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III Workshop for Astronomy Beyond the Common Senses for Accessibility and Inclusion (3WAI) (November 29-30, 2023)
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ASTRONOMY FOR EQUITY'S COMMUNITY HUB FOR EXPANDING ASTRONOMY OUTREACH TO BLIND AND LOW VISION INDIVIDUALS WORLDWIDE

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RESUMEN

Los astrónomos aficionados de todo el mundo acercan la astronomía al público, las escuelas y otros lugares a través de una gran variedad de programas de divulgación, compartiendo el cosmos con otros. Sin embargo, la astronomía se representa principalmente de forma visual, lo que excluye a quienes son ciegos o tienen baja visión. No obstante, existen recursos táctiles y de sonificación para una variedad de actividades, y hay experiencia en presentar la astronomía a aquellos que no pueden ver, desde clubes de astronomía hasta instalaciones de la NASA. El Centro Comunitario de Astronomía para la Equidad para compartir estos recursos con organizaciones activas de divulgación en todo el mundo, aumentará la conciencia y utilización de estos recursos y experiencia existentes.

ABSTRACT

Amateur astronomers worldwide bring astronomy to the public, schools, and other venues through myriad outreach programs, sharing the cosmos with others. Astronomy is represented primarily visually, though, which leaves out those who are blind or have low vision. Tactile and sonification resources for a variety of activities, however, and there is experience in presenting astronomy to those who cannot see, from astronomy clubs to NASA facilities. Astronomy for Equity's community hub for sharing these resources with active outreach organizations around the world, will increase awareness and utilization of these existing resources and expertise.

Key Words: tactile — sonification — astronomy clubs

1. INTRODUCTION

John Dobson is generally credited with launching a revolution in the activities of amateur astronomy clubs with the founding of the San Francisco Sidewalk Astronomers in 1968[2]. Taking telescopes to the streets where the people were rather than dark-sky sites with better observing conditions, Dobson encouraged amateur astronomy clubs to engage the public through outreach and education programs. During the Global Star Party of the 100 Hours of Astronomy Cornerstone Project of the International Year of Astronomy 2009 (IYA2009[3], outreach astronomers gave a first view of the cosmos to as many as one million people in one night in most of the world's countries. The public's opportunity to learn directly from outreach organizations has only grown since then. Many clubs take educational materials and telescopes to rural locations for people who would otherwise never have these opportunities in an effort to ensure that no one is left out. Notable examples include the GalileoMobile[4], launched as a Special Project of IYA2009, AstroBus Ethiopia[5] (Fig. 1), and outreach efforts on behalf of children in Internally Displaced People (IDP) camps in northern Nigeria conducted by AWB-Nigeria[6]. Several projects have developed inclusive tools for astronomy education as well, both during IYA2009 (Ortiz et al 2010, 2011) and later (Ortiz et al 2011; Ortiz el al 2014; García et al 2013), as "Astronomy for all Senses"[7]. At the professional level, the IAU created "Inspiring Stars" (D'Antonio, Canas, Díaz Merced 2019), an inclusive, international traveling astronomy exhibition (Fig. 2).

But, in general, for those who are blind or have low vision, astronomy remains out of reach. Educational materials are primarily presented visually even when the source data is from telescopes that gather wavelengths that we cannot see, such as infrared,

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[2]https://www.sidewalkastronomers.us/id31.html

[3]https://www.astronomy2009.org/

[4]https://www.galileomobile.org

[5]https://www.astrobus-ethiopia.com/

[6]https://awbnigeria.org/report-idp-cao-covid-intervention/

[7]https://www.astro4dev.org/astronomy-with-all-senses/

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Fig. 1. The Astrobus of the Ethiopian Space Science and Technology Institute visits a rural location, introducing STEM through astronomy, with telescopes and other educational resources. Credit: Ethiopian Space Science and Technology Institute.

Fig. 2. "Inspiring Stars" is an inclusive international traveling exhibition created by the International Astronomical Union. Here, blind students enjoy learning about astronomy.

radio, or x-ray, with data converted into visual images using various representations. There are many organizations that have created tactile and sonification resources in order to share their passion for astronomy with those lacking vision and repositories of these materials have been created (Fig. 3). The IAU Executive Working Group for Equity and Inclusion maintains a repository of inclusive resources gathered from many sources, with a section for materials for use with blind and low vision people[8], and the projects cited previously maintain archives.

2. BRIDGING GAPS FOR THE VISUALLY IMPAIRED

Some astronomy resources have been created by individuals and organizations that have started their own programs for this form of inclusive outreach ranging from amateur astronomy clubs to the

[8] https://iau-oao.nao.ac.jp/iau-inclusion/files/astronomy-for-blind/

Fig. 3. Blind people learning about Earth's day/night cycle, the seasons, and more using a tactile model representing the Sun, Earth, and sunlight. Credit: Stelle per Tutti.

Space Telescope Science Institute[9], which operates the Hubble Space Telescope and the James Webb Space Telescope, and the Chandra X-Ray Observatory[10]. These practitioners have mostly had to figure out how to do this themselves but they now have years of experience. A few amateur astronomy clubs around the world that are already engaged in public outreach and education have done the same, finding their own paths to creating these programs. But this represents a very small fraction of the astronomy outreach and education community.

There are two reasons for this: 1) Lack of awareness of the possibility of doing astronomy outreach and education with blind and low vision people and 2) Uncertainty in how to get started and work with people who are blind or have low vision. The author has discussed this with astronomy clubs around the world and others in astronomy who almost unanimously express surprise when hearing that this is possible. And they are often quite enthusiastic about the idea of engaging this community. After all, sharing with others is at the very heart of outreach. The Inclusive Outreach sub-working group of the IAU Executive Working Group for Equity and Inclusion[11] holds regular webinars providing useful information. But despite stated interest from groups worldwide in beginning these programs and the availability of resources, few groups do so.

3. ASTRONOMY FOR EQUITY'S COMMUNITY HUB FOR INCLUSIVE OUTREACH

Astronomy for Equity Working Group has created a community hub where astronomy outreach

[9] https://www.stsci.edu/~carolc/3dastronomy/3D-Astronomy.html

[10] https://chandra.harvard.edu/edu/touch/

[11] https://iau-oao.nao.ac.jp/iau-inclusion/inclusive-outreach/

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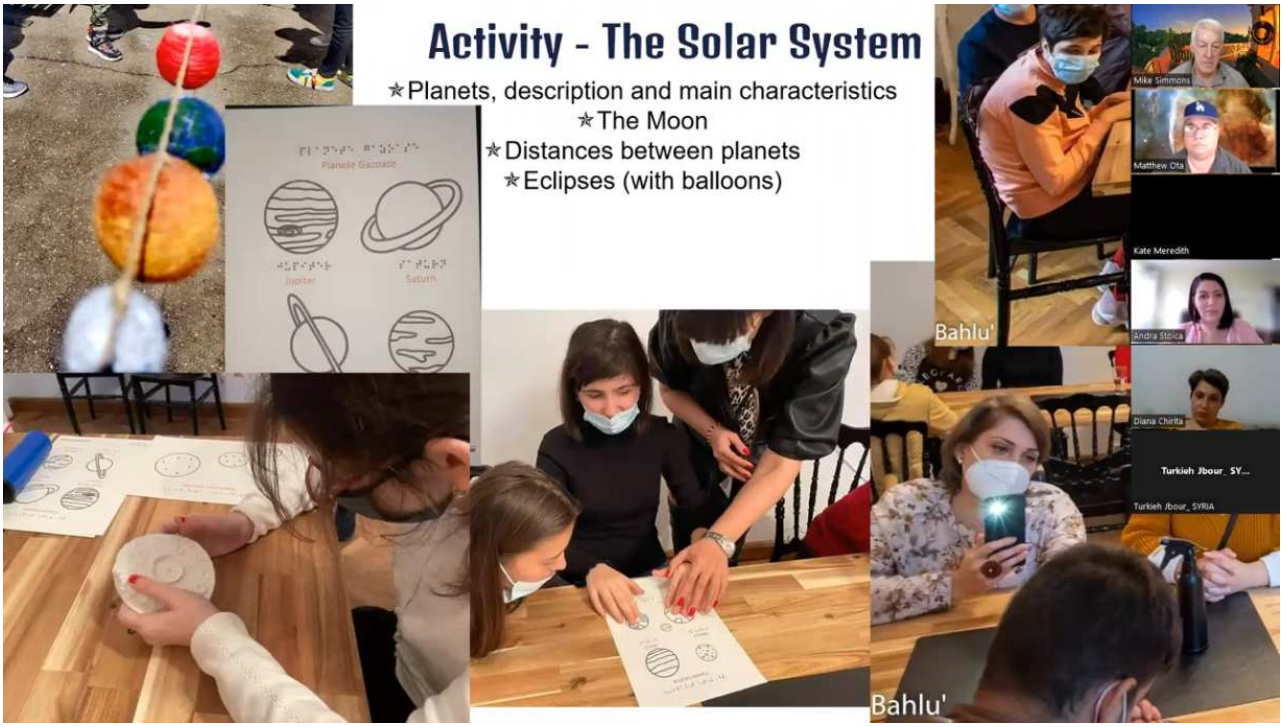

Fig. 4. Andra Stoica of Space Club in Bucharest shares a recent outreach program with blind and low vision students. The club used tactile materials that they had made themselves as well as purchased. Credit: Space Club, Bucharest, Romania.

organizations can learn firsthand how to include individuals who are blind or have limited vision in their outreach programs[12]. This community hub provides the missing component for success, a social context in which beginners can learn directly from mentors, ask questions, and share with others who hope to start similar programs. Social learning environments improve participation and the probability of success compared to working in isolation. Individuals are encouraged and inspired by what other beginners accomplish. Group learning environments are more engaging, exciting, and fun for most people. Learners are more enthusiastic when sharing the experience with others. A diversity of perspectives leads to deeper understanding, involvement, and a sense of accomplishment. Few invest time to research a new field or learn how to interact with those who are blind. Here, self-starters who have done so are helping others enter this unfamiliar territory.

The community hub is similar in some ways to a workshop that one might attend at a conference. Participants are given materials, told how to use them, and can ask questions of the experts. Participants may be seated at a table with others who often end up working together to solve problems they run into (Fig. 4). But there the similarity ends. Workshop participants take their materials and their first experience in the topic home but do not always build on the experience. The community hub is a workshop that continues, is available 24 hours a day, and is accessible from anywhere. There are benefits for experienced practitioners as well. There is little or no communication between most practitioners, particularly amateur astronomy clubs. Aside from sharing successes and new ideas, resource creators in the community hub can learn about the use of their own resources with different audiences and cultures. Experienced practitioners learn from others with different audiences, such as the public versus students in special schools. With most practitioners working in isolation, everyone learns from others once they meet up. A survey among group members found that about half were already engaging blind and low vision people in astronomy and wanted to both share what they've developed and get feedback from a more diverse audience. Among the first members of the community hub, along with educators at NASA facilities, are amateur astronomy clubs from around the world on every continent except Antarctica, with approximately half outside the developed western countries. Astronomy is universal and people everywhere deal with issues that marginalize and

[12] https://discord.gg/f48gyPZFrG

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isolate communities. All of these astronomy outreach groups are sharing with others who have yet to discover the wonders of the Universe. The expansion of this community hub, based entirely on existing resources and expertise, is driven by that enthusiasm to share with others, in the same way that other programs bring astronomy to other isolated communities.

4. CONCLUSION

It may be surprising to some that in our globally connected world there are ambitious individuals continually reinventing materials and procedures that others have already created and used. Unfortunately, this is the norm. The problem is generally not a lack of resources or expertise but a lack of awareness and distribution. This is the first of several community-based efforts being created by Astronomy for Equity to increase the use of existing resources and expertise among outreach groups to promote astronomy in ways that benefit marginalized communities, providing the greatest impact with the least effort and expense. The next community hub planned will be for those sharing experiences with rural, isolated communities with the goal of encouraging more outreach groups to expand their programs to include those who are geographically isolated and, therefore, most often in need of STEM opportunities.

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