

## Editorial

We have reasons to celebrate in this fourth number of the *Latin-American Journal of Astronomy Education (RELEA)*, since there was a substantial increase in the number of submitted articles. We thus see materialized our best expectations, as expressed in the former Editorial, in a short timescale of less than one year. It remains to be seen whether this increase is due to a more intense and focused disclosure undertaken by us, to a new reality of a permanent increase of the scientific production in this area, or is just a spurious effect produced by several localized causes without a sustained perspective.

Despite the uncertainty in the evaluation of the main reasons for the increase of the submissions, it seems reasonable to attribute part of them to the intensification of the disclosure of the Journal. In this direction, we can stress the contacts we established during the XXVI General Assembly of International the Astronomical Union (Prague, August of 2006). In that occasion we presented a work discussing the Journal, establishing a more intense strategy for spreading the Journal together with members of the Editorial Board attending the event, besides contacting potentials authors and new members for the former.

It is possible that our more ample campaign, at the same time directed to the people with potential production in the area, had a positive effect on the habitual lack of publication tradition in astronomy education, that we already criticized in previous editorials. It is also possible, that an independent increase of the production happened, due in part to the increase of people graduated specifically (particularly in Brazil) with Masters and PhDs in the area of education in astronomy. However, as noted above, it is still possible that this growing in the number of articles is just transitory, due to a collection of factors which are still difficult to identify and evaluate.

In any case, the growth of the submissions is a reason for celebration, with some caution for the time being. As we commented in the previous editorial, we would like to stabilize the publication of the Journal at two numbers per year, with about five articles or so each - or even more if there is enough scientifically qualified production for such an increase.

In this aspect, it is necessary to have in mind that the growth of the mentioned submissions does not automatically imply an increase in the accepted number of articles for publication. Here, the lack of tradition in the area is certainly a factor. It is still quite common the submission of works that have lower standards than the type of work we intend to publish. We believe, however, that if the increase of submitted articles reflects, on the one hand, an increase of masters and doctors in the area and, on the other hand, a greater penetration of the RELEA among those who work with education in astronomy, the intrinsic quality of the articles will increase and thus contribute for the establishment of robust standards for publications in the area.

Once more we count on the support of the interested people in education in astronomy, for the submission of new works as well as for the spreading of the RELEA among colleagues, graduate students and other sectors of their professional influence.

In the present number, we count on five articles, covering some subjects in the area according to a variety of approaches, aiming at different purposes, public and levels of education.

The article *The Moon Phases in a Paper Box*, by Maria de Fátima Oliveira Hail, Cláudio Amateur Beust, Érico Kemper, Pablo Goulart and Angela Muller, proposes teaching resources - didactic material and clarifying texts - for the teaching of the phases of the Moon. The authors explore the use of this material to work out some aspects associated to the cyclical changes in the appearance of the Moon for we observers at the Earth. The article discusses the movements of the Moon, in particular its rotation around the Earth and the precession of its

orbit, and is quite well illustrated, facilitating the visual reference about what is being discussed and on the very application of the teaching material. Complex and difficult aspects for working in the classroom, such as the appearance of the Moon in the sky in each phase (depending if one looks at it from the direction north or south, or from the terrestrial hemisphere of where it is seen) can be addressed through the resources considered in this work. The authors, however, call the attention for two inconveniences associated to the considered resource: the lunar phases "move" due to the movement of the observer, and not to the motion of the "Moon" (in relation to the "Earth"), and the face that the "Moon" shows towards the "Earth" is different from phase to phase. Moreover, the considered resource requires complex mental processes of abstraction and understanding (relative to the necessary changes of perspective with its use and to the understanding of the images visualized) in comparison with the observed real lunar phases day-by-day. This does not preclude, however, that the material can be used with pedagogical advantages, even acknowledging that it is more appropriated for use in the high-school and higher education levels.

In the work *Adapting a Common Photographic Camera to Take Pictures of the Sky*, Marcos Cesar Danhoni Neves and Ricardo Francisco Pereira present a method to photograph the astronomical bodies and aim with this to make more concrete and bring into a context the astronomy education, which involves sufficiently distant objects, distances, phenomena and concepts from the ones we use daily. The authors criticize the excessively theoretical form which the physics education often adopts, collaborating for the students' loss of motivation regarding that science, and attempt with this work to help leave the astronomy education more concrete, since the latter also deals with quite subjective aspects. Moreover, the astrophotography has other advantages from the educational point of view, when contributing for a re-approximation of the people for the vast and beautiful area of Astronomy, which is central in cultural terms and for the history of science; the authors also explore these advantages. The characteristic techniques of different films and photographic machines are supplied. In the article, however, and aiming to make the process of photographing the sky accessible to the interested parties, the authors concentrate in presenting a method that allows to take this type of photograph with a common photographic machine (not a reflex-type). Some detailed directions and recommendations are given to achieve this goal, with two examples on the results that can be obtained.

In the work *The Science Teachers and their Way of Thinking About Astronomy*, Cristina Leite and Yassuko Hosoume discuss the results of a research involving the knowledge of concepts of astronomy by science teachers of the elementary school level. The authors oppose the strong recommendation of the NCP (National Curricular Parameters of Brazil) for the teaching of those concepts, mainly in the third and four cycles of this level, with the lack of formation of the teachers in the subjects. One of the main concerns was to study the conceptions that these teachers have of the universe and its constituents, exploring with particular attention the 3-D view, always associated to the space and astronomical objects, but little or nothing studied in general. The article is a byproduct, in part, of the PhD thesis of the first author (with orientation of the second) in mid-2006. The authors perform half-structured interviews with 17 professors, the great majority with biology degrees. The results are discussed in detail for the various categories of analysis created by the authors. The great similarity between the conceptions of teachers and children and the persistence of bidimensional representations for astronomical objects are notable. The authors criticize the excessively conceptual form with which astronomy is taught in elementary education (when and if it happens), and strengthens the pedagogical importance of working the space representation in astronomy and the urgent need of courses for the continued formation that minimize deficiencies and conceptual distortions of the teachers.

In the article *From 9 to 12 and Finally 8: How Many Planets are Around the Sun?*, Gonzalo Tancredi addresses the troubled episode involving the "degradation" of Pluto to the category (until then unknown) of *dwarf planet*, following the resolution of the XXVI General Assembly of the International Astronomical Union (IAU), in August of 2006. The author summarizes the description of the Western relationship, of human beings with the "nomadic stars" and of the questionings, from 1978 on, whether Pluto would deserve the denomination of "planet". These questionings had been always raised because of physical parameters associated to the referred body. In particular, the discovery of the "transneptunian object belt", from 1992, containing some objects of comparable size to Pluto's, contributed to shake the planetary character of the latter. It is also presented a historical briefing on the constitution of the IAU commission that would establish the criteria to define planet in a scientifically acceptable way. These criteria had not been accepted without controversy in the astronomical community, and the author displays his decisive personal contribution to the proposal of the criteria which received even greater acceptance than that of the criteria of the commission itself. This work concentrates in the technical aspects of the debate, without discussing implications of cultural character entailed to the episode. The article features the text of the IAU resolution that specifies the current official definitions of planet and dwarf planet.

The work *Astronomical Perception of the Secondary School's Students in São Paulo's State School in Suzano City*, by Edilene F. de Oliveira, Marcos R. Voelzke and Luis H. Amaral, analyzes the result of a survey from 344 students of the high-school level about their basic knowledge of astronomical phenomena. The authors remark that although astronomy contents are a structural subject of physics teaching in NCP (National Curricular Parameters of Brazil), it is often given emphasis to formulas, without the necessary links to the life and interests of these youngsters, and does not satisfy their natural interest on the enigmas of the universe. With the possible exception of gravitation - and even if so addressed in a biased way as already criticized - practically nothing else is taught about astronomy at this school level. Despite of the employed methodology (based on questionnaires and questionable hypothesis in what concerns cultural aspects which emerge in the analysis of the answers and the gravity of the conceptual deficiencies of the students), the work brings up basic shortcomings in the knowledge and perception of the youngsters concerning several astronomical phenomena. These are basic shortcomings which become a matter of concern when one realizes (as one more result from this work) that high school is the decisive place for these youngsters to acquire the few and feeble astronomical concepts they have. The influence of other media in the acquisition of knowledge is also quantified in the work. The authors finally give specific suggestions for the insertion and improvement of the astronomy teaching in the high school.

More information about the Journal and instructions for the 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, Prof. Rosely Berwerth Pereira, for their support to this Journal. We also acknowledge Mr. Felipe de Miranda e Souza for his help with the handling of the papers, the authors, the referees, and all those who in some way helped us to continue with this project, and in particular with the preparation of this issue.

Editors:

Paulo S. Bretones

Luiz C. Jafelice

Jorge E. Horvath