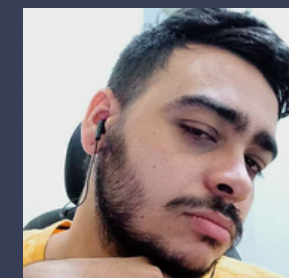


APPROACHING COLORS AND SHAPES IN A MULTISENSORY WAY

TEXTURIZED MATERIALS FOR INCLUSIVE ASTRONOMY EDUCATION



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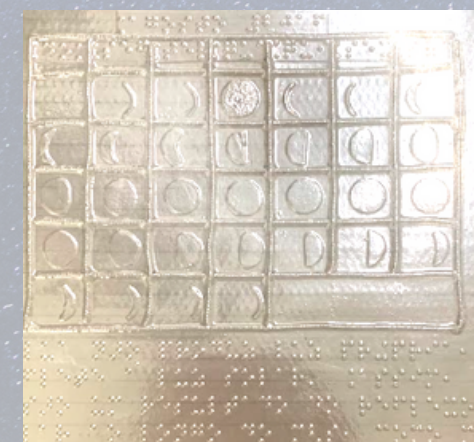
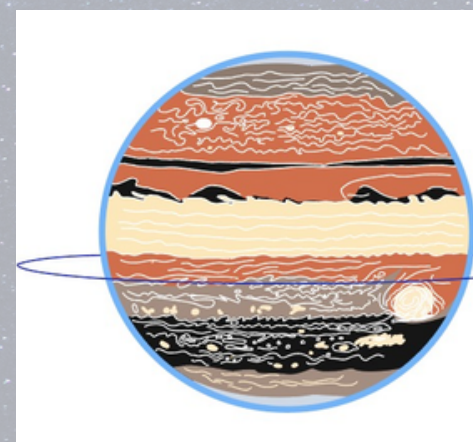
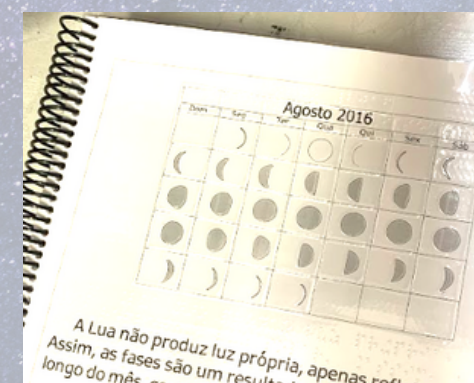
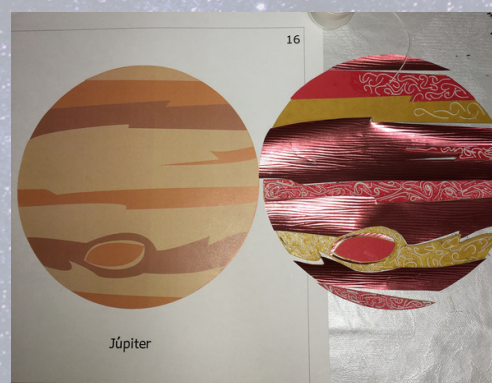
(1) CCMN / UFRJ - (2) OV / UFRJ - (3) EBA / UFRJ - (4) IBC

INTRODUCTION AND MOTIVATION

Observational techniques that work in different intervals of the electromagnetic spectrum are necessary to study and explore the universe. In fact, the optical spectrum - the one that can be observed by our eyes and ground-based telescopes - is the smallest interval of the entire electromagnetic spectrum. Other spectral regions are blocked, either totally or partially, by the Earth's atmosphere, rendering them invisible to human eyes. In this work, we adapted images observed at different wavelengths, making them tactile through texturization with low-cost materials such as beads, textured paper, and string, which are applied over the images. Once the textured image is created, it is passed through a thermoform machine that "prints" the textures onto an acetate sheet, which will be used by blind and visually impaired children. Our goal was to highlight the differences between images obtained in the visible and infrared spectra and to show that something that is invisible to sighted individuals becomes an inclusive teaching and outreach material for children with visual impairments. Images of the planets Jupiter and Uranus, and the galaxies M74 and IC5332 - all observed in both visible and infrared spectra - were chosen. The textured images will be tested by technicians at the Benjamin Constant Institute before being used in the classroom.

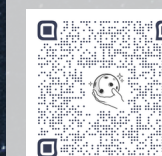
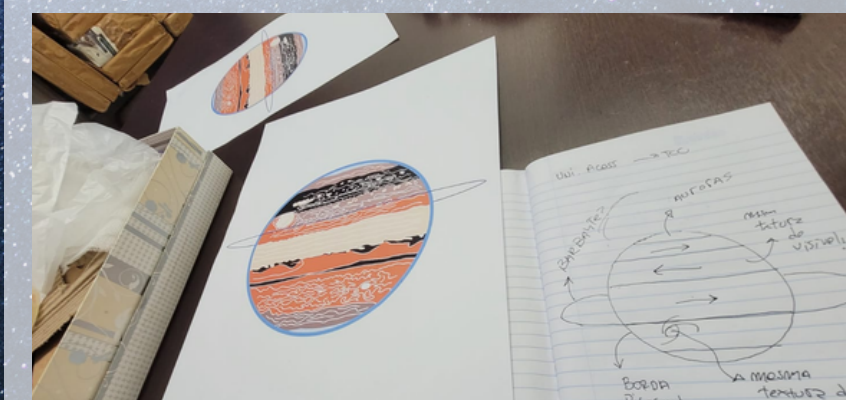
DEVELOPMENT

To produce tactile pages we have a few steps. Once the astronomical image was adapted, we started texturing. The textured page will be a template. Thus, we will have two pages, one of which is a textured model (the template), created by us, representing the image we want to show. This page we created using different low cost materials like twine, beads, special papers. The other is a plastic page. The textured model is produced from the technique called thermoforming, which involves heating a thermoplastic material to produce specific shapes. After that, the material is cooled to solidify and maintain its shape. The plastic page overlaps other writing and drawing, with contrasting colors.



CONCLUSION

The work is in the final phase of development. The adapted Jupiter model is part of the fourth volume of notebooks produced by our project, "Universo Acessível". However, it will also be used to compare Jupiter in the visible wavelength (captured by the Hubble Telescope) with the non-visible wavelength (captured by the JWST). Once completed, the model will be evaluated and tested by a technician from the Benjamin Constant Institute (the leading center for education of blind and visually impaired individuals in Brazil) and displayed as a plaque for inclusive classes of science.



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