Team Interaction Dynamics during Collaborative Problem Solving

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The need for better understanding collaborative problem solving (CPS) is rising in prominence as many organizations are increasingly addressing complex problems requiring the combination of diverse sets of individual expertise to address novel situations. This research draws from theoretical and empirical work that describes the knowledge coordination arising from team communications during CPS and builds from this by incorporating methods to study interaction dynamics. Interaction between team members in such contexts is inherently dynamic and exhibits nonlinear patterns not accounted for by extant research methods. To redress this gap, the present study draws from methods designed to study social and team interaction as a nonlinear dynamical system. CPS was examined by studying knowledge building and interaction processes of 43 dyads working to solve NASA's Moonbase Alpha simulation. Specifically, frame-differencing, an automated video analysis technique, was used to capture the bodily movements of participants and content coding was applied to the teams' communications to characterize their CPS processes. A combination of linear and nonlinear analytic and modeling techniques were applied to quantify and predict CPS performance based on the observed interaction dynamics and other individual differences. We hypothesized that teams exhibiting synchronization in their bodily movements and complementarity in their communications would produce better problem solving outcomes. The present research advances theory and empirical knowledge on effective team interaction during CPS and provides practical guidance on methods that can be used to observe and quantify interaction dynamics during CPS in complex work domains.