

Using Television for Astronomy Teaching

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Abstract. The full potential of television for education has not been used in developing nations. It is relatively inexpensive to produce astronomy programs that can be broadcast taking advantage of satellite transmissions.

We suggest that these programs should have the following elements in order to be efficient:

- 1 Be in the local language.
- 2 Be short enough so that the teacher has a chance to comment on them during a one-hour lecture.
- 3 Show experiments specially if they are meant for schools that do not have laboratory facilities.
- 4 Be produced for several educational levels, including programs aimed for teacher training.

Inexpensive books should be edited in the local language in order to serve as an educational complement to the television series.

1. Introduction

Developing nations have a great need to enhance their science teaching. For instance, in México, middle school has only recently become compulsory and it has been necessary to train teachers and to produce new materials for a student population of two million. As many studies have shown, in order to teach science efficiently, one must adapt to one's particular audience. So it is important to produce teaching materials that are meaningful to local students. In particular Spanish, as spoken in México, should be used in order to satisfy the needs of our students. Similarly, examples that have to do with students' everyday lives should be included. Thousands of students live in rural communities where a single teacher must deal with every subject for the three-year secondary school. Recorded programs on specialized topics such as astronomy provide, therefore, a good teaching aid.

2. Production

Two sets of programs have been produced. The second one drew experience from the preceding one. The program structure was the following: Introduction; several series of explanations; humor breaks and a conclusion. The explanations included experiments. In some cases the experiments were complemented. During the breaks a professional actor presented a small sketch and said something funny.

This structure was chosen because if the astronomer explains the same topic in several different ways, with animation and adding a touch of humor, the audience would have a better chance of grasping the idea. This procedure made the 15-minute programs agreeable to a wide audience.

The topics that were recorded are: Galileo, celestial sphere, telescopes, solar system, binary stars (determination of diameters and masses), stellar evolution, planetary nebulae, black holes, astronomical distances (to Venus, parallax, spectroscopic parallax, cepheids, supernovae, cosmological expansion), galaxies, search for extraterrestrial life and cosmology.

3. Teacher Training

One of the reasons for producing these videos was to offer an aid for teacher training. In México elementary-school teachers receive very little formal science education. We would like them to learn how to learn, to teach, to adapt and to change. So it is important for them to have good books, workshops and videos as a complement. We also feel teachers need to have more time available to spend on their education. When a teacher uses a video he or she should interrupt its viewing in order to ask questions and discuss the topic with students to make sure they understand.

4. General Considerations

Video production is a very time-consuming activity. It not only requires serious planning but one must work hard on the script and production. Nevertheless, once the videos are ready they can be distributed widely, even to remote localities, and can be transmitted by the educational television channels which reach tens of millions of students. In other words, one must not underestimate the media for educational purposes. If someone wants to begin video production my suggestion is to start with a very simple project and build new materials from it.

5. Complementary Materials

A special book for teachers was produced to accompany the television series. It includes the main topics we feel a teacher must handle in order to have a basic astronomical understanding and to be able to answer some of the most frequent questions their pupils have. Small books for the general public are in the process of being edited, since we believe it is important to have written materials along

with the videos, the topics are the following: a brief history of astronomy, so that teachers can understand how scientific knowledge was developed; a little ancient prehispanic astronomy related to the calendar is included and planetary nebulae, which is one of the topics to which Mexican astronomers have contributed to worldwide knowledge. The rest of the materials tend to cover classical topics: solar system, stellar evolution, astronomical instrumentation, search for extraterrestrial life and cosmology.

Discussion

In reply to Tancredi, who asked if the videos and educational materials were available to other Latin American countries, Fierro replied with a definite “yes”! Send enquiries to her at: Directora General de Divulgación de la Ciencia, Universum-Cu., C.P. 04510, D.F. México, or by e-mail at the address given at the head of the paper.