ASTRONOMY EDUCATION IN GREECE*

Dr. Margarita Metaxa
Astronomer
Arsakeio High School
63 Eth. Antistaseos, 15231, Athens, GREECE
mmetaxa@athena.compulink.gr
Received: 1997 November 22

I. INTRODUCTION

Contemporary teaching requires a connection with events in our everyday lives. The reasons for this are: (1) the enormous advances which have taken place this century; and (2) increasing competitiveness.

Astronomy is an interdisciplinary science and is related to various subjects, such as (in order of increasing relation to astronomy): economics, technology, geology, biology, chemistry, mathematics and physics. By using in the classroom all these aspects of astronomy we can enhance students’ interest and overcome the problems we face daily in the classroom. Astronomy education, and education in general, must be related to the classroom environment shown in Figure 1.

With this in mind we began three years ago to further develop astronomy education in Greece. Some of our activities are outlined in this paper.

FIGURE 1. Outline of the environment to which astronomy education must relate.

* Paper presented at the International Astronomical Union 23rd General Assembly, Joint Discussion No. 20, “Enhancing Astronomical Research & Education in Developing Countries”, 1997 August 26, Kyoto, Japan.
II. SUMMER SCHOOL FOR STUDENTS

Fifty school students from Athens gathered at the National Observatory of Athens in order to participate in the First Summer School on Astrophysics, September 2-5, 1996. The program contained lectures by professional astronomers on the following topics: solar system, stars, galaxies and cosmology. Also, the students were familiarized with the instrumentation of the Observatory. The whole event became well known as an educational project.

The goal of this school was "the development of citizens/people with knowledge, sensitivity, imagination and an understanding of their relationship with their physical and human environment, ready to suggest solutions and participate in decision making and implementation." We are now preparing the second summer school!

III. INTRODUCING STUDENTS TO RESEARCH

We are particularly interested in introducing school students to research. Students who are involved in research projects can learn more about science and feel more confident in themselves. For example, research can be done by examining various objects on Schmidt plates and carrying out the computational part of projects on a PC. Students from the Arsakeio Astrolaboratory have worked on the following research projects, which serve as pilot project for Greece:

•1994 "Is NGC 1938 AND NGC 1939 a Binary Cluster?" Z. Cournia, E. Marinou, K. Feretou, M. Douvogianni. First prize at the international research competition "First Step to Nobel Prize", which is organized by the Polish Academy of Sciences. The award was one month of free accommodations for the students at the Polish Academy in Warsaw, in order to carry out a research project.

•1995 "Planetary Systems." E. Venieri, G. Albanis, D. Sholidou. Second prize for Greece at the European Competition "Europe towards the Stars". This competition was organized by ESO.

•1996 "Stellar Content of Associations in LMC." D. Sholidou. Second prize at the international research competition "First Step to Nobel Prize", which is organized by the Polish Academy of Sciences.

•1996 "Boundaries and Stellar Content of the Associations LH52 and LH53." G. Albanis, D. Sholidou. Third Prize at the 8th research competition Eurocontest 96, which is organized by EC and was held at Helsinki, Finland. The award was 1,500 ECU. Our students were also selected to participate at the International Science and Engineering Fair in USA competition, Kentucky, in March 1997. G. Arsenis, the Greek Minister of Education, sent a congratulating letter for this success.

IV. LABORATORY EXERCISES

It's better for the students to do science than just to learn about it. We thus have introduced the following Lab exercises at Arsakeio:

• Supernova Remnant— from Schmidt plates
• Classification of Galaxies from Schmidt plates
V. CONTACT WITH PROFESSIONAL ASTRONOMERS AND INSTITUTES
Bringing students into contact with professional astronomers and institutions allows them to learn about their social environment and brings them into contact with potential science mentors. We thus try in every astronomical event to bring students and professionals together, beyond the normal visits to the relevant institutions.

VI. INTERNET PROGRAMS
Through the Internet our students familiarize themselves and enhance their knowledge of their technological environment. At present, two of these kind of programs have been implemented in Greece.


A total of 56 groups from 15 countries with 250 students participated in that internet program. Additional information can be found at the website:
http://www.forthnet.gr/arsakeio/universe.htm

The goal of the program was to let students explore the science of astronomy and learn about it through the use of Information Technology and Telecommunications. Specifically, they looked for information on the WWW, downloaded graphics and software, exchanged their findings and communicated with professional astronomers through e-mail. They were exposed to some fine educational material on astronomy as well as fascinating projects, mostly by NASA, University of Michigan and University of Berkeley in California.

The distinguishing characteristic of the program was the application and publication of the knowledge gained. The students went beyond the point of added knowledge and comprehension and were able to work on a specific application at all levels (analysis, synthesis and evaluation). Motivation for the students to pursue these higher levels of competency was provided by the publication of their work on the WWW, building their own web pages. This program may also serve as a starting database for educators, who want to get information on astronomy from the WWW and use it in their astronomy classes. The contents of the program included:

THE EARTH AS AN OBSERVATORY
VISIBLE AND INVISIBLE ASTRONOMY
SPACE AS AN OBSERVATORY
THE SOLAR SYSTEM
THE UNIVERSE OF STARS
GALAXIES AND COSMIC EVOLUTION
The Greek members of our program were: Dr. M. Metaxa, Dr. E. Kontizas, Director of the Astronomical Institute of the National Observatory of Athens (NOA) and the researchers of NOA. Also, professors from National Technical University of Athens, University of Athens, and University of Thessaloniki participated.

The foreign participants were: Professor J. Percy, University of Toronto, Chairman of the IAU Commission 46, Professor J.M. Pasachoff, Field Memorial Professor of Astronomy and Director of the Hopkins Observatory, Professor Darrell Hoff, Luther College of Iowa, IAU Commission 46, and Dr. S.M. Pompea, Adjunct Faculty University of Arizona.

Excellent web pages and multimedia materials for the program were created by Mr. A. Markopoulos of Arsakeio.

VII. CONCLUSIONS

We always have in mind the goal of encouraging our students to be close to their natural environment. This can be done by various activities, which we think are of great importance. Here are some of the activities that our students at Arsakeio Astrolaboratory participate in: variable stars (AAVSO), Eratosthenes project, Solar eclipses, sunspots, comets.

It is certain that astrophysics and space technology and the introduction into schools of modern teaching methods has much to offer to education. It gives us a sense of respect and humility which is an essential element of our cultural development.

VIII. ACKNOWLEDGMENTS

I would like to express my thanks to my school ARSAKEIO for the financial support which allowed me to attend the IAU General Assembly in Kyoto, Japan in August 1997.