

ANDRILL educational activities in Italy: progettosmilla.it, a case-study of an interactive project

Matteo Cattadori, and the ANDRILL scientific team

INTRODUCTION

In January 2008, the second drilling campaign of ANDRILL (an international research involving 200 scientists from USA, New Zealand, Italy and Germany) was finished. Here, for the second time the significant research information about the rock cores up to 1100 meters in depth was revealed.

Such investigation adds to the valuable information regarding the role of Antarctica in the global climate system; some of these findings would become a basis for new and more sophisticated models for the estimation of global changes our planet is now facing.

ANDRILL has an educational and public outreach initiative called ARISE (ANDRILL Research Immersion for Science Educators). Every year, a group of teachers from the four participating countries is involved with the scientific discipline teams. These educators take an active part in research operations in Antarctica, taking place at the American base McMurdo Station. Each ARISE teacher must prepare an educational project and elucidate the idea behind, in order to explain to the schools of their own country the methods, results, techniques and objectives of the research.

The project progettosmilla.it was the Italian educational outreach proposal selected for participation in the first campaign of ANDRILL, held from October to December 2006. It became the first educational project on Antarctica in Italy. In 2007/2008 the local School Administration (Provincia Autonoma di Trento) incorporated the project. progettosmilla.it is also made possible by the help of ANDRILL and the Italian National Antarctic Program (PNRA).

Here are presented the experiences and outcomes obtained by progettosmilla.it in the two years of activities between the first edition of the project (beginning in September 2006) and till date (April 2008).

SCOPE and OBJECTIVES

The objective aims to engage students in a scientific experience by making them proactive and involved in the process. With this main goal of the project progettosmilla.it, it was targeted students and teachers throughout the entire academic year and motivated them to continue after this period. These objectives align with the main initiative ANDRILL-ARISE. (Ref. 1)

In addition, there are some other goals related to motivation, which has constantly been active:

- create opportunities for further training of science teachers;
- offer teachers, researchers and institutions to demonstrate opportunities for mutual cooperation;
- improve and support the adoption of new techniques by teachers in various environments and teaching condition;
- motivate teachers to become advisors in their regions on ANDRILL themes and Polar Sciences;
- support didactic initiatives carried out by other entities (international, national, local) involved in the field of science.

METHODS TOOLS AND PHASES

METHODS

The method adopted by the project encompasses a number of different methodologies. The methodological basis of the ARISE is an integral part of the methods.

In brief:

- 1- The study and knowledge gained by the team of teachers on the ANDRILL scientific research and as well as the general knowledge on the similar disciplines of polar sciences
- 2- The subsequent explanation of goals, methods and results of the research to the school community during the time period set in the proposal.

For Teachers

For teachers, the adopted method has been based on a research model, called research-action, where teachers are the main players of educational practice and teaching.

Research-action is the systematic study of attempts by a group of participants to change and improve the practice of education through their reflection on the effects of these actions. (Ref. 2)

The progettosmilla.it translates this principle trying to reach students mainly through motivation, and update daily assistance to teachers. An example of educational project that is based on similar principles is Finnish Environmental Education called as ENO (Ref. 3)

For students

The method of adventurous storytelling has been adopted for students (about Antarctic expeditions, scientific research, life in the places of extreme conditions etc.) by using the typical communication style of web services; particularly, one adopted through blogs of adventurous activities by various types of athletes such as mountaineers, sailors and explorers. These blog-diaries can help maintaining the public attention, even for longer periods. The representative website for these types of communications is explorersweb.com (Ref. 4)

TOOLS

For Teachers

The following tools were provided to teachers:

- A didactic kit containing various types of resources (CD, DVD videos, brochures, stickers) by ANDRILL and / or other national disseminations of polar science;
- A resource folder for the teacher on the theme chosen for the study. The resource, downloadable via web and protected, contained a main document called "sheet resources for the teacher" as well as other materials useful to the teacher for the realization of lectures, laboratory experiments and teaching activities;
- A course update for teachers on the topic of ANDRILL and Polar sciences titled "Antarctica and ANDRILL free territories for new paths of Sciences" of 15 hours duration.
- Online support (mail and telephone) for the design and implementation of: lectures, laboratory experiments, online activities, visit to centres or research institutions and polar illustrations.

For students

- Online competition: Appearing occasionally and consistent in its reply by e-mail to individual questions on the site or conducting articulated tests, posted on a web platform.
- Interactive educational animations: Made by collaboration with the IPRAE (Trento), an institution specialised in the production of interactive educational purposes (Ref. 5) together with accompanying a brief questionnaire on key issues of polar science.
- Online support (mail) to experts by individual students, with the theme of personal knowledge



Figure 1 - Home page of the website project www.progettosmilla.it

and works to be presented during final examinations and tests.

For teachers and students

-A project website with URL www.progettosmilla.it, as shown in **Figure 1**. It has been the primary tool used to achieve the basic goals; and composed of 140 pages html, multimedia (1200 photos, 40 audio and video files) and a section dedicated to all the classes involved. All contents of explanatory ANDRILL were made with the continuous supervision of researchers from the scientific team.

-A blog made on the site of ANDRILL through which the events and feelings of life in Antarctica were described.

-Chat and videoconference were the instruments adopted to carry out activities with students and teachers, both about Antarctica (during shipping) from the progettosmilla.it, located in Trento.

-Conference-meetings under the auspices of the participating schools and in collaboration with the teacher in contact. The target aim was to explain both the content of research with ANDRILL, and the basic concepts of polar science. In various meetings, ANDRILL researchers also participated; part of the effort was always dedicated to check the progress of the works by students in the follow up of the final objective.

PHASES

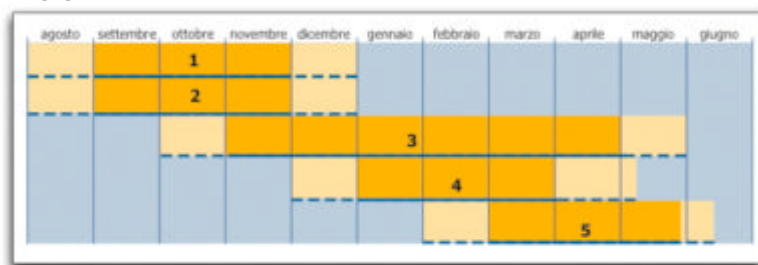


Figure 2 - Scan temporal phases of the project

The project, free for all Italian schools, had one year duration with the starting and ending dates coinciding with those from the corresponding scholastic year. For each of the two years of activities following the successive phases of the project have been running:

1. Online registration: The interested teacher was invited to indicate an improvement of the subject matter (ANDRILL and / or Antarctica) and a type of final product to be carried out with the classes, in addition to general items relating to the school and classes to be involved (maximum two). The teacher from the time of registration was the referred teacher of progettosmilla.it for his school. At the end of the biennium, there were 8 different fields of study.
2. Sending resources for the teacher: Each teacher received contact: -Didactic kit, via regular mail -Resources folder, protected by password, via web
3. Accomplishing a didactic pathway: The referred teacher continued to work with full autonomy, though, with the continuous distant support of progettosmilla.it; as a way to go in depth of the educational theme. The project, at this stage, offered to this educator and his/her students the full range of services available online described previously.
4. Meeting in person: Each participating school has experienced contact in person at least once.
5. Development and use of the final product: Classes are encouraged for the production of final products many of which are used in different situations such as end course exams, open-

day of school, temporary local exhibitions and scholastic issues (environmental education, school and research, polar years). The phases were the second successive cadence illustrated in **Figure 2**.

RESULTS



Figure 3 - Geographical distribution of the schools participating in two editions of the project

than half of teachers participating in the project reported that activities of progettosmilla.it course will also be repeated in subsequent scholastic years, regardless of the future accession to subsequent editions of the project. At course update organized teachers took part almost all 37 teachers in the province of Trento.

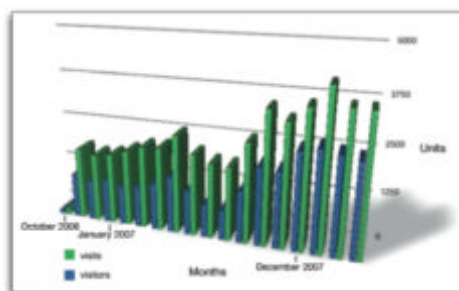


Figure 4 - Data access to the site, reported to www.progettosmilla.it (September 2006-March 2008), on a monthly basis

Sixty-six **schools** have been involved over two years (25 in the first and 41 in the second year). 12 out of 25 schools participating in the first edition of progettosmilla.it (48%) decided to join the next edition. Their geographical distribution is shown in **Figure 3**. The provinces were 18, located in 13 different regions (65% of total Italian regions).

Students involved: 2193 (928 in the first year and 1265 in the second year). The main type of class involved (over 98%) belonged to one of the following: average 3rd (students of 13 years age); 1st-2nd professional or technical school (students of 14-15 years age); 5th Scientific high school (students of 18 years age).

The reason for this distribution is to be found in the fact that the main content area under which the contents of ANDRILL falls is earth sciences, typically, in the programmes of these science classes.

Teachers involved directly in the activities were 66. Further, more than half of teachers participating in the project reported that activities of progettosmilla.it course will also be repeated in subsequent scholastic years, regardless of the future accession to subsequent editions of the project. At course update organized teachers took part almost all 37 teachers in the province of Trento.

Over time range, a total of **88 meetings in-person with the registered schools** (33 in the first year and 55 in the second) were carried out, directly related to the planned project. In addition to these, 11 meetings of other types were held.

Classes that ended the participation in the project with a final product were 46 out of 66, i.e. 70% of the total participating schools. The types of end products made by the schools were

very diverse: power point, website development, exhibition posters, exhibitions or video clips.

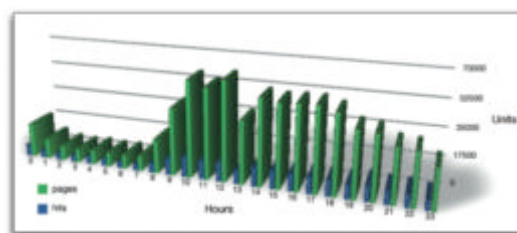


Figure 5 – Data access to the site, reported to www.progettosmilla.it (September 2006 – March 2008) on a hourly basis

By analyzing the **data access on a monthly basis** as shown in **Figure 4** makes a trend on account of the annual cycle of teaching activities. Every month of the second edition of the data values have access to the site, higher than the same months of the previous year.

The **data access on hourly basis** as shown in **Figure 5** depicts maximum values matching morning hours during school activities but it is

interesting to note that the accesses during afternoon and evening do not have values so markedly lower as might be expected from a site of this kind that is aimed exclusively at the school population. The following **additional activities** are conducted by Prof. Cattadori, parallel to the project but had various positive consequences on developing progettosmilla.it

- Meeting with some schools of the New Zealand city of Cristchurch, along with other teachers of ARISE team,
- Collaboration to conduct a project called Flexhibit (a second draft ANDRILL).
- On-going collaborating with the educational section of the organization of 'International Polar Year (IPY) through the staff of the Museum of Natural Sciences Trent of Trent for the realization of events aimed at schools on the occasion of Polar Year.

CONCLUSIONS

The inferences drawn are following :

- The granting of detachment from teaching work to Prof. Cattadori by the Autonomous Province of Trento allowing him to carry out the second year of the project makes the activity running continuously.
- The high percentage of schools after the first year had renewed their affiliation to the second year activities.
- The high schools have concluded a path to go deeper with a final product
- The data accesses to the project web site have constantly been increasing
- The high number of browsed pages during the afternoon and evening indicating a high attendance in extra school hours
- The numerous accounts of informal positive feedback on the effectiveness of the project expressed by researchers, school principals, teachers and students have been recorded during the two years;
- it approves the belief that the methodology adopted by progettosmilla.it helps with achieving the preset goals.

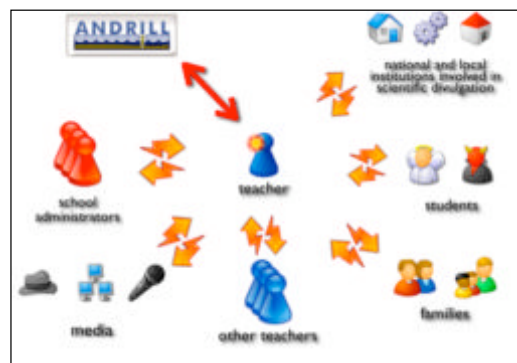


Figure 6 - Pattern of relations with other subjects activated in the Course Project

The experience of progettosmilla.it then provides input for other ideas about the methodology adopted.

- Cooperation and the mutual availability of researchers and teachers can lead to the realization of projects of communication with schools maintaining high quality, which can effectively reconcile the authenticity and effectiveness of scientific communication and teaching.
- The network of relationships within which the teaching professional activities are enhanced (**Figure 6**) can be valuable assets to be used in the creation of educational initiatives with public outreach related to scientific research.
- Few communication techniques, typical to some non-educational website (such as ones of exploration sports), can be used in the execution of educational projects with good results in terms of greater motivation of the students and teachers.
- The activities, contacts and established collaborations have allowed the project to acquire a new role: with an environment in the service of a professional community of different types and nations (researchers, teachers, museum operators) urging a greater synergy between teaching and research related to Polar Sciences.

REFERENCES

1. The ANDRILL media guide (<http://www.andrill.org/node/32>)
2. Ebbutt, D. 1985. 'Educational action research: some general concerns and specific quibbles' in R. G. Burgess (ed.), Issues in educational research: qualitative methods. Lewes: The Falmer Press.
3. ENO - Environment online. A Global virtual school for sustainable development (<http://www.joensuu.fi/en/basics/briefly.htm>)
4. Explorersweb.com - the pioneers checkpoint. (<http://www.explorersweb.com/>)
5. "Imparo giocando: videogiochi ed apprendimento. Rapporto di ricerca sul quadriennio di sperimentazione" Romano Nesler. 2007, IPRASE Trentino