Assessing the Relationship Between Systems Engineering MPTs and Integrated Product Team Performance

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I. Overview

The study focused on the relationship between Systems Engineering (SE) models, processes, and tools (MPTs) and overall design project success. The research question addressed in this study was “Can we develop a mixed-methods model that will show the relationship between SE practices and project effectiveness?”

NASA supported two multi-institution projects as part of this study: Radio Astronomy on the Moon and a Science Mission to Europa. As part of an undergraduate Integrated Product Team (IPT) course, design teams were comprised of engineering and science students from various locations across the world. Training and surveys were developed and presented to the students to assess team member understanding and use of three significant SE tools: requirements development, functional analysis, and trade studies. Using the Pearson correlation coefficient, the data was then correlated with individual and team performance as determined by both internal and external assessments.

III. Impact

Systems engineering is a key enabler to support the development of complex systems. Drawing on years of best practices from industries, practitioners have developed SE MPTs designed to support IPTs dealing with related and often conflicting technical and programmatic requirements. Project failures are, however, still common. Part of this disconnect may be caused by a reliance on qualitative rather than quantitative data that is used to support MPT use. This research attempted to better understand this relationship by focusing on the understanding and use of specific systems engineering tools and comparing them to both individual and team performance.

IV. Explanation

The IPT course studied in this research aids in improving undergraduate education by supporting new engineers in making the transition from a classroom learning-focused environment to a real-world application-oriented environment.

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