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Empowering Young Minds through the Abdul Jabbar Astronomy Workshop: A Model of Informal STEM Learning in Bangladesh

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Since 2009, the Abdul Jabbar Astronomy Workshop has emerged as a flagship program of the National Outreach Coordinator (NOC)-Bangladesh Office under the IAU Office of Astronomy Outreach (OAO). Named after one of Bangladesh's pioneering astronomy educators, this initiative aims to foster interest and foundational understanding of astronomy among higher secondary and undergraduate students through informal STEM education methodologies.

Held annually, usually in the capital city Dhaka, and now distributed across multiple regions—including Chattogram and Rajshahi cities—this workshop integrates engaging theoretical sessions with interactive, hands-on activities, fostering a participatory learning environment. Leveraging informal learning pedagogies highlighted by Alexandre et al. (2022), the program emphasizes collaborative exploration, critical thinking, and sustained student engagement beyond conventional classroom settings. Session topics include cultural astronomy, positional astronomy, planetary science, stellar astrophysics, introducing sky-observing softwares and telescopic observations, astrobiology, and cosmology, delivered by an international array of experts and educators, both offline and online.

The workshop curriculum is further enriched by the guiding framework of the Big Ideas in Astronomy—a globally endorsed set of 11 core concepts developed by the IAU to help educators communicate key astronomical principles. These Big Ideas and their nested elaborations offer a coherent structure for planning learning outcomes and designing outreach content aligned with evolving scientific understanding.

A notable feature of this Workshop is its measurable impact. Utilizing pre- and post-workshop assessments, significant improvements in participants' conceptual grasp and scientific reasoning have been documented, echoing the findings of Trott & Weinberg (2020) who identified transformative outcomes associated with participatory and action-focused pedagogies. Furthermore, aligning with findings from Contente & Galvão (2022), the workshop demonstrates enhanced cognitive and metacognitive competencies among students through interdisciplinary problem-solving activities.

Driven by the enthusiastic efforts of national volunteers, translation teams, and regional astronomy societies, this Workshop series exemplifies a scalable model of informal STEM learning capable of bridging educational gaps and promoting widespread interest in astronomy. Over the decades, we have incorporated pedagogical research results to continuously improve the workshop deliverables. This paper details the workshop's structure, impact evaluation methodologies, encountered challenges, and insights from organizing multiple editions, underscoring the significance of informal, inclusive, and community-driven astronomy education in developing nations.

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