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IAF SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
New Worlds - Non-Traditional Space Education and Outreach (7)

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SKYBOX & ASTROBOT - AN ENGAGING AND PERSONALIZED EDUCATIONAL ACTIVITY FOR SPECIAL NEEDS CLASSROOMS FEATURING HANDS-ON ACTIVITIES

Abstract

STEAM educational activities that are targeted towards a youthful audience aim to foster interest and engagement towards science while letting imagination flourish and preparing the ground for a successful career. However, very few of these activities focus on special needs students, who are presenting conditions such as ADHD, autism, aggressivity, intellectual deficiencies and motor disabilities. For this specific audience, such activities must be carefully adapted. Technical content should remain low in complexity and students must stay engaged in order to maintain interest, preferably through hands-on and visual content. These atypical learning conditions call for non-conventional and original ways to introduce STEAM fields to such classrooms.

This paper presents the framework for "SkyBox" and "AstroBot", a set of activities designed for special-needs classrooms that leverages the skills of university students on their way to become space professionals, referred to as animators, bringing to those classrooms an engaging educational workshop in space technologies that focuses on perseverance, learning and creativity. The workshop or activity is designed by the classroom's teacher, who is most aware of the challenges affecting his students. Suggested activities include robot building with Lego Mindstorms, 3D printing experiments, CubeSat and Rover demonstrations, Mars base interactive simulations, and more. An animator is then paired with the teacher, helping him tailor and improve the activity's content. Once ready, the activity is presented by the animator, with supervision from the teacher for safety purposes. The SkyBox and AstroBot framework presents a unique opportunity for special needs children to learn more about space from an older student, who serves as a mentor and role-model and an example of perseverance, enabling an increase in self-esteem. It also allows to sensitize the animators and the general public on the reality of special needs children and their place in STEAM fields.

This paper presents the results of the project's first two editions, conducted in 2022 and 2023, based on measurable objectives such as the number of participating classrooms and classroom satisfaction. Important lessons learned and best practices when interacting with special-needs classrooms in the context of space education are also presented, followed by recommendations for professors and students looking to adapt this project to their social context. The SkyBox project started as an initiative from the Centre de services scolaire de Montréal (CSSDM) and has been promoted to all of its affiliated schools, which includes 129 elementary and 37 secondary schools.