D22 Final Report of the SkyWatch project

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Short Description:

The results of the project in terms of publicity and participation in the contest, as well as opportunities that are raised for the future in the fields of science communication and teaching are presented in this deliverable. The publicity of the project was very fruitful, both in terms of wide and disperse dissemination, as the project reached both genders in several countries, age groups and educational levels, as well as in terms of direct impact to the communicated parties.

List of Recipients: All the Partners

Contents

1. Executive Summary

This deliverable focuses on the results of SkyWatch and the degree in which the initial objectives of the project, mainly in terms of dissemination and participation in its activities, have been met. Additionally, perspectives for the future are examined and scenarios for the continuation of the project's activities are presented.

The report focuses on three project activities, which were considered from the beginning to be the main tools for the achievement of the project's goals:

The contest

The Science Days

The Interactive Popular Science Courses

2. The SkyWatch Concept

SkyWatch project constitutes an innovative approach aiming at promoting increased public scientific and research culture. This approach targets to crosscut the boundaries between schools, research centres and science thematic parks and involve users in extended episodes of playful experience and scientific research. This target was reached basically through the deployment of two categories of initiatives involving mainly young people, an International Astronomy Contest and a series of science communicating events called “Science Days”. Of course, the point of reference for the contest and the communication with the participants and the wider public has been the project’s web portal, which has been developed and operating since March.

The SkyWatch Portal

The SkyWatch Web Portal (Fig. 1) has been the main communication tool of the project and the basic platform for the contest operation throughout its duration. Essentially it functioned as an interactive learning and communication environment, informing the wider public on the activities of the project through the SkyWatch bulletin and newsletters and at the same time assisting the contest participants with on-line lessons, Q&A courses, an observation data library and an interactive help desk where they had the opportunity to be in continuous communication with experts in the field.

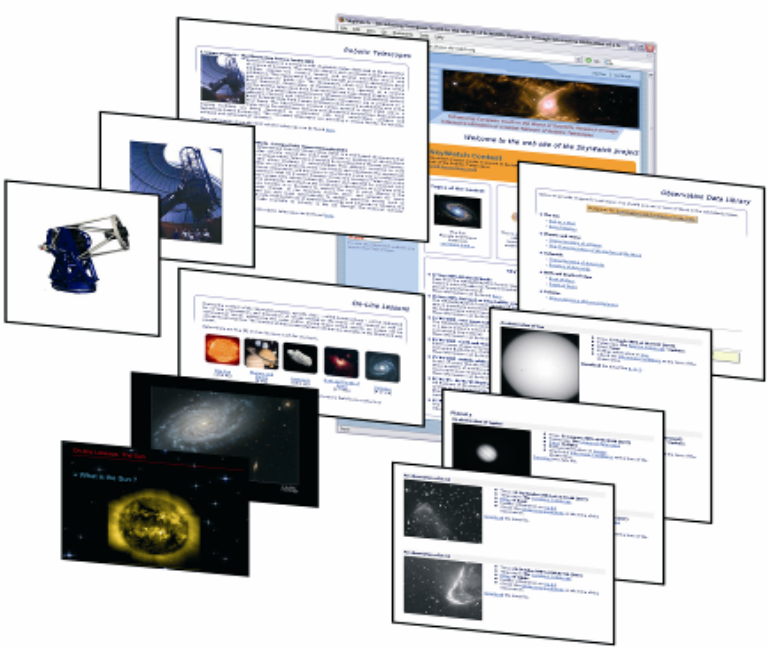


Figure 1: The SkyWatch Portal

A special section of the portal is devoted to the SkyWatch contest, providing all interested visitors with information about the contest topics and rules, tips for success, guidelines and example projects, the relevant registration and project submission forms, important dates and deadlines, and evaluation procedure and criteria.

The SkyWatch International Contest

The contest of the SkyWatch project was launched in April and lasted until the 30th of September. The contest addressed three age groups, which were defined according to educational level and perceptual abilities, as follows:

Age group 1: Students < 15 years old

Age group 2: Students between 15 and 18 years old

Age group 3: Adults

The contest topics, evaluation criteria and presentation format were common for each age group, but eventually the projects were evaluated separately for each age group.

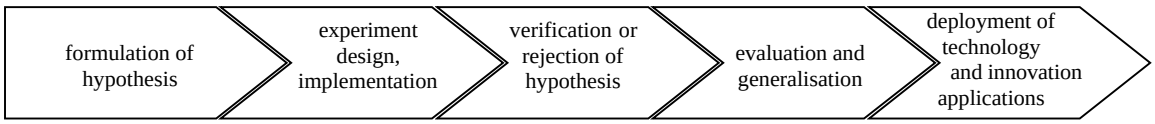
The contest topics have been selected in order to cover the wider range of Astronomical knowledge possible, but at the same time offer a fruitful research field to all participants, from children to amateur astronomers. Eventually there were 5 contest topics:

The Sun	Planets and Moons	Asteroids	Birth and Death of Stars	Galaxies
				
- Sun as a Star - Solar Rotation	- Characteristics of a Planet - The Characteristics of the Surface of the Moon	- Characteristics of Asteroids - Rotation of Asteroids	- Birth of Stars - Death of Stars	Characteristics of Normal Galaxies

The participants had to register in the contest and afterwards submit their projects, following specific rules that were published in the respective section of the project's web portal (www.sky-watch.org/contest-rules.htm). The evaluation procedure and criteria were also posted in the portal (www.sky-watch.org/contest-evaluation.htm) and were available to all the participants from the beginning of the contest.

The implemented strategy of SkyWatch contest should aim to demonstrate the procedure of scientific inquiry as a whole. Towards this scope, the SkyWatch scientific

committee has defined the general basis upon which all the participating projects in the contest should be built:



Those steps were considered to be the first crucial factors of assessment. Furthermore, the SkyWatch scientific committee evaluated the contesting projects, according of course to their age group, based on 9 specific evaluation criteria (as published in the portal):

1. Narrative / structure.
2. Illustrations / layout / design.
3. Clarity of presentation.
4. Understanding: good use of facts and theory.
5. Use of SkyWatch data (from the portal observation data library).
6. Use of own (or found) data (images).
7. Creativity / originality.
8. The value of the proposed observations to the subject.
9. Overall impression.

Science Days - Interactive Popular Science Courses

Within the scope of SkyWatch, besides the contest, was the organisation and realisation of a series of events that would promote scientific culture and disseminate the project's activities. These events, called "Science Days", took place from May to November in several European countries and have contributed on one hand to the transfer of astronomical knowledge from experts, and on the other hand to the dissemination of the project's activities and contest to school students, researchers and the wider public. Lessons on Astronomy, lectures on the use of telescopes, live observations, experiments and hands-on experiments and constructions related to Astronomy were some of the activities that took place during the 25 "Science Days" that were realised from SkyWatch within the whole duration of the project, with a total of more than 2000 people attending.

The Interactive Popular Science Courses (IPSCs) were developed and linked to the SkyWatch portal in order to assist the visitors to check their knowledge on Astronomy and the contest participants to have additional backup for their projects. They were constructed in such a sense so as to follow the contest topics and different difficulty levels and under the concept of a distance learning tool. The SkyWatch scientific team selected and gathered material, which was reviewed by numerous professionals involved in the project, accepted by the consortium and linked to the SkyWatch web site as Q&A quizzes (Fig. 2). Specifically, the resources for the questions were taken from numerous secondary and undergraduate university level physics textbooks. In addition, the NASA web site was utilized for information and confirmation. The textbooks were referred to, for example, to find different difficulty levels of questions for the users, as well as to find relevant information for a broad and structured inclusion of a wide range of topics.

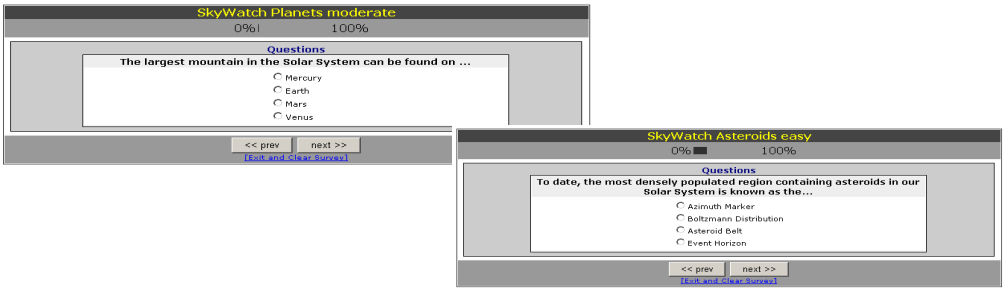


Figure 2: The IPSCs' "Asteroids Easy" and "Planets Moderate" sections

The Science Days and the IPSCs served the project's goal for wide dissemination and science communication to a great extent, and additionally provided the project with feedback from the visitors.

3. Project Results

Overall the SkyWatch Web Portal has been visited by 4200 individuals from 53 countries all over the world since June 2005. 57% of them were from Greece, 10% from the UK, 6% from Germany, 3% from Switzerland, 3% from Poland, 2% from Hungary, 2% from Sweden, 2% from Romania, 1% from the USA, 1% from Bulgaria, 1% from Belgium, while 7% was from the European Commission. The rest 5% came from various countries all over the world (Italy, China, Israel, India, Hong Kong, Brazil, Australia, even Iran and Indonesia).

Another interesting statistic regarding the visitors of the portal is the one concerning the page reference. 54% of the visitors have visited the page directly, while 27% visited the page following the www.sky-watch.org link from several web sites where this has been posted. This shows that the majority (81%) of the project's web site visitors, on one hand have already been informed about the project before they entered the portal, and on the other hand visited the portal on purpose and not by chance (e.g. searching the web for something else, similar in title, and got mislead to SkyWatch), thus were interested specifically in the project.

The interest and participation in the contest was great, since 95 teams comprising of 250 individuals from 30 countries have registered. Eventually, 53 projects have been successfully submitted in the 3 age categories.

During the project's 3rd meeting, the evaluation committee was gathered in order to assess the submitted projects. After the evaluation, the committee concluded that the initial schedule of the contest had to be altered due to the submitted projects' number, level and overall potential. It was decided that 11 projects should proceed in the contest, as they were all too interesting to be left out, in contrast with the rest of the projects that either were not consistent with the contest's rules, or lacked in terms of originality, clarity or interest in such a degree that forbids them to qualify to the next phase. The SkyWatch scientific committee ranked the submitted projects for each one of the evaluation criteria in a scale of 0-5, according of course to the respective age categories. The 53 projects were eventually ranked by the sum of ranks of the 9 criteria. In the second age category 6 projects were assessed as too interesting to be left out, while in the adult category only 2 projects were considered to be good enough to be awarded.

Analytically, the results of the contest were:

	Students below 15 years old	Students between 15 and 18 years old	Adults	Overall
Participated	23	55	17	95
Submitted	10	36	7	53
Awarded	3	6	2	11

The 53 contesting teams consisted of 78 persons and originated from 13 countries. In the first age category 16 individuals comprised the 10 teams, 7 of which were females and 9 of which were males. In the second age category, 21 females and 34 males formed the 36 teams, while 3 female and 4 male adults contested (Fig. 3). The UK was represented by 18 teams, Greece by 12, Sweden, Hungary and Bulgaria by 4 each, Latvia, Israel and Bahrain by 2 each, while Switzerland, Russia, Poland, Italy and Estonia had from one contesting team each (Fig. 4). The 11 winning teams were consisted of 8 females and 11 males originated from 8 countries (UK, Israel and Hungary had 2 winning projects each, the rest were from Bulgaria, Greece, Latvia, Russia and Switzerland).

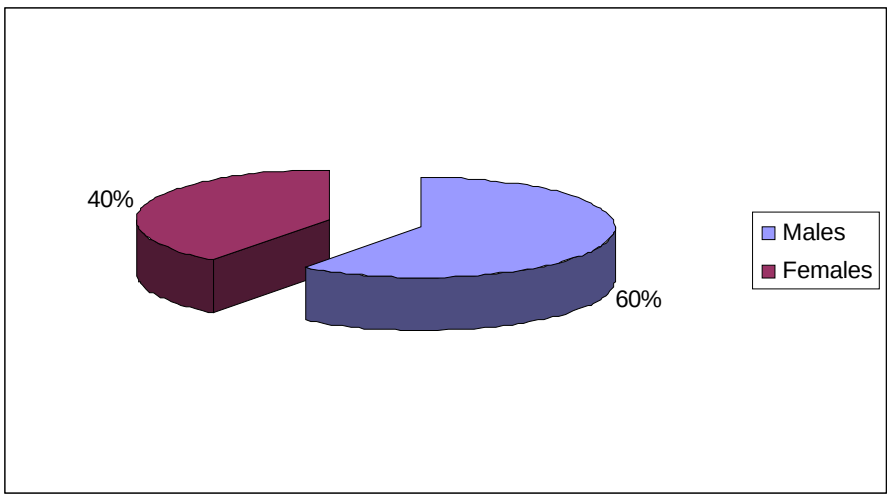


Figure 3: The distribution of the contestants per gender

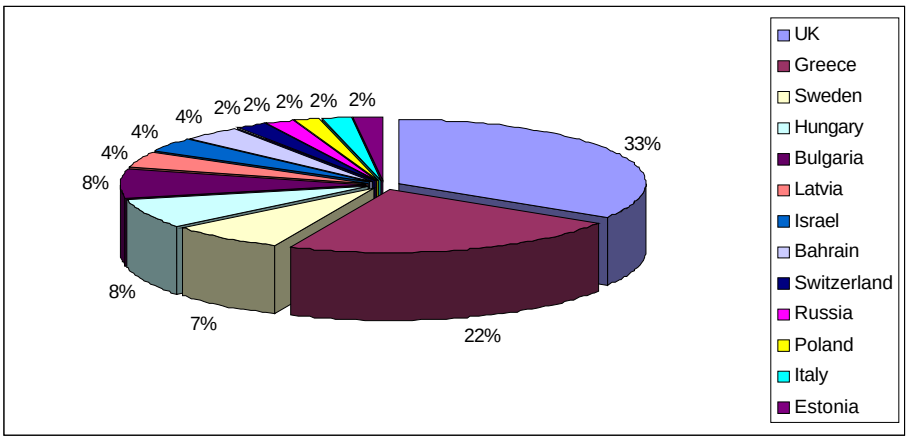


Figure 4: The distribution of the contestants per country of origin

All 250 contestants were granted free access to the Liverpool Telescope for one Year, as recognition and reward for their effort. The 19 persons comprising the 11 winning teams (5 students below 15, 12 students between 15 and 18 and 2 adults) were all invited to participate to the SkyWatch final events in Athens during the European Science Week 2005, where they exhibited their work and were awarded personal telescopes from the SkyWatch team (Fig. 5,6).

Figure 5: The SkyWatch contest exhibition

Figure 6: The SkyWatch contest awards ceremony

From May until November, 29 “Science Days” have been realised within the framework of the SkyWatch project. 24 of them have been realised in several European schools and institutes, while 5 were carried out during SkyWatch’s final events, within the European Science Week 2005. These events are briefly presented in the following table:

Science Day description	Date	Country	Participation
Sun observation	12-05-2005	Greece	70 (students)
Sun observation and science experiments	22-05-2005	Greece	200
Presentation of the SkyWatch Project	23-05-2005	Greece	80 (students)
“Living in Space” lecture	31-05-2005	UK	50 (6-10 years old)
“The Dynamic Universe” lecture	30-06-2005	UK	120 (students)

“Astronomy with Robotic Telescopes” lecture	01-07-2005	UK	100
“Deep Impact” lecture and observing	05-07-2005	UK	40
“The Dynamic Universe” lecture	07-07-2005	UK	130 (students)
“Explore the Universe” lecture	08-07-2005	UK	100 (students)
Presentation of the SkyWatch Contest	12-07-2005	UK	180 (students)
“Astronomy with Robotic Telescopes” lecture	14-07-2005	UK	80 (students)
Presentation of the SkyWatch Project and Contest	15-07-2005	Bulgaria	50 (students)
“The Dynamic Universe” lecture	20-07-2005	UK	60 (students)
“The Dynamic Universe” lecture	21-07-2005	UK	100 (students)
Presentation of the SkyWatch Project and Contest	22-07-2005	Bulgaria	50 (students)
“Journey into space“ lecture and observing	9-08-2005	UK	40 (6-10 years old)
Perseids Shooting star observing	13-08-2005	UK	30
“Rocketry” science experiments	30-08-2005	UK	30 (6-10 years old)
The Observatory Science Centre Astronomy Festival	9/10/11-09-2005	UK	80 (adults)
Annular Solar Eclipse observation	3-10-2005	Greece	100 (students)
“The Dynamic Universe” lecture	10-10-2005	UK	50 (students)
“The Dynamic Universe” lecture	15-11-2005	UK	30 (students)
“Astronomy with Robotic Telescopes” lecture	23-11-2005	Greece	50 (students)
Hands-on Astronomy	24-11-2005	Greece	30 (students)
Science experiments	25-11-2005	Greece	40 (students)

Sun observation	26-11-2005	Greece	30 (students)
SkyWatch exhibition and workshop	26-11-2005	Greece	300
“Explore the Universe” lecture	9-12-2005	UK	70 (students)
“Explore the Universe” lecture	5-1-2006	UK	40 (students)

All the above indicate that the publicity of the project was very fruitful, both in terms of wide and disperse dissemination, as the project reached both genders in several countries, age groups and educational levels, as well as in terms of direct impact to the communicated parties.

4. Activities after the ESW 2005

The main objective of the SkyWatch project is to develop an innovative pedagogical framework that attempts to blend formal and informal learning, proposing an educational reform to science teaching. The scope of SkyWatch is to consolidate this framework by continuing its activities even after its official closing.

Under this scope, SkyWatch has been in close collaboration with another Astronomy related project, which is based on the same framework. The Discovery Space (D-Space) project contributes to the access to and sharing of advanced tools, services and learning resources, not only between schools but also among science parks and research centres. The project aims at the deployment of a virtual science thematic park that will connect schools, universities, science museums and parks with a network of robotic telescopes around the world. It is building on this aim as it brings to students, teachers, researchers and individuals (amateur astronomers, visitors of science parks) all around the world the opportunity to use remotely controlled robotic telescopes in real time giving accessibility to unique resources. The D-Space service is already running through a web based tool (www.discoveryspace.net) that gives the opportunity to the user to utilise observations through the network of telescopes and also to get access to the D-Space data base (images, learning content, library etc.).

The D-Space service can be considered to be the basic infrastructure tool that the SkyWatch project was based, and expand the activities of it both in terms of the extent of the robotic telescopes network, as well as in terms of the fields of exploitation of the service as the SkyWatch could be consider as one of the services that the D-Space will provide. Through the D-Space service, the SkyWatch aims to communicate further the idea of the utilisation of international astronomy contests using robotic telescopes via internet in order to establish it in an annual basis. Already the second SkyWatch Contest, SkyWatch 2006 Astronomy Contest is starting to organised and is going to award the winners to the Science Teachers Conference in CERN on 15-17 of June 2006. The 2006 contest will be organised in cooperation of the D-Space and PENCIL projects.

The results of the contest regarding participation and level of submitted projects were very encouraging, and it is the project consortium's belief that such an initiative will have even greater response and success as a confirmed annual happening.