

# *Consensus and single leader decision-making in teams using structured design methods*

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*Decision-making in teams can be accomplished by including varying levels of team member opinion. This study considers two styles of group decision-making, consensus building and single leader decision-making with input from the team, in structured design selection tasks. The role of decision-making style in the speed of decision-making, team member satisfaction, and decision quality are examined. In this study, single leader was found to be faster than consensus. However, single leader was not rated by teams as faster, suggesting that perception of speed may be more important than actual speed. It was also found that when there was more ambiguity in a decision, as represented by a smaller point spread between choices, teams tended to rate speed and process quality lower.*

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*Keywords: decision-making, teamwork, design methods*

Team decision-making is a pervasive and critical activity in product design and development. Research in social psychology on team performance suggests that groups tend to be more effective than direct aggregation of individual team members' choices (Stasser & Dietz-Uhler, 2001) and make better decisions than the most highly skilled individual in a group (Michaelsen, Watson, & Black, 1989; Shaw, 1971). There are a number of strategies for team decision-making, and one way to categorize them is by the balance of participation between the leader of a team and individual team members, from no team member participation (autocratic) to no leader participation (delegation) (Vroom & Jago, 1988). Management experts argue that, in many cases, team function will improve when decision-making moves away from traditional command decision-making to give individual team members more of a voice or buy-in to decisions (Fisher, 2000; Katzenbach & Smith, 1993). However, team-centered decision-making can have caveats. Fisher points out that managers accustomed to traditional "bossing" are often uncomfortable ceding decision-making power to the greater team. Likewise, team members are sometimes reluctant to take the responsibility that comes with playing a role in decision-making.

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[www.elsevier.com/locate/destud](http://www.elsevier.com/locate/destud)  
0142-694X \$ - see front matter *Design Studies* 31 (2010) 345–362  
doi:10.1016/j.destud.2010.03.002  
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While decision-making style appears to play an important role in team effectiveness, there is little research on its value specifically for design teams. Research on decision-making in design has focused on strategies for modeling design choices themselves, but less attention has been paid to the social aspects of how decisions are made during design. This paper seeks to bridge this research gap by comparing two team-centered decision-making styles applied to design tasks: consensus building and single leader decision-making with team input (Arnold, 2001). In consensus, all team members discuss their rationale for making decisions in order to arrive at a mutual agreement that is acceptable to all. Consensus tends to increase buy-in from individual team members, but decisions may be “watered down” through compromise in order to reach a conclusion that all can agree on. As a result, the process of building consensus can take additional time compared to other approaches. In single leader decision-making with team input, a leader makes a final decision after conferring with team members as a group. Individual team members may take less ownership of a decision than in consensus, but a decision may be reached with less compromise and in potentially less time. These two methods are similar in that they take into consideration the comments of the team, but they differ in the way authority is applied to a final decision. The research question considered in this paper is: What differences in decision-making outcome, if any, are there between design teams using consensus and those using single leader decision-making with group input? The overall intent of this work is to contribute to understanding of design team behavior that will help improve how designers make decisions in a group context.

This study looks at these two decision-making styles specifically in the context of structured engineering design methods. Some of the more well known of these methods are Quality Function Deployment (House of Quality) (Akao, 1990), Axiomatic Design (Suh, 1990), and Pugh Concept Selection (Pugh, 1991). Such methods provide formal guidelines for design decision-making and offer a shared visual representation around which teams can discuss issues concerning a design. This study uses structured design methods as a tool to engage teams in qualitative debate and discussion regarding design tasks. Structured design methods impose order on the process of decision-making and encourage the elicitation of design rationale and negotiation among team members.

In this paper, three common criteria for group decision-making are used to assess design decision-making tasks. First, the *speed* of reaching a decision is considered. Speed is a critical quantity particularly in environments where decisions must be made under time pressure (Eisenhardt & Zbaracki, 1992). Second, this study examines how satisfied individual team members are with the final choice (De Dreu & Weingart, 2003). Team member satisfaction with a decision may have implications for how well team members will support the final decision in the future and may reflect how well members believe they

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