Spring 2015 Seminar

The Role of Analogy in TRIZ and its Implications

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Abstract

Amidst current technological challenges, it is essential that engineering educator continue to foster the innovative potential of students. The ideation step in design is a crucial point for cognitive research as each successful artifact begins with a notion in the designer's mind. This work focuses on the TRIZ method and research that indicates its ability to improve the novelty of idea generation. Prior research in the literature has demonstrated TRIZ's ability to improve performance in engineers in industry and studies in this research portfolio demonstrate TRIZ's ability to improve the novelty of engineering student performance. On the basis of this work with students it is suggested that the underlying cognitive process necessary in successfully applying TRIZ is analogical reasoning.

Current research examines the predictive link from an individual's analogical and relational reasoning ability to their success using the TRIZ ideation method. TRIZ instruction was shown to significantly increase the novelty of participant’s generated solutions to an engineering design problem. Moreover, the degree of the increase in the novelty of a participant's generated ideas was linked to their relational reasoning ability. Specifically, those participants with greater ability to reason relationally experienced a greater increase in ideation success when using the TRIZ method. These empirical findings support existing theoretical accounts of the TRIZ method as an implicitly analogically-driven design method.

Implications for engineering practice and education are discussed. These repercussion include considering the role of analogy in other, established, design methods, and the impact that specific cognitive behavior for success has on the design and use of supporting tools (e.g., internet databases).

About the Speaker

Linda Schmidt is an Associate Professor of Mechanical Engineering at the University of Maryland with 19 years of experience teaching design courses. Schmidt completed her doctorate in Mechanical Engineering at Carnegie Mellon University with research in grammar-based generative design and earned B.S. and M.S. degrees in Industrial Engineering from Iowa State University. Schmidt has published over 100 refereed publications in the areas of design theory and methodology, product development and manufacturing, mechanism design, generative design and effective student learning on engineering project design teams. Schmidt co-authored three texts related to engineering design and manufacturing, partnering with co-author George Dieter on the 4th and 5th editions of the McGraw Hill text “Engineering Design.” Schmidt won the American Society of Engineering Education's 2008 Fred Merryfield Design Award and is an ASME Fellow.