



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

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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 have 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)**. Teachers from the four participating countries are involved with the scientific discipline teams as they take an active part in research operations at the American base McMurdo Station, Antarctica. 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).

This project has now become a **permanent project** thanks to a national museum (the National Museum of Antarctica) and a local museum (Museo Tridentino di Scienze Naturali, Trento).

Here are presented the experiences and outcomes obtained by progettosmilla.it in the two full school years of activity since the project was born in September 2006.

SCOPE AND OBJECTIVES

The objective is 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 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 on-going others goals related to motivation:
- Create opportunities for further training of science teachers.
 - Offer teachers, researchers and institutions a model for opportunities involving mutual cooperation.
 - Improve and support the adoption of new techniques by teachers in various environments and teaching scenarios.
 - Motivate teachers to become regional advisors on ANDRILL themes and Polar Sciences.
 - Support didactic initiatives carried out by other entities (international, national, local) involved in the field of earth science.

METHODS TOOLS AND PHASES

METHODS

The methodological basis of the ARISE Program is an integral part of the methods.

In brief:

1. The study and knowledge gained by the team of teachers working as a part of the ANDRILL scientific research, 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)

Progettosmilla.it translates this principle, trying to reach students mainly through motivation, and updated 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 to maintain 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 centers 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 IPRASE (Trento), an institution specialized in the production of interactive educational animation (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 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; 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 explanation about ANDRILL were made with the continuous supervision of researchers from the scientific team.
- **A blog** where the events and feelings of life in Antarctica were described.
- **Chat and videoconference formats** whilst being in Antarctica and then later from Trento.
- **Conference-meetings** with the participating schools and in collaboration with the lead teacher. Part of this effort was always dedicated to check on the progress of the work by students towards reaching the final objective. ANDRILL researchers also participated in some of these meetings.

PHASES

The project, free for all Italian schools, had a one-year duration coinciding with the scholastic year. For each of the two years

activities, the following phases have been performed:

1. **Online registration:** The interested teacher was invited to choose a field of study (selected from ANDRILL and/or Polar Science) and their intended final product. The teacher from the time of registration was the lead teacher of progettosmilla.it for his/her school. At the end of the biennium, 8 different fields of study were examined.
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 lead 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 with Prof Cattadori.
5. **Development and use of the final product:** Classes are encouraged as they work toward 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 duration of each of these phases are illustrated in Figure 2.

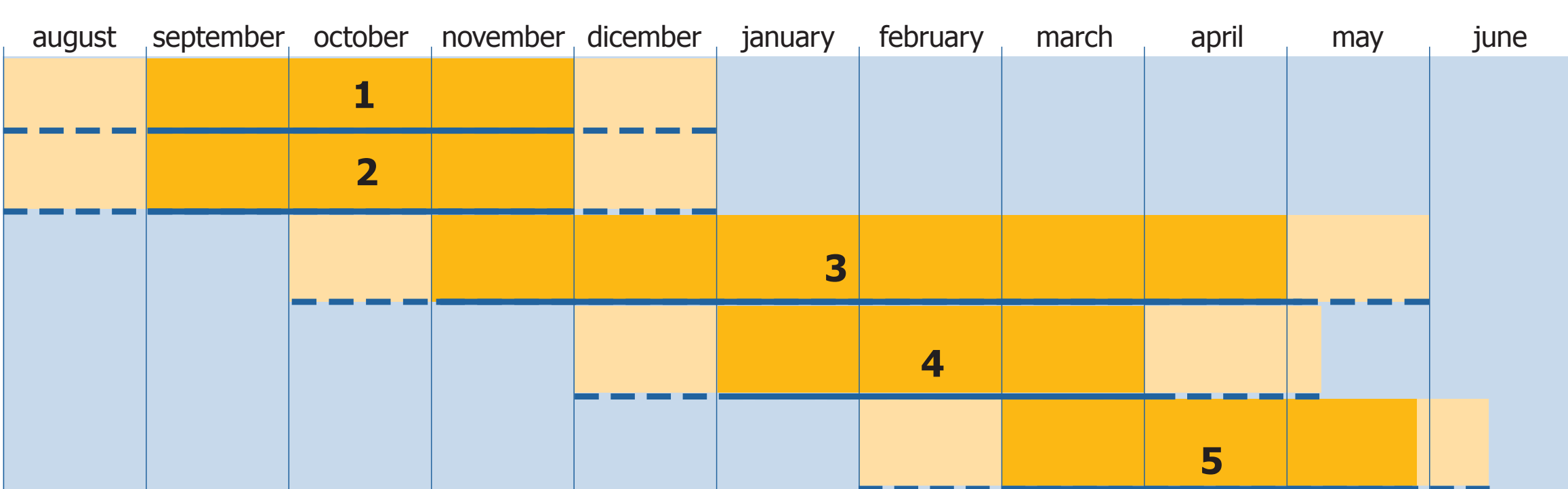


Figure 2 - Scan temporal phases of the project.

RESULTS

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.

There were 18 provinces, located in 13 different regions (65% of total Italian regions).



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

Students involved: 2,193 (928 in the first year and 1,265 in the second year). The main type of class involved (over 98%) belonged to one of the following: middle school (students of 13 years); professional or technical school (students of 14-15 years) and 5th class of scientific high school (students of 18 years). 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

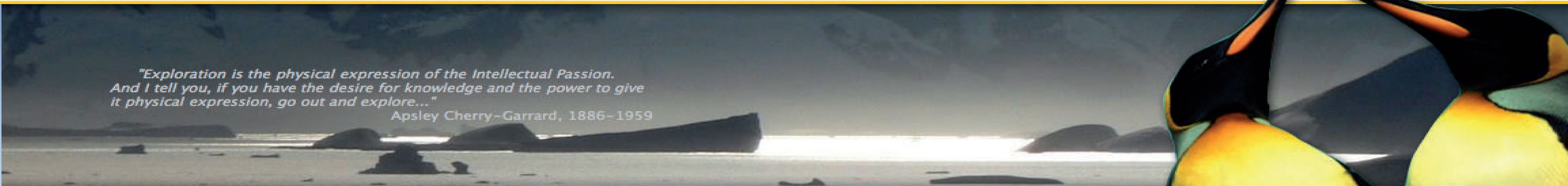


Figure 1. Home page of the website project www.progettosmilla.it



Moments of the project

earth science, typically found 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 the progettosmilla.it course would also be repeated in further scholastic years, regardless of the future access to subsequent editions of the project.

During the biennium, 21 **chats and videoconferences** took place, between the various parties involved: teachers, students, Prof. Cattadori and researchers of the ANDRILL team.

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

Forty-Six out of sixty-six classes ended the participation in the project with a final product. This represents 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.

In analyzing the **data access on a monthly basis** as shown in Figure 4 a trend on the annual cycle of teaching activities can be viewed. Each month of the second edition has data-access higher than the same months of the previous year.

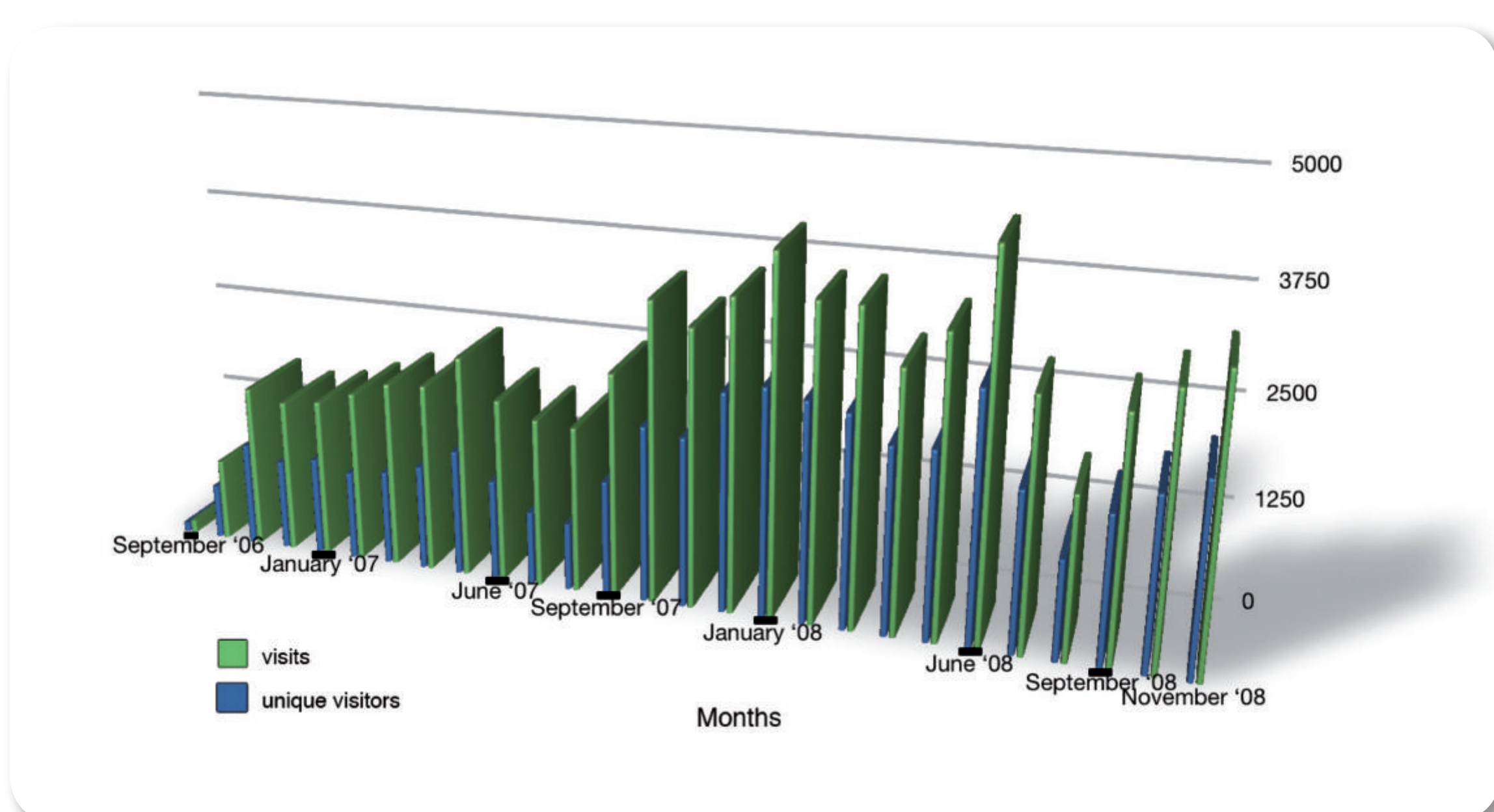


Figure 4 - Data access to the site, reported to www.progettosmilla.it (September 2006- November 2008), on a monthly basis.

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.

Prof. Cattadori has conducted the following additional activities. These are parallel to the project and had various positive consequences on developing progettosmilla.it

- Meeting with some schools of the New Zealand city of Christchurch, along with Betty Trummel (US) and Julian Thomson (NZ)

teachers of ARISE team;

- Collaboration to conduct a project called Flexhibit a flexible science exhibit that is presented by students with teachers as the facilitators;
- 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 Trento for the realization of events aimed at schools on the occasion of Polar Year.

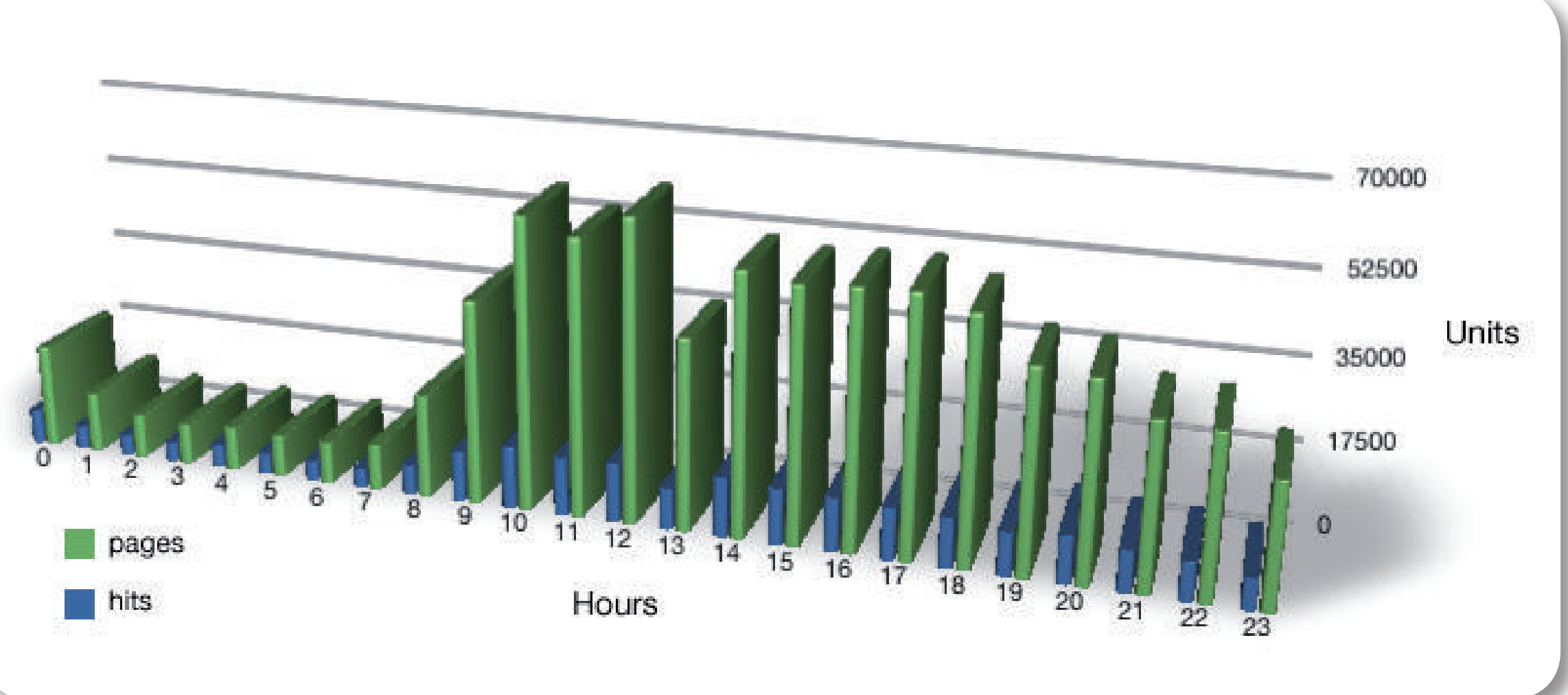


Figure 5 - Data access to the site, reported to www.progettosmilla.it (September 2006-November 2008), on an hourly basis.

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 made it possible to keep 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 indicates a high attendance in interest after school hours.
- 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.

All these elements support the belief that the methodology adopted by progettosmilla.it helps with achieving the preset goals. 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 involving high quality communication with schools, 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 a valuable asset to be used in the creation of educational initiatives with public outreach related to scientific research.

- Similar **communication techniques**, typical to some non-educational website (such as ones of exploration sports), can be used in the implementation 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.

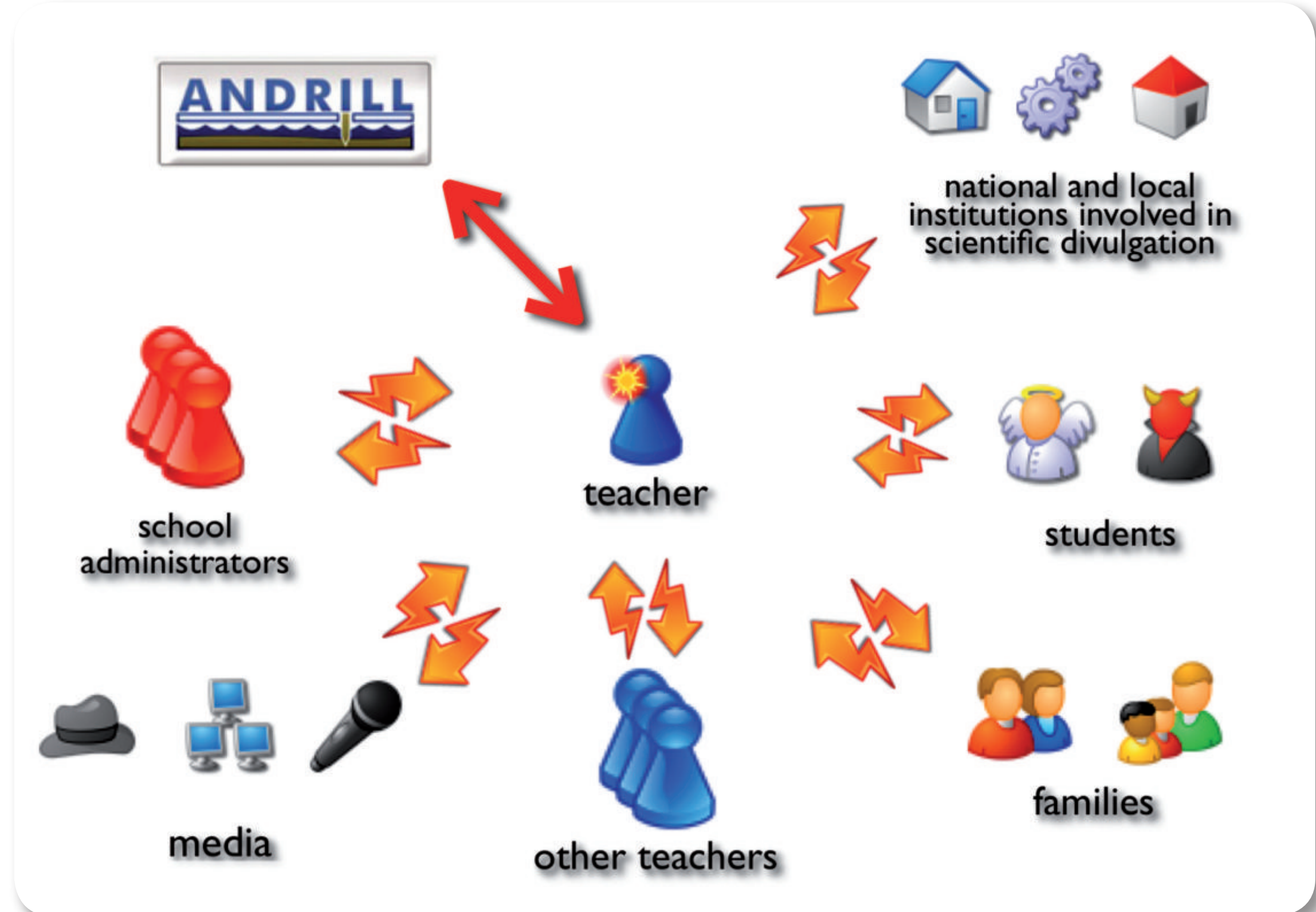


Figure 6 - Pattern of relations with other subjects activated in the Course Project.

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