2021 AIAA Region II Student Conference

UGA Community Outreach Project - Space Race: A Voyage to the Moon Board Game

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Abstract

Background: Most elementary and middle schools lack the engineering (design innovation) component in the STEM curriculum as identified by the National Academy of Engineering (NAE) and the National Research Council (NRC). These reports also emphasize that "engineering design" should be taught in schools to promote engineering education and the engineering habits of mind. As we celebrate the 50th anniversary of the first moon landing, it is very timely and exciting that we were able to use nontraditional learning tools and create a design strategy game based on a voyage to the moon to boost STEM learning and skills of elementary and middle school students and attract the next generation of students to engage in space exploration and education.

Design Objective: The goal of the design game concept is to create a fun and informative learning product that inspires students (grades K5-8) to develop an interest in STEM careers by emphasizing the theme of "voyage to the moon". Three interrelated principles are also integrated into the design of this game. The first is the game primarily emphasizes engineering design. Second, it integrates students learning and draws upon their knowledge of math, science and technology. Third, it fosters creativity, teamwork, and application of engineering theory to real life. The design game concept is easily implemented in classroom or as a stand-alone activity that students can have fun completing at home.

Approach: This project was carried out as a capstone design project for senior students within the College of Engineering at UGA. After reviewing the existing popular board games, and also surveying schoolteachers, it became clear that there was a need to design a board game that is inspiring, educational and entertaining for the students. The team designed and evaluated multiple concepts using a design matrix to determine the final design concept that involves a competitive, traditional style board game in which players roll a die to progress from the earth to the moon, while implementing Chance and Question cards to provide historical context and assist the students in understanding STEM concepts. This design underwent several revisions after testing the game amongst our group and with college aged peers. The resulting board game incorporated missions to complete before reaching the moon in addition to original game elements.

Outreach and Education: Though the final board game, cards, and character pieces were all completed, due to the global pandemic, the game could not be tested with our target audience, and the physical game and cards could not be printed. Based on our design and development, we believe that providing our game to local grade schools would have a significant community learning impact, with the students and teachers experiencing a fun and educational medium to reinforce STEM concepts. Finally, our product could be used as an educational tool at home, which could reinforce these concepts the children are learning in class and keep them thinking about them outside of the classroom in a fun and engaging manner.