RevMexAA (Serie de Conferencias), **35**, 279–280 (2009)

INTEGRAL PROGRAMME OF BASIC ASTRONOMIC LITERACY DEVELOPMENT

H. Tignanelli[1]

RESUMEN

Presentamos el desarrollo y optimización de un proyecto educativo que involucra a toda la población de la provincia de San Luis, Argentina. El núcleo del proyecto incluye actividades y recursos que toma aspectos curriculares formales dirigidos hacia todos los niveles de la enseñanza. Las actividades educativas del proyecto se han visto beneficiadas por la compra de dos planetarios hechos en Argentina, un telescopio MEADE 16″ que se puede operar por control remoto desde cualquier salón de clases de San Luis, y un observatorio a ojo desnudo con más de 30 instrumentos pre-telescopio, y otras herramientas didácticas diseñadas especialmente para la enseñanza de la astronomía. Adicionalmente, un site de internet donde se hospedan todas las actividades astronómicas sugeridas que han sido desarrolladas en publicaciones didácticas y de interés general.

ABSTRACT

We discuss the development and optimization of an ongoing educational project involving the whole population of the province of San Luis, Argentina. The core of the project includes activities and resources that capture formal curricular aspects directed towards all levels of teaching. The educational activities related to this project have been benefited by the acquisition of two planetariums made in Argentina, a MEADE 16″ telescope to be operated by remote control from any school-room in San Luis, and a naked-eye observatory with more than 30 pre-telescopic instruments, and other didactic tools specially designed for the teaching of Astronomy. Furthermore, an Internet site to upload all the astronomical activities suggested that has been developed along with a number of didactic and general-interest publications.

Key Words: education

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Ed. G. Magris, G. Bruzual, & L. Carigi

1. INTRODUCTION

The sky is simply everywhere, it is free and is available to all of us, even to poor schools. Working on the sky implies the use of adjusted reasoning to the view and an ecological layout towards nature, closely linked to joy and emotion. Those resources and the teachers aware of the high motivation that the sky and its all phenomena yield students, the attractive, suggestive and favorable scenario is well set for the astronomic education, an inevitable step towards the completion of the teaching of natural sciences and the essential link for the scientific culture of an individual.

We can think that, probably, the purpose of scientific culture is too ambitious and will never be completely achieved. However, we can hope, inversely, that the scientific education can change into a social tool to generate new representational abilities of people. We state that we, simultaneously, try to educate with an alive science paradigm, incomplete and permanently changing and look for the way that cultural values of the societies have to be reaffirmed and supported. There should be a guarantee of basic education for individuals before, so that they would reflect and value the advances in science. While we go further that direction; not with standing it is possible to make popularization actions in our societies, from which we hope less functional expectations than from promotion and educative actions, but identical communicational rigor. Therefore, the scientific culture should be conceived as/through the sum of actions of formal, promotional and popular teaching.

2. ACTIONS FOR A BASIC ASTRONOMIC CULTURE

1st ACTION: Based on the studies and layouts about the principal tools used in different cultures to observe the sky with the naked eye, we have developed, mounted and set a theme park in motion, which aimed at the astronomical pre-telescope observation, called Solar de las Miradas. It is a property of more than half of a hectare, with an elliptical tracing. Inside this park, we have mounted various tens of apparatus, which are differentiated in:

(a) Observation instruments, a classical group composed of an Equinoctial Ring, a Gnomon, a Pole,

[1]Universidad de La Punta, San Luis, Argentina (htignatelli@ulp.edu.ar).

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a Ptolemy Plinth, a Triquetrum and Sun clock of different formats. Another group was composed of apparatus that reproduce four of the more significant instruments than Tycho Bracheâs (1546-1601): the Maxim Equatorial Ring, the Great Semicircle Azimuthal, the Triangular Astronomic Sextant, and the Small Angles Register. Finally, a set of instruments by hand composed by a Jacob's staff, also called a cross-staff, a Rectangulus, a Ring Sphere and some Tubes to look through.

(b) Sensitive artifacts like: a celestial Ramp that enables the perception of the celestial equator and an Observation Tower, whose flat roof can be visited to contemplate the whole Solar de las Miradas.

(c) Pedagogical devices Such as: a crystal Dome, its structure simulates the principal referential celestial circles; a Parallel Earth Globe that represents homothetically the Earth and a Circumpolar Watchtower. It permits to visualize the circumpolar stars zone at the south hemisphere through a tubular structure.

2nd ACTION: Two planetariums were obtained, one with an electro-mechanic projector and the other one is digital. Both were manufactured in Argentine by the Columbia Project Enterprise. One of the planetariums, next to a metallic dome for 50 people, started a voyage all over the province of San Luis, as part of a function for all the towns in that province. The second planetarium, which had the same dimensions, was built in a building next to the Solar de las Miradas.

3th ACTION: Along with the actions 1 & 2, a training program for the teaching of astronomy started. Local specialists and people from other jurisdictions in the country, astronomers and specialists teaching science participated in this program. All the teachers of the seminars have implemented strategies to enhance the astronomy culture at schools and high schools.

4th ACTION: We organized the first Astronomy Olympiads for students coming from the Province of San Luis. It was the first Olympiads of that discipline in Argentina. It aimed at encouraging students to study natural sciences through astronomy.

5th ACTION: We incorporated an astronomical observatory which consisted of a dome and a 16″ Meade telescope. This telescope is thought and prepared to be operated in a remote way. Therefore, through the net it is possible to make observations at night from any spot of the province. This advantage allows every school to become an astronomical observation centre for the whole community.

6th ACTION: Together with these actions, we have developed a website (`http://www.palp.edu.ar`) that shows information about astronomy and the work of the Parque Astronómico.

3. OTHER RELATED ACTIONS

A series of TV micro-programs about astronomy are presented on Channel 13 TV of San Luis for children. Those programs are daily repeated in different hours.

Two research projects have been started out: (a) Rebuilt the history of astronomy in the province, specially the one related to the work done in San Luis at the beginning of the twentieth century. At this time, a team of American astronomers from the Dudley Observatory settled in the capital city. This team was headed by Dr. Lewis Boss who, as part of their work result, elaborated the renowned San Luis Catalogue. It collected 15.333 stars for the epoch 1910. (b) Explore carefully the new strategies to teach astronomy in order to elaborate a text book for teachers of the province. An agreement was signed with the association LASCO-SOHO to receive information and images of the sun, taken with the space telescopes of the Large Angle and Spectroscopic Coronagraph (LASCO). It belongs to the space mission Solar-Helium-spherical Observatory (SOHO) of the NASA and the European Space Agency. The images and the information gathered by NASA will contain data collected since 1996 up to now. This data will be up-dated permanently.

During 2007, Universidad de La Punta (ULP) started the construction of two sculptural representations of the Solar System. These representations tend to become the largest ones above the terrestrial surface and will cover the whole province.

4. PERSPECTIVES

Through the education system and its intervention of the spontaneous participation for promotional and popularization actions, the society of the province San Luis starts to appropriate the astronomic topics, and along with them, it has a genuine interest in the natural sciences in general and in the technology that enables us to be in contact with those sciences. The qualitative and quantitative results show us that we still have to make a lot of adjustments, but we believe that a plan, like the one we have presented, contributes (calm but continuous) with a representational change as the one we mentioned above. This plan demonstrates to the science that the astronomy is the engine for the change, is a part of the local and universal culture in harmony with the rest of the nations.