
PROJECT TEAM DYNAMICS AND COGNITIVE STYLE

Keith W. Buffinton, Bucknell University
 Kathryn W. Jablokow, Pennsylvania State University
 Kathleen A. Martin, Bucknell University

Abstract

Problem-solving styles and interpersonal dynamics of project teams are often critical factors for a team to function effectively. To study problem-solving styles and track intra-team interactions, the Kirton Adaption-Innovation Inventory (KAI) was used to determine the cognitive styles of engineering and management students in Bucknell's Institute for Leadership in Technology and Management (ILTM). KAI scores allowed interpretation and characterization of data from student journaling assignments that recorded observations about project team members' abilities to work and communicate with each other. KAI results show correlations with both positive and negative aspects of project team experiences. The results indicate potential sources of conflicts in project teams comprised of mature individuals working in a corporate environment.

Introduction

Within Bucknell University's ILTM, the faculty traditionally assemble student project teams to maximize heterogeneity in gender, major, and grade point average (GPA). The heterogeneity not only balances the capabilities and skill sets of the teams, but also forces students to work with others who may have different approaches to problem solving. Previous experience shows that although the teams are designed to be as similar as possible, some teams inevitably function better than others, and often at least one team suffers significant problems with team dynamics.

To investigate and establish the functional heterogeneity (or homogeneity) of the teams, cognitive style theory and the KAI were introduced into the ILTM on-campus program in the summer of 2001. Kirton's Adaption-Innovation theory is based on the assumption that individual cognitive differences in approaches to problem solving produce distinctive patterns of behavior and that the differences can be identified by a relatively simple psychological instrument. Kirton's work indicates that significant differences (20 points or more in KAI scores) in problem-solving styles of project team members can lead to serious difficulties in team members' functioning, communication, and collaboration.

By studying engineering and management students in the ILTM program, this investigation seeks to determine whether KAI scores can be used to develop correlations and draw conclusions about project team dynamics. This was accomplished by determining the KAI scores of the students and faculty advisors, then tracking the progress of the project teams through student journal entries and faculty observations. While the results are clearly applicable to student project teams, our results, as well as those previously reported on project team

dynamics (Foxall, 1986; Hammerschmidt, 1996; Keller, 1986; Schroder, 1994), suggest that our conclusions can be applied to a broad range of corporate, engineering, and managerial teams. The contributions of the present study are that it focuses on integrated teams of future engineers and managers, evaluates interactions of team members through journal entries, and closely ties KAI scores to observed functional problems.

We give an overview of the 2001 ILTM program with descriptions of the student project teams, a brief summary of cognitive style theory, and the approach to cognitive style developed by Dr. Michael J. Kirton. Specific data will be presented, including KAI score distributions and sample anonymous journal entries. Results indicate that KAI scores help with understanding and appreciating problem-solving strategies of others, and predict trouble spots within project teams.

About the Authors

Keith W. Buffinton is a professor of mechanical engineering at Bucknell University. He earned his BSME from Tufts University and his MS and PhD from Stanford University. His primary interests are in the modeling, dynamics, and control of flexible mechanisms, principally robots, with secondary interests in sports engineering and engineering management education.

Kathryn W. Jablokow is an associate professor of mechanical engineering at Pennsylvania State University, School for Graduate Professional Studies. She received her BS, MS, and PhD in electrical engineering from Ohio State University. She currently teaches and conducts research in robotics, system dynamics and control, and creativity.

Kathleen A. Martin is the assistant director of institutional research at Bucknell University. She earned her doctorate in physical education with a specialization in sport psychology from Springfield College. Her primary research interests are team and coaching staff cohesion and mentoring students and faculty in the process of conducting research. She also serves as a sport psychology consultant and statistical consultant.

Contact: Keith W. Buffinton, Bucknell University, Department of Mechanical Engineering, Lewisburg, PA 17837; phone: 570-577-1581; fax: 570-577-7281; buffintk@bucknell.edu (ILTM information)

Kathryn W. Jablokow, Pennsylvania State University, Department of Mechanical Engineering, Penn State Great Valley, 30 East Swedesford Rd., Malvern, PA 19355; phone: 610-648-3372; fax: 610-889-1334; kw13@gv.psu.edu (KAI information)