IAF SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
Lift Off - Secondary Space Education (2)

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AN INNOVATIVE APPROACH TO LEVERAGE ON 3D-PRINTING AND LOCAL MATERIALS FOR SPACE EDUCATION OUTREACH TO SECONDARY SCHOOLS IN AFRICA: A LOOK AT IRAWOSCOPE -AFRICA'S FIRST 3D-PRINTED AFFORDABLE AMATEUR TELESCOPE.

Abstract

Long before Galileo Galilea invented the Telescope, the beauty and fascination of the Stars has always served as inspiration for Innovation. Traditionally, Africans have relied a lot on astronomy in daily life. However emerging technologies such as 3D-Printing, Artificial Intelligence, Virtual and Augmented Reality are beginning to disrupt our daily lives. In particular, 3D-Printing offers an exciting opportunity to improve the quality of STEM Education while enhancing hands-on experiential learning for visualizing and bringing into reality theoretical principles.

This paper presents the opportunities, recorded successes and challenges encountered while leveraging on 3D-Printing and locally-sourced materials for improving STEM Education and igniting the curiosity for Space among high school students (aged 11-18) in Nigeria, as they develop important skills needed to thrive in the 21st century technology sector. Specifically, it introduces; IrawoScope – Africa's first 3D-Printed Affordable Amateur Telescope, which was designed and manufactured by the team at AstioTech. Project AstioTech was initiated with the sole goal of making Space Education Learning more exciting and experiential for young people in undeserved African community schools. Also, some challenges encountered within the project were discussed. This paper further discusses about the Innovative teaching model used by the AstioTech team to inspire high school students into Space Education. The methods employed are in two phases. Phase 1 entails taking the students through hands-on lessons on how to design 3D computer models and then teaching them how to handle and operate a 3D-Printer to produce the various parts needed to make an Amateur Telescope. While Phase 2 then involves teaching the students to use locally sourced materials such as; Card-boards, PVC pipes and Bamboo to make replica of the 3D-Printed Amateur Telescope, after which they are taught the physics behind the functionality of a Telescope, in a more fun and exciting approach.

Lastly, evaluating the lessons-learned and learning outcomes from the Project, this paper discusses a collaborative Capacity Building strategy that involves a Public-Private partnership in supporting Space Education and Outreach in Africa. Thus, since 3D-printing is an expensive technology for most African schools, improvising with locally available materials would go a long way in defining strategies to provide cost-effective capacity-building practices and approaches that meet both social and economic needs with a particular focus on developing countries.