

Cultural Astronomy: Transformative Potential in Basic Education

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Astronomy, one of the oldest sciences, traditionally studied from a Western perspective, reveals transformative potential when examined through cultural diversity. This work explores the integration of Cultural Astronomy into basic education, proposing a reconfiguration of teaching to incorporate an intercultural understanding that values the celestial knowledge of various cultures.

The educational system often faces challenges in dealing with cultural differences, especially in the inclusion and recognition of those who do not fit hegemonic standards. These challenges are evident in traditional approaches that tend to overlook the rich cultural plurality and the valuable contributions that non-hegemonic knowledge can offer to student development. Intercultural perspectives challenge these dominant norms, seeking to overcome assimilationist and differentialist approaches that, as discussed by Candau, often result in the homogenization of knowledge from marginalized cultures or in the intensification of cultural segregation by excessively emphasizing differences without promoting effective dialogue [1].

Within the disciplines associated with the teaching of Natural Sciences, Astronomy stands out for its intercultural potential. The varied interpretations of the sky and the different ways of relating to it provide a rich field of intercultural study. Cultural Astronomy, specifically, investigates how different societies perceive and interact with celestial phenomena within their cultural and social contexts [2]. This field of study seeks to integrate the knowledge of various cultures through the observation of the sky and its influence on the lives of cultural groups, enhancing a science education that is more inclusive and representative of global diversity.

Integrating Cultural Astronomy into basic education is not limited to expanding the science curriculum but involves reorienting pedagogy so that cultural diversity becomes an essential component of teaching. According to Lima et al., this intercultural approach promotes respect and appreciation for diversity, which are fundamental in pluralistic societies [2]. Through Cultural Astronomy, a bridge is established between scientific and cultural knowledge, revealing how science is intrinsically linked to diverse historical and cultural contexts.

Moreover, by exploring astronomy through a cultural lens, students can perceive that scientific knowledge is just one of multiple ways of understanding the world. This view aligns with the ideas of Jafelice, who advocates for a holistic approach in science education, where different perspectives are valued and integrated into learning [3]. This holistic perspective is further reinforced by legal guidelines, such as Federal Law No. 11.645/08, which encourages the inclusion of Afro-Brazilian and indigenous history and culture in school curricula. As pointed out by Oliveira, these guidelines not only promote more inclusive and representative education but also ensure that students recognize and value cultural diversity as an essential enrichment to their academic and personal formation [4].

However, the inclusion of Cultural Astronomy faces significant challenges, from institutional resistance to a lack of adequate educational resources. As observed by Candau, many schools still adopt assimilationist or differentialist perspectives, which can dilute or marginalize non-hegemonic knowledge [1]. Assimilationism, for example, tends to homogenize cultural contributions, framing them within a dominant framework that does not reflect the true richness of diversity. In contrast, the differentialist approach can inadvertently

promote segregation by overly emphasizing differences without encouraging constructive dialogue between cultures.

The intercultural proposal seeks to balance the appreciation of diversity with the promotion of shared understanding and mutual respect among different cultural communities. Implementing this approach involves reexamining and possibly reinventing pedagogical practices and curricula to ensure that education in Cultural Astronomy not only adds to the educational environment but transforms it to incorporate and value all voices. As Rodrigues points out, it is crucial for educators to develop teaching materials and methods that reflect the plurality of astronomical and cultural knowledge, paving the way for a richer and more inclusive understanding of science [5].

Education in Cultural Astronomy has the potential to profoundly transform students' perceptions of the universe and their social interactions, fostering mutual respect and intercultural understanding. By integrating various interpretations of the cosmos, students are encouraged to challenge the Western-dominated view in science. Jafelice highlights that learning about cultural connections with celestial phenomena allows students to perceive science as a narrative intertwined with culture, religion, and philosophy, not just as a collection of decontextualized facts [3].

In conclusion, integrating Cultural Astronomy into basic education not only meets legal guidelines that promote multicultural education but also redefines the parameters of how science is taught and understood in a globalized context. This work has shown that the intercultural approach of Cultural Astronomy can substantially enrich the educational curriculum while preparing students to be global citizens, aware and respectful. By exploring a variety of cultural perspectives on celestial phenomena, this educational approach challenges traditional paradigms and fosters a learning environment that values diversity and intercultural dialogue. Thus, Cultural Astronomy emerges as a crucial element not only in promoting tolerance and empathy but also in developing profound critical thinking, preparing students to face and positively contribute to an increasingly diverse and interconnected society. Therefore, more than an addition to the curriculum, Cultural Astronomy is an essential educational necessity to cultivate a more comprehensive and inclusive understanding of the world we live in.

References

- [1] V. M. Candau, "Multiculturalismo e educação: desafios para a prática pedagógica," in *Multiculturalismo: Diferenças culturais e práticas pedagógicas*, Candau, V. M. and Moreira, A. F. B. (Eds.), 10th ed., (Editora Vozes, Petrópolis, 2013), pp. 13-37.
- [2] F. P. Lima et al., "Sky-earth relations among indigenous peoples in Brazil: distinct skies, different views," in *History of Astronomy in Brazil*, Matsuura, O. T. (Ed.), (Companhia Editora de Pernambuco, Recife, 2013), pp. 85-128.
- [3] L. C. Jafelice, "The teaching of Cultural Astronomy: For whom, by whom, how, and why?," *Proceedings of the IV National Symposium on Astronomy Education (SNEA)*, (Goiânia, 2016).
- [4] É. de Oliveira, "Multiculturalismo e Ensino de Ciências na Educação Básica: Desafios e Potencialidades da Astronomia Cultural," Master's Thesis, University of São Paulo, (São Paulo, 2020).
- [5] M. de S. Rodrigues, "The diversity of knowledge about the sky and astronomy teaching: didactic proposals and potentialities of cultural astronomy," Master's Thesis, University of São Paulo, (2015).