IAF SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
Space for All: Promoting Inclusive Practices in Space Exploration (2)

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INCLUSIVE ASTRONOMY MAPS: UNIVERSAL DESIGN FOR ACCESS TO SPACE

Abstract

Astronomy is one of humanity's most fundamental sciences, offering insights into the origins and structure of the universe. However, its educational materials rely heavily on visual data, creating significant barriers for visually impaired individuals. Traditional tools such as star maps, telescope images, and digital simulations cater primarily to sighted users, limiting accessibility and engagement in space sciences for those with visual impairments. This lack of inclusivity restricts access to knowledge and prevents visually impaired individuals from actively contributing to scientific discourse.

To address this issue, this study introduces **Inclusive Astronomy Maps (IAMs)**, an innovative approach enabling both sighted and visually impaired individuals to explore the cosmos together. IAMs integrate tactile surfaces, audio descriptions, and interactive technologies, ensuring universal accessibility in astronomy education. This groundbreaking development fosters a shared learning environment where individuals with different sensory abilities can engage equally.

Astronomy maps are essential tools for understanding the positions and characteristics of celestial bodies. However, traditional maps rely solely on visual elements, excluding visually impaired individuals. IAMs overcome this limitation by incorporating tactile embossing, textured surfaces, and audio guidance. Constellations are represented through raised textures, allowing users to explore shapes through touch. When a specific area is touched, audio descriptions provide details about the object's name, size, and location. Additionally, interactive digital systems allow users to navigate the night sky using voice commands, further enhancing accessibility.

The most significant feature of IAMs is their ability to serve both sighted and visually impaired individuals simultaneously. This shared learning experience promotes inclusivity and equal opportunities in astronomy education. Visually impaired individuals can actively engage with space sciences, while sighted users benefit from enriched tactile and auditory learning experiences. By fostering collaboration and accessibility, IAMs create a more inclusive and dynamic educational environment.

Designed with multilingual audio support, IAMs are adaptable for global use across various educational systems. Their flexibility ensures accessibility across different cultures and languages, making them a powerful tool for inclusive space education. By addressing the lack of accessible educational materials, IAMs increase engagement in astronomy for visually impaired individuals, bridging gaps in scientific education.

This project represents a significant transformation in astronomy education. IAMs empower visually impaired individuals while enriching the overall learning experience for all. By applying universal design principles, this study sets a new precedent for accessible science education, ensuring that the wonders of the universe are available to everyone.