Development of Immersive Technologies Applied to Astrobiology Teaching

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Immersive technologies have been evolving and significantly influencing human interaction. In this scenario, developing High Immersion Environments (HIE) can contribute to education - providing universal access and the development of Scientific Literacy, alongside the skills and competencies required by Brazil's National Common Curricular Base (BNCC) and National High School Exam (ENEM). Moreover, such practices can promote Digital Literacy, critical thinking and contribute to developing autonomy and a fairer and more equitable society. This project aims to develop an HIE and verify the potentialities and challenges of its use in Astrobiology teaching, through Investigative Teaching Sequences. During Phase 1, the Pedagogical Approach, a study was made of Astrobiology concepts in Basic Education that could base the HIE's development, finding 28 concepts and 34 ENEM and BNCC skills. In Phase 2 - the Environment's Planning -, the Immersive Design Document was made. Furthermore, the storytelling elements were detailed, and the concepts that ground the HIE were selected, based on Phase 1's results. In Phase 3, the Environment's Development began. As a result, using Unreal Engine, Medium, Blender, Substance Designer, and Substance Painter software, the following were created: real-time interaction and movement, meshes, a spaceship, and multiple planets with diverse procedurally generated terrains, made with the Marching Cubes algorithm using a function based on multidimensional Perlin Noises combined with Fractional Brownian Motion and Domain Warping, scripted on C++. The results show the HIE can be useful to develop the selected concepts, skills, and competencies, bringing notable contributions to teaching.

Awards Won:
International Council on Systems Engineering - INCOSE: Certificate of Honorable Mention