Universe Awareness for Young Children

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Universe Awareness (UNA) is an international programme that will expose economically-disadvantaged young children, between ages 4 and 10 years, in developed and developing countries to the inspirational aspects of modern astronomy.

Introduction

From the dawn of history, the beauty of the sky and its intimate connection with the development of human civilisation have inspired countless generations with a sense of wonder. Modern astronomy continues to play a unique role in conveying the excitement of science to the general public. In recent years considerable resources have been devoted to astronomical outreach in developed countries, aided by the spectacular images produced by modern astronomical facilities and the continuing list of major astronomical discoveries that have changed our views of the Universe. Universe Awareness is a new programme intended to reach a target group that has so far been neglected by such outreach programmes, namely children between four and ten years of age.

The programme is motivated by the premise that access to simple knowledge about the Universe is a basic birthright of everybody. The formative ages of four to ten years are crucial in the development of a human value system. This is also the age range in which children can readily appreciate and enjoy the beauty of astronomical objects and can learn to develop a "feeling" for the vastness of the Universe. Exposing young children to such material is likely to broaden their minds and stimulate their world-view.

The programme concentrates on *disadvantaged* young children for two reasons. Firstly, most other children will be exposed to some knowledge about the Universe in later years. Secondly, the educational disparities between advantaged and disadvantaged children are smallest for the youngest children.

ESO workshop

Following the setting up of an ad-hoc UNA steering committee in 2004, a workshop was held at ESO Headquarters on May 27 and 28, 2005 to discuss the feasibility of the Universe Awareness idea. The 16 participants from 14 countries in 5 continents included professional astronomers, educators, scientific outreach professionals and a social anthropologist. The participants were unanimously enthusiastic about Universe Awareness as an idea and about the feasibility of developing it into a useful programme. At the workshop two sub-committees were formed to follow up on detailed aspects of the project. The first is studying educational aspects of Universe Awareness, including the content of the programme and the optimum didactic methods for delivering it. The second sub-committee is focusing on questions of organisation and funding.

The project

UNA is intended to be a programme that is *inspirational* and entertaining rather than to impart facts or develop specific cognitive skills. The minimum goal will be to make young children aware of the *beauty and scale of the Universe*. It also carries the implicit message that Nature can be interrogated by rational means. The tools and methods of UNA will be developed with the aim of eventually reaching as large a number of children as possible. The development and implementation of UNA will be driven by the needs and wishes of active educators in the target countries, combining the innovative use of professionally developed tools, including songs, games, toys and animation films in a coordinated modular programme.

The UNA programme will begin with "Earth Awareness", emphasising that the child is a member of a diverse human family of children living on a particular planet. Universe Awareness will then introduce the concept of the Sun, the Solar System, stars and galaxies. Through excitement, adventure and wonder, children will be stimulated to appreciate the beauty and enormity of the Universe.

Young disadvantaged children live in diverse environments. For example, the educational infrastructure for disadvantaged children in the inner cities of European countries is qualitatively different from the situation for disadvantaged children in an agricultural African village. UNA will therefore initially develop, implement and evaluate a pilot project in a small number of countries representative of the following three different educational environments:

(i) Environment 1:
– School starting at age 7–8 or non-existent;
– Television scarce.

(ii) Environment 2:
– School starting at age 6–7;
– Sporadic access to Internet;
– Television at home and at school;
– Poorly trained teachers.

(iii) Environment 3:
– School starting at age 4–5;
– Access to Internet at school and often at home;
– Well-trained teachers;
– UNA accepted as in-school curriculum.

For each environment a phased, coordinated modular programme will be prepared and training courses will be developed, all specifically tailored to fit the culture and language of the target group.

Tools and methods

Where very young children do not attend school (Environment 1), creative appealing materials will be developed for distribution by any available delivery method (e.g. national television or travelling UNA buses). For Environments 2 and 3, the programme will provide teachers with materials that involve children more actively.

Several *short films* will be developed to illustrate the two aspects of Universe Awareness, beauty and scale and gradually make children aware of the Earth, the Solar System and the Universe. The films will be designed to appeal to young children by entertaining them. They will

From the UNA workshop at ESO Headquarters.

Photo: H. H. Heyer, ESO

make use of *cartoon characters, animation and exciting adventure stories*. These films will be made by experienced makers of children's entertainment films and creative educators, with advice provided by astronomers. The adventures, featuring some of the most beautiful images made by modern telescopes, will be set in a variety of exotic environments known to exist in the Universe. They will attempt to cultivate the sense of imagination that is widespread in young children.

Additional coordinated material tailored for each country will be developed with the aid of talented educators, scientists and artists from these countries. These will include *games and songs*. They will often focus on the cartoon characters, feature UNA images and emphasise relevant aspects of Universe Awareness. Where appropriate, involvement of ancient local cultures with astronomy will be woven into the material. A goal will be to stimulate active group participation by the children, where possible, but will also include simple board games that children can play on a one-to-one basis. By including a uniform set of characters, images and environments over a range of material, the UNA message will be reinforced.

Internet will be used to creatively enhance the programme for disadvantaged children in advanced educational environments (Environment 3). Special material will be developed to enable UNA *"twinning"* activities, for class collaborations between young children in deprived regions of advanced countries and young children in developing countries. For example, children would learn from each other that developing countries are often "richer" in sources of UNA wonderment than developed ones. For example, skies in agricultural regions are generally darker and less polluted by light, so that children can count much larger numbers of stars.

Special attention will be devoted to optimum methods for *delivering the programme* in less developed environments. Tailoring films to local needs so that they can be transmitted on national or local television is one option. Another option is to equip travelling UNA buses with interactive games and exciting exhibits. Such buses are already frequently used for educational purposes in Tunisia, travelling between widely dispersed villages, stopping as appropriate.

To coordinate the programme and maintain links with the schools, teachers, parents and children in the target countries, several Universe Awareness Coordinators will be trained for each target country.

Pilot project

We propose to commence Universe Awareness with a pilot project that will target a limited number of developing countries and disadvantaged groups in up to four European countries. There are two reasons for combining these two target groups. First, the concept of "earth awareness" provides a good reason for linking these two geographically separated target groups. Secondly, a well-defined European involvement in such a one-world educational programme fits

Present Organisation of Universe Awareness

Universe Awareness International Steering Committee

Co-Chairpersons:
Mr. Claus Madsen, Head of the Public Affairs Department, ESO, Garching, Germany
Prof. George K. Miley, Royal Netherlands Academy Professor, Leiden University, the Netherlands

Dr. Cecilia Scorza de Appl, Landessternwarte Heidelberg, Germany
Prof. Alec Boksenberg, Chairman, UK National Commission for UNESCO, Institute of Astronomy, Cambridge, United Kingdom
Ms. Alexa Joyce, International Programme Coordinator, European Schoolnet, Brussels Belgium

UNA Project Manager Coordinator
(from September 15, 2005):
Dr. Carolina Ödman, Leiden University, the Netherlands

Universe Awareness Education Sub-Committee

Chairperson:
Dr. Cecilia Scorza de Appl, *Astronomer/Educationalist,* Landessternwarte Heidelberg, Germany

Mr. Gonzalo Argandona, *Astronomical Outreach*, ESO, Santiago, Chile
Ms. Chandra Fernando, *Primary School Teacher/ Teacher training*, Northeast Montessori Institute, Baltimore, USA
Ms. Birthe Kirknæs, *Primary School Headmaster (rtd.)*, Copenhagen,Denmark
Mr. Jesper Kirknæs, *Social Anthropologist*, Copenhagen, Denmark
Dr. Naoufel Ben Maaouia, *Educator/Astronomer/Planetarium Director*, Tunis, Tunisia
Mr. Bernat Martinez, CEFIRE (In-service *Teacher Training Centre*), Benidorm, Spain
Dr. Premana W. Premadi, *Astronomer*, Institut Teknologi Bandung, Indonesia
Dr. Rosa M. Ros, *Educator/Teacher training*, Technical University of Catalonia, Barcelona, Spain
Dr. Karl Sarnow, *Educator*, European Schoolnet, Brussels, Belgium
Dr. Henri Boffin, *Astronomical Outreach*, ESO, Garching, Germany
Dr. R. West, *Outreach Astronomer (rtd.)*, ESO, Garching, Germany

Universe Awareness Organisation Sub-Committee

Chairperson:
Prof. Alec Boksenberg, *Astronomer*, Chairman, UK National Commission for UNESCO, Institute of Astronomy, Cambridge, United Kingdom

Ms. Marina Joubert, *Scientific Outreach*, South African Agency for Science and Technology Advancement, Pretoria, South Africa
Mr. Claus Madsen, *Head of the Public Affairs Department*, ESO, Garching, Germany
Prof. George K. Miley, *Astronomer*, Royal Netherlands Academy Professor, Leiden University, the Netherlands

well with the aspirations of the European Union and several individual European countries.

An "announcement of opportunity" will be disseminated at the end of 2005, requesting expressions of interest by national groups that are interested in participating in UNA. Although the pilot project will concentrate on the selected target countries, UNA material will be made available generally.

Organisations

At present the following organisations support the Universe Awareness Programme: ESO, the European Schoolnet (ESN), the European Association for Astronomy Education, (EAAE), the International Astronomical Union, Leiden University and the Royal Netherlands Academy of Arts and Sciences (KNAW). During the next year we will seek further endorsements.

The development of the UNA project is presently being overseen by a 5-member Universe Awareness International Steering Committee (UNAISC) and two sub-committees devoted to education and organisation/funding respectively. Dr. Carolina Ödman has been appointed as UNA international project manager/coordinator at Leiden from September 15, 2005.

It is planned to hold a second larger interdisciplinary workshop to discuss progress in the project in the late summer of 2006. All those who are interested in UNA and wish to be kept informed of developments should contact Carolina Ödman (*odman@strw.leidenuniv.nl*).

Preliminary Timeline

Three stages in the pilot project are envisaged:

September 2005–December 2006
Preparation
– Contacting suitable funding organisations
– Refinement of educational goals and needed material
– Preparation of funding proposals

2007–2008
Development
– Production of actual animation films, games, toys, and internet tools
– Development and organisation of coordinator training courses

2009
Implementation
– Start of pilot project with evaluation

Note that the expected implementation date for the pilot project coincides with the International Year of Astronomy planned for 2009.

Catherine Cesarsky Elected Member of Academies of Sciences

On April 20, 2004, the US National Academy of Sciences selected 72 new members and 18 foreign associates from 13 countries, including Dr. Catherine Cesarsky, ESO's Director General. This brought the total number of active members to 1949, including 351 foreign associates.

Among its distinguished members, the National Academy includes 83 astronomers. Catherine Cesarsky was elected in recognition of her role as a pioneer of space infrared astronomy and a leader of European physics and astronomy, and more particularly, for her seminal contributions to the study of star formation in near and distant galaxies, the cosmic infrared background, and the confinement and acceleration of cosmic rays.

The US National Academy of Sciences is a private, non-profit, self-perpetuating society of distinguished scholars engaged in scientific and engineering research, dedicated to the furtherance of science and technology and to their use for the general welfare. Upon the authority of the charter granted to it by the Congress in 1863, the Academy has a mandate that requires it to advise the federal government on scientific and technical matters.

On April 30, 2005, at the Annual Meeting of the US National Academy of Sciences, Catherine Cesarsky, was officially inducted into this highly prestigious society.

At about the same time, Catherine Cesarsky became a Foreign Member of the Royal Swedish Academy of Sciences. Founded in 1739, this Academy was modelled on the pattern of the Royal Society of London and of l'Académie Royale des Sciences in Paris. It is an independent organisation whose overall objective is to foster the sciences, particularly mathematics and the natural sciences. And, of course, every year the Academy awards the Nobel Prizes in Physics and Chemistry, the Bank of Sweden Prize in Economic Sciences in Memory of Alfred Nobel, the Crafoord Prize and a number of other large prizes. It might be worth mentioning that this year's laureates of the Crafoord Prize are three astronomers: James Gunn and James Peebles from Princeton University, USA, and Sir Martin Rees from the University of Cambridge, UK.

On May 27, 2005, Dr. Cesarsky was also elected Foreign Member of the British Royal Society, thereby joining the 1292 Fellows and 132 Foreign Members of the world's oldest scientific academy in continuous existence. The Royal Society was founded in 1660 and has, throughout its history, promoted excellence in science through its Fellowship and Foreign Membership, which has included Newton, Montesquieu, Darwin, Rutherford, Einstein, Hodgkin, Crick, Watson and Hawking.

Photo: L. Bulatis/The Royal Society

Catherine Cesarsky is inducted into the British Royal Society.