Mars Mission Design Strategy Game for Attracting STEM Students

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The recent successful landing of NASA’s Curiosity rover on Mars, presents an opportunity to capture the imagination of young minds and excitement to pursue STEM fields. This is especially true for aerospace and defense fields where most STEM students/engineers are needed. National Academy of Engineering in their 2009 report emphasized that “engineering design” should be taught for STEM students in schools promoting engineering education following the engineering habits of mind. As a professor of mechanical engineering at VCU teaching design, I have been working on the idea of creating a design strategy board game for about two years or so with a view to demonstrate the design process to elementary/middle school children. Board games represent one example of using non-traditional means to educate students about design innovation concepts and promote interest in STEM fields.

Virginia Commonwealth University undergraduate students and faculty (Ben White, Alex Tatom, and Matthew Proietti, Patrick Profitt, Sarah Cunningham and Dr. Pidaparti) developed the Mars Mission Design Strategy board game (see picture insert) with the overall goal of illustrating the various phases of the design process. The Mars Mission board game is intended for school age children (ages 8–12 years). It takes them on a fun and educational journey along four loops as they visit different aspects of the design process (research, design, engineering and building) and answer questions related to understanding the Mars rover design specifications, engineering calculations, securing funding, and selecting components for their design. Finally, the players/teams evaluate their design against the criteria set forth before the beginning of the game mission related to cost, weight, efficiency, maneuverability, durability, and speed. After evaluation of their design, students/players build a physical model of their design by assembling the components. The winning design will have the highest score during the evaluation.

A prototype of the Mars Mission board game was developed and pilot tested at St. Catherine’s school to verify the games’ appeal and ease of use and most importantly confirm design engineering aspects of the Mars Mission board game. A major objective of the Mars Mission board game is to educate and provide awareness at an early stage so that all children will start practicing design innovation strategies and develop interest in STEM fields. With the help of sponsors, the Mars Mission board game can be mass produced and distributed to teachers/students to implement in the school curriculum in VA and beyond.

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