

## Editorial

The *Latin-American Journal of Astronomy Education* (RELEA) achieves its second issue. This fact certainly satisfies us because it means a continuity towards the consolidation of the initiative that led to the creation of the Journal, with an international presence, aimed to promote and express the Latin-American research in this area.

However, we are not as satisfied as we might have expected. The reasons for that are quite evident: we expected to launch at least two issues per year, ideally featuring a higher number of papers per issue. This second issue, however, is launched almost one year after the first one and contains a minimal number of papers.

Despite the fact that we have been rigorous with the selection of articles, in order to define and hold a quality standard for the RELEA, this does not by itself explain the difficulties encountered by us for increasing the frequency of the issues. We have attempted both national and international dissemination of the Journal, and invited several potential authors to submit contributions in their particular fields of work to be refereed in the Journal.

The reasons behind the lack of publishable material are various. We must conduct a specific investigation to identify the causes with higher confidence, but we may suggest some reasons, based on our previous experience in this area and our knowledge of the “community” of those involved with the teaching of Astronomy.

It is convenient for this brief analysis to confront the teaching of Astronomy with the teaching of other sciences. Among the latter, the teaching of Physics has the longest tradition, not only in Brazil but also in the rest of the world generally speaking. In Brazil, in particular, after 30 years of the creation of this area of research one has a relatively large number of PhDs who perform research and advise graduate students in Physics teaching, most of these also begin to publish their work. This is not yet the case of the teaching of Chemistry, Biology, and certainly not the case of Astronomy teaching.

The works addressing teaching of Chemistry began to appear almost a decade and a half ago, and more recently teaching of Biology and Science for the elementary school followed. However, the teaching of Astronomy is still in its infancy in terms of research in education. In this area of our direct interest, most of the activities of the involved people still resemble the former “popularization of science”, with all the limitations and biases of that approach, rather than actual educational research.

In Brazil, it is only in the last three years that specific graduate Master programs were created, aiming explicitly the formation of *Masters in Astronomy Teaching*, in the opposite geographic extremes of the country: one hosted by the Universidade Federal do Rio Grande do Norte (Natal) and the other by the Universidade Federal do Rio Grande do Sul (Porto Alegre). Thus, we foresee a medium-term growth of publication in the area. In the rest of Latin-American countries, graduate studies in Astronomy teaching are in a much worse situation.

In spite of our discussion not being exhaustive, one of the motives that appear for so few articles being submitted is the small number of professionals working specifically with the teaching of Astronomy, in comparison with the number of those working with the teaching of other sciences.

Another motive to stress related to that fact is the relative lack of tradition for publication. In fact, most of those involved with the teaching of Astronomy are amateurs, interested more in the dissemination of Astronomy to the public opinion, in the form traditionally made, rather than in the development of methodologies and didactic resources to be systematically communicated to their colleagues for the improvement of conclusions and reflections related to pedagogical and cognitive aspects in the area.

Certainly the recent launch of the RELEA as well as the fact that its credibility and reputation must be yet established among its potential audience of readers and authors, is also a factor that adds to this slow start of the publications. However, a quick look at the quality of the material being published in Astronomy teaching by a handful of Journals in science education makes clear that the problem of the reduced number of Astronomy contributions is even more severe than the one suffered by the RELEA, or that might be attributed to its new character just because it has not yet been established as a traditional vehicle in the area.

In summary, we believe that the main reasons for the low productivity of papers in this area are the lack of tradition of publication and the small number of researchers working in the development of didactic and pedagogic methodologies in Astronomy, not only in the practical and operational aspects for the students and general public, but also in epistemological and conceptual issues present in the construction of astronomical knowledge, the historical, philosophical and sociological aspects of that knowledge, and the discussions about educational policies and the inclusion of Astronomy contents in national curriculum guidelines in the various levels of formal education.

We conclude this first part of the Editorial with a reflection, which we like to share with our colleagues kindly invited to join efforts and propose some solutions, even if preliminary and incomplete. In our opinion, the teaching of Astronomy faces two serious problems: the lack in the formation of human resources and the non-existence of a tradition of exchange of material and ideas among researchers about systematic work in this area. The autonomy of this research, from the methodological and epistemological points of view, is not yet being fully exploited. Most of the authors who occasionally publish in this area have formation and interests primarily in Physics teaching or other sciences teaching. Teaching of Astronomy does not appear yet to constitute a field with enough density, depth and own identity in what concerns its contribution to the research in education. However, there are some hints that this situation may and should change.

We need to work for the consolidation of the natural aim of this field. The RELEA hopes to contribute for that purpose, although there is a lot to be done by those of us interested in the development and improvement of the teaching of Astronomy at the several education levels. We encourage the dissemination of the RELEA's site and the submission of opinions and matters for discussion of the problems pointed out above, and naturally for the submission of articles.

In this second issue five articles are published dealing with several matters.

In the article *Conversations with Marcrgrave: The Origin of Modern Astronomy in the Southern Hemisphere*, Alexandre Medeiros and Fábio Araújo enlighten the history of Astronomy "below the equator", relating it to an important period of colonial Brazilian northeast region. The authors resort to a narrative style that Medeiros has developed in previous publications related to the teaching of Physics. Such a style consists of resuming the Socratic dialog tradition, widely used, for example, by Galileo. Thus, the authors succeed in conducting a discussion involving the history of science in a contextualized and easy to read way, yet very rigorous concerning historical contents. This resource has proved quite efficient when dealing with matters not always adequately presented to students and general public audiences.

Jaime Carrascosa, Daniel Gil-Pérez, Jordi Solbes and Amparo Vilches, in *Earth and Heavens: Two Separate Universes?*, discuss how the study of gravitation is particularly suitable for the exploration of multiple connections between science and technology. They go beyond this point and suggest activities for the students designed to reveal that connections, in an attempt of "reconstruction of process" characteristic of the first scientific revolution. Besides, they propose the discussion of very pertinent questions and made it explicit the potentially very rich correlations among Physics, Astronomy, History of Science and Technology. It is important to point out that the authors adopt a positivistic view of the science, often find in science teaching. Recent social-historical approaches concerning the development of science and its present situation, however, propose alternative interpretations to "scholastics" versus "scientifics" conflicts of the historical period considered and emphasize that the same components of a mythical thought criticized in the so called pre-scientific conceptions of the world keep existing within the present science.

In *Difficulties of First Years Elementary School Teachers with the Teaching of Astronomy*, Rodolfo Langhi and Roberto Nardi turn their attention to the important and little studied issue related to the formation of elementary school teachers. Using the method of discourse analysis the authors collect spontaneous concepts in Astronomy held by teachers and study their relation with the contents of that field, textbooks and guidelines for national benchmark for those contents. They discuss several types of difficulties encountered by those professionals related to the knowledge of Astronomy and to the teaching of associated topics for children at a critical phase of their elementary school formation.

Paulo Henrique Azevedo Sobreira, in *Teaching of Astronomy at Teresa Martin College*, discusses the formal insertion of Astronomy teaching in undergraduate courses. He presents a concrete

example taken from such an experience in a Mathematics Teaching course in a private college. The historical development of this initiative is exposed, ending with the definitive adoption of Astronomy contents in that course.

This issue ends with the article *The Danger from the Outer Space* by Paulo Bedaque, dealing with a specific content potentially useful for work in the classroom, namely the collision of celestial bodies with the Earth and several consequences for the environment after one of those events. Some quantitative issues are addressed, not only of the candidate objects, but also of the effects, and several information and estimates from numerical simulations presented for that type of collisions.

Finally, we request once more your collaboration for the diffusion of the RELEA to all possible interested people, and invite you all to submit your contributions in the field.

More information about the Journal and instructions for authors may be found at the address: [www.iscafaculdades.com.br/relea](http://www.iscafaculdades.com.br/relea). We remind that the articles may be written in Portuguese, Spanish or English.

Our acknowledgements to the personnel of ISCA, especially to the Director MSc. Maria Cristina dos Santos Cruanhes, for their support to this Journal. We also acknowledge Mr. Felipe de Miranda e Souza for his help in the handling of the papers, the authors, the referees and to all those who in some way helped us to continue with this project, and in particular with the preparation of this issue.

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