and evaluation of the ideas from a brainstorming session. The basic concept behind brainstorming is that when a group works together to generate ideas, each new idea contributed can trigger additional ideas in the minds of the participants. Osborn (1957), the father of the brainstorming technique, called this synergistic effect the "two-way current" of group collaboration and described a significant boost in the number and quality of ideas a group could generate. However, academic study revealed problems with the practice and showed that group participation could actually inhibit creative thinking, particularly when group size increased (Diehl & Stroebe, 1987; Taylor, Berry, & Block, 1958). Table 1 lists and defines some of the potential drawbacks that have been associated with traditional verbal brainstorming sessions.

Examination of the drawbacks identified in these studies and others showed that computer-

Table 1. Sources of productivity and quality losses in brainstorming

Source	Description
Production Blocking	Losses that occur when people have to wait while another person is speaking. Examples of how this might affect participants include that they may simply not get the opportunity to contribute within the allotted time, they might forget their ideas, or they may withhold ideas because they no longer believe it is an original or relevant idea. (Lamm & Trommsdorff, 1973)
Evaluation Apprehension	Losses that occur when people are concerned that others will perceive them negatively because of their ideas. (Diehl & Stroebe, 1987)
Social Loafing	Losses that occur due to a decrease in individual effort when people believe they have less directly-attributable responsibility for the team result (Latané, Williams, & Harkins, 1979)
Cognitive Interference	Loses that occur when the content of the ideas generated by others interfere with an individual's own ability to generate new ideas. (Lamm & Trommsdorff, 1973)