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The First International Astronomy and Astrophysics e-Competition

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Abstract

The International Olympiad on Astronomy and Astrophysics, which had been postponed owing to the continuing COVID-19 pandemic, was replaced with the inaugural Global e-Competition on Astronomy and Astrophysics in September–October 2020. Despite the limited time provided for planning, the tournament was run effectively, attracting 325 students from more than 42 nations without any serious concerns. The attendees' comment was favorable and highlights how similar activities may increase interest in astronomy and astronomy education. In order to serve as a reference for other event organizers, and given that online activities are expected to become more common in the future, we offer an overview of the competition process as well as some lessons discovered after the fact.

Introduction

The International Olympiad on Astronomical and Astrophysics, often known as IOAA, is an annual competition in which students in their final year of secondary school compete by solving both theoretical and practical astronomy questions. It was founded as a response to the perceived need for an event with a format like the International Physics Olympiad (IPhO), but one better suited to astronomy and astrophysics. Because of this, it is a part of the International Science Olympiads. Any nation may submit a team of up to five students together with two adult team leaders (a second team, or "guest," may also be sent with the host's consent). Although the national selection procedure is left to each nation, it often entails a national astronomy Olympiad or comparable competition. It goes without saying that topics connected to technology, such as robotics, programming, or astronomy, pique the attention of young people and children and may be used as motivators for pedagogical work in a variety of sciences, including mathematics. Even though astronomy is one of the oldest academic sciences known to mankind, it does not have a fitting position in a traditional school curriculum. Students complete the fundamental education cycle without even being exposed to the fundamental scientific principles, leaving them vulnerable to the traps set by misinformation waves, such as conspiracy theories, false news, negationism, post-truth, or the acceptance of alternative truths. As a result, it was decided to conduct a descriptive study to further the theme's development. This study would present the opinions of experts in the field as well as the findings of observations made during a graduation internship regarding the teaching methods used by the "School Project" from the Alpha Lumen Institute, an NGO that works with high-skill students in So José dos Campos. This study, therefore, serves to illustrate both the presence of an interdisciplinary between astronomy and mathematics as well as the outcomes of a teaching strategy that establishes this interconnection as a consequence of the scenarios highlighted. From the time we are born, until early life, we are constantly developing our natural awareness of space and shapes. Even if unintentionally, we are forming the initial geometric ideas, and through time, as we mentally create the environment around us, we will come to grasp how the space around us operates. When we suddenly glance up at the sky, all we had learned up until that point is ineffective at defining what is in front of our eyes. Astronomy is one of the first human disciplines that has been studied throughout history, and it has been shown to be crucial in a wide range of endeavors, even the most basic ones like hunting, fishing, navigation, agriculture, climate control, weather forecasting, and calendar dating. History demonstrates how closely tied it is to mathematics that diverse ideas that mathematicians have understood and employed up until now may be determined from the observation of celestial bodies. In every single field

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of knowledge, we are aware that when a person's curiosity or interest is piqued, information is assimilated more thoroughly, which has the effect of fostering an even greater desire to learn more. In this way, if the connection between astronomy and mathematics is presented as a basic explanation, we might inspire pupils to tackle the subject of mathematics or even to do so from new perspectives. This link is, however, seldom touched upon in the contemporary educational context. When it comes to this science, the majority of pupils who have gone through the instructional phases lack consistent information. Furthermore, this issue is quite concerning, made all the more so by the fact that we are currently seeing a misinformation campaign that questions fundamental scientific ideas like the shape of the planet Earth.

The host country plans the tournament and offers lodging, seminars, cultural activities, and excursions for the competitors. The participants learn from these activities that other young people share their interest in astronomy throughout the world. Participants routinely express a high level of appreciation for this component, and many of them go on to pursue astronomy as a field of study and employment as a result of their positive participation. Additionally, the IOAA inspired the establishment of national astronomical contests in a number of nations, and instructors still utilize its former papers and problems as a source of information. The difficulties of holding the IOAA have also led to tighter relationships between professional and amateur astronomers as well as between astronomers and instructors. In participating nations, all these factors contribute to the growth of astronomy education. The host country plans the tournament and offers lodging, seminars, cultural activities, and excursions for the competitors. The participants learn from these activities that other young people share their interest in astronomy throughout the world. Participants routinely express a high level of appreciation for this component, and many of them go on to pursue astronomy as a field of study and employment as a result of their positive participation. Additionally, the IOAA inspired the establishment of national astronomical contests in a number of nations, and instructors still utilize its former papers and problems as a source of information. The difficulties of holding the IOAA have also led to tighter relationships between professional and amateur astronomers as well as between astronomers and instructors. In participating nations, all these factors contribute to the growth of astronomy education. The IOAA has historically been a free-to-enter competition. Each of the member nations offers to host the IOAA once, and during their chosen hosting year, they are responsible for covering all associated costs. Even in rare circumstances where a nation is unable to acquire the financing required to host, the participation price is maintained to a low just to cover the budgetary gap and no further burden is imposed on the participants. Team captains and members of the IOAA executive committee are all unpaid volunteers. Team leaders were invited to volunteer to assist in assessing the response scripts as part of GeCA's same financing strategy, which included no participation fees for participating teams.