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The i cleen Project
Inquiring on CLimate & ENergy

Research meets education in an inquiry-based approach to Earth System Sciences in Italian classrooms

E-Learning Award 2010 — European Schoolnet

State of the art

In Italy the Inquiry-based method for teaching sciences (and consequently the Earth System Sciences) is not widespread. That is not all: also the teachers willing to adopt it are little supported. Some evidences are hereby listed (**ref.1**):
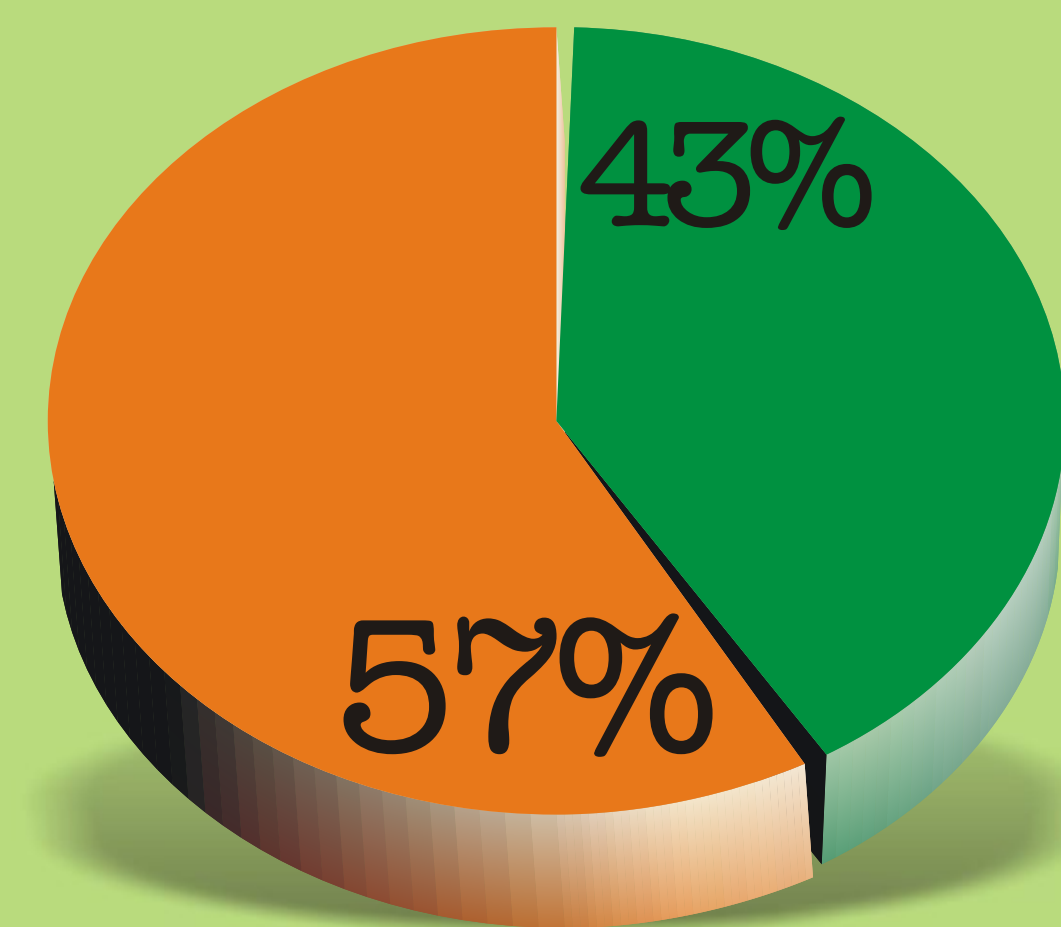
"In your activity in the classroom, which one of the following teaching methodologies you use the most?"

- monologue + monologue and discussion
- interactions and experiences

40%
60%
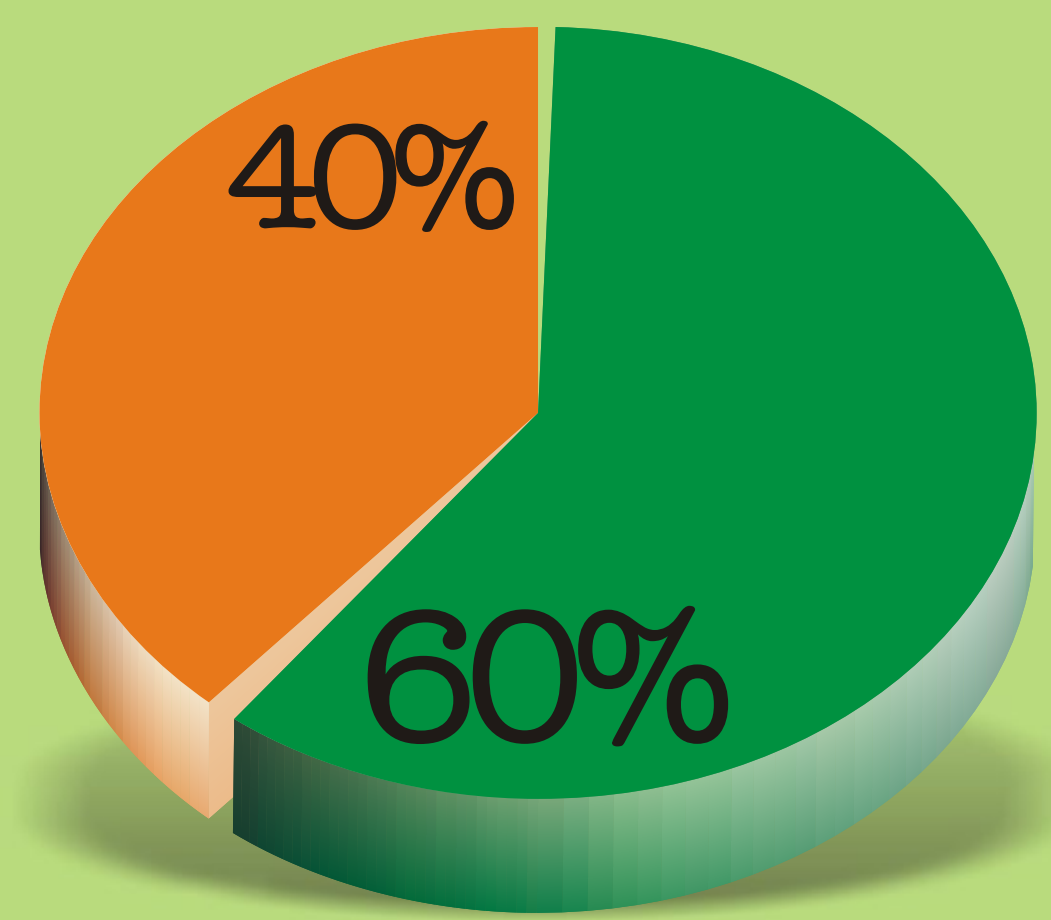
"How would you consider your relations with your colleagues as far as the educational and teaching \planning is concerned?"

- not enough satisfying
- enough satisfying and more

43%
57%

"Which ones of the retraining techniques you have experienced would you value as the most effective?"

- educational updating about teaching themes
- all the others (9 items)

45%
55%
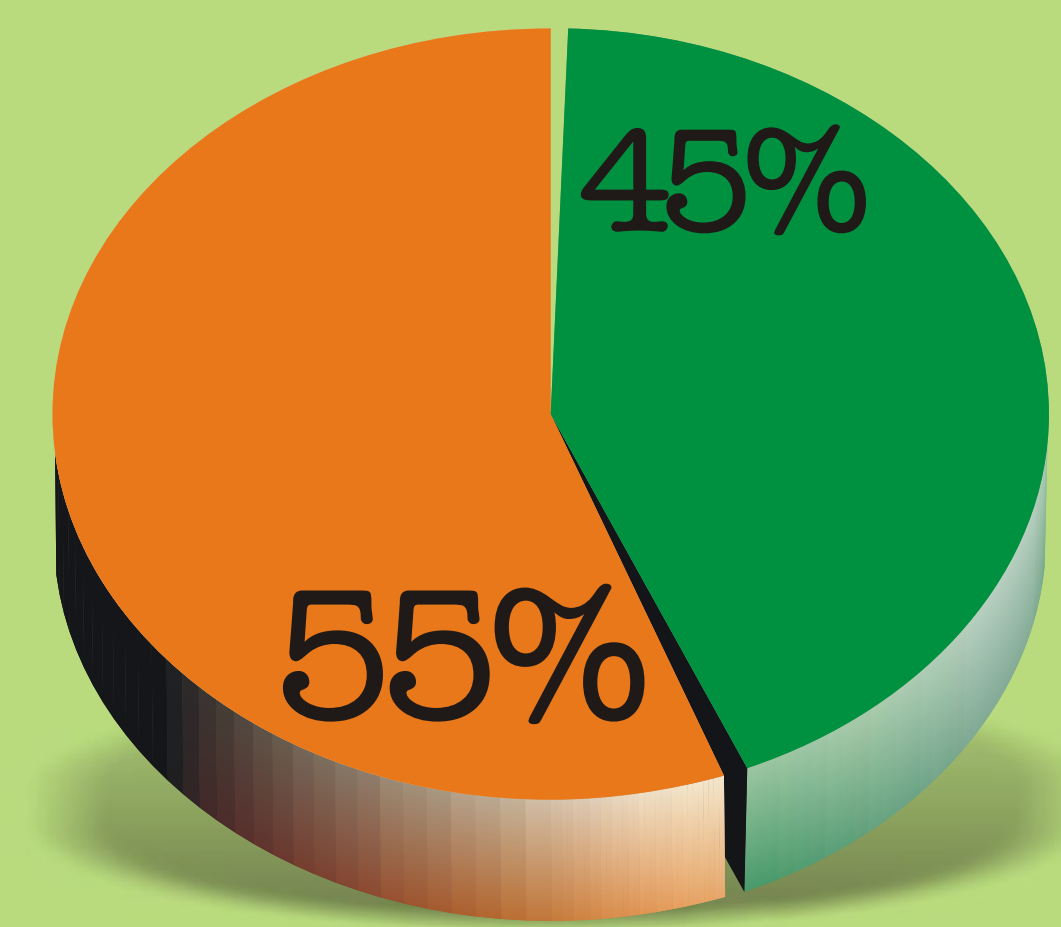
The I-CLEEN project

THE MUSEUM

The Museum of Sciences is located in the North-East side of Italy and has an "Educational Services" section with a strong tradition supporting the work of teachers. The services provided are used by about 70 thousand students a year, coming from all over the country.
In 2006, thanks to some innovative outreach experiences, such as, for instance, the ANDRILL-progettosmilla.it Project (**ref 2**), it has been noticed that the web can be a powerful means of improvement for the educational practices of teachers.

On the basis of these factors, the idea came out to create a web service being at the same time **database** (TRY entry of the main menu) and **means of sharing** (TAKE PART entry of the main menu) of resources and practices for an active teaching in the field of the Earth System Sciences. These are also the 2 goals pursued by I-CLEEN.

The project started on summer 2008. In the planning and designing stages, the guidelines followed were those drafted by the European projects supporting the creation of information gateways (DESIRE Project **ref.3**) and digital literacy (SPREAD Project **ref.4**). It was very helpful also:
- the **technical support** provided by INDIRE (International Agency for the Development of Scholastic Autonomy), most of all during the realization of metadata and respective vocabularies;
- The analysis of **similar projects**, such as DLESE (**ref.5**), OER (**ref.6**), and LRE (**ref.7**).

TRY

In this section of the website (www.icleen.museum), teachers have free access to the database. Its main features are hereby stated:
- it is an **information gateway** of educational resources ready to be used to actively explain topics in the range of the Earth System Sciences;
- The **data sources** are both within the staff itself, as well as coming from other teachers, or other educational projects/boards (also the foreign ones, such as NSTA (**ref.8**) and IODP(**ref.9**)). The very most of those are published under a Creative Common License;
- The selection takes place according to a specific **inclusion policy** formalized in a specially provided and public document;
- All the resources aim to facilitate the teachers to get closer to the daily use of **active** (or Inquiry-based) **educational practices**. They are not only ICT oriented!

- Some resources facilitate the carrying out of those kinds of lessons which use **particular tools and/or methods**, such as Google Earth (with the publishing of kmz files ready to be used), White Boards (with files ready to be used in a suitable format) or resources for the teaching of Sciences in English;
- The resources are published with one or more **covering documents** realized according to an editorial standard, so to simplify their adoption without long preparation stages;
- All the documents are subject to a **scientific review** carried out by researchers, mentioned among the authors as well;
- Besides, the database fulfils the LOM (Learning Object Metadata) (**ref.10**) and DCMI (Dublin Core Metadata Initiative) (**ref.11**) **standards**.

TAKE PART

Here are some elements and services of sharing currently adopted by the I-CLEEN Project:
- "**A Worthy Experience**": a contest awarding with a cash prize the teachers authors of original practical educational experiences. These are reviewed by the editorial staff, which publish them in the authors' name, in accordance to the project format, and under a Creative Commons License;
- **Workshops and meetings with teachers (all over Italy)**, during which the project is explained and, if necessary, other figures of collaborators are involved (editors, test-teachers, proofreaders, etc.)

THE TOOL

The software tool adopted to realize the service is LifeRay. The basic framework is in Java format. The work of personalization lasted almost two years and was carried out by the YMIR software house of Trento - Italy.
At the moment, all the editorial work takes place in **one single space** which blends the functions of a CMS (Content Management System), and those of management of the resources database, of the documents, and the various typologies of users. That allows a huge flexibility of use and, if needed, an implementation of services of the web 2.0 kind. Despite the complexity of the software, great care was taken of the realization of a GUI (Graphic User Interface) extremely simple, with a very short menu, and catching.

LIFERAY

Impacts
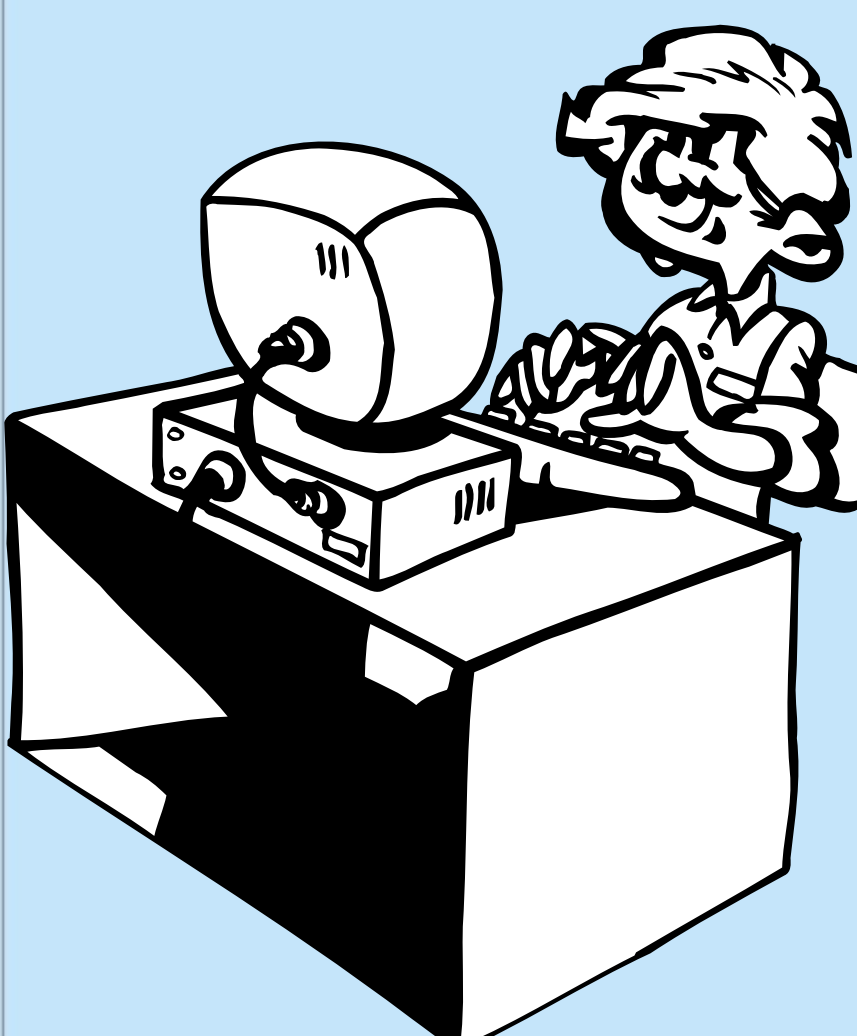
WEBSITE DATA

These are the main server access data to the domain **wwww.icleen.museum** referred to the time period between 1st January 2010 and 30th September 2011 (Google Analytics source).

Visits	12497
Pages views	84135
Pages/Visits	7,16
Average time of visit	5:11
Absolute unique visitors	6634

It should be pointed out that the service target a population of potential users, which correspond to roughly 50,000 secondary school science teachers. File download data analysis may provide a further key to interpret the picture. Almost **twenty thousand files of educational material were downloaded** from the I-CLEEN archive between February and June 2011. This data could signify that a more widespread use is made of the service than web traffic data seem to indicate.

TESTS AND AWARDS

- ICLEEN was the object of two separate researches made in collaboration with the University of Trento aimed at experimentally measure of **the effectiveness of the ICLEEN service** and **the interface usability**
These tests confirm that the following assumption made during the service definition and development phases was correct: **Italian earth science teachers have a great need of supplementary educational materials that should be RELIABLE and READY TO BE USED** The result of the service usability study was the basis of the development of the second release of the gateway that is currently online.
- I-CLEEN was granted the first prize in the category "Mathematics, Science and Tecnology" at the European Schoolnet (ref 12) **eLearning Award 2010**. 539 projects from 39 different Countries, some of which outside Europe, competed for the award;
- I-CLEEN was one of the three finalists for the award put up by the Italian branch of **ICOM (International Council of Museums)** in the category Information and Communication Technology and open to Italian museums;
- I-CLEEN has been included in the repository (Clearinghouse) of **OPAL (Open Educational Quality Initiative ref 13)**, an European consortium that also includes UNESCO and that aims to support open educational practices.
- some resource of I-CLEEN is included in the database of the **SCIENTIX** project (ref14), the biggest european web portal of resources for science education.

Web references

1. Cavalli A. "Gli insegnanti nella scuola che cambia", Società Editrice Il Mulino Studi e Ricerche, Bologna, 2000.
2. ANDRILL's Education and Outreach Programme 2005-2008: MIS and SMS Project Activities during the 4th IPY L.T. Huffman, et al. Terra Antartica, 15(1), 221-235, 2008-2009,
3. DESIRE Information Gateways Handbook http://www.desire.org/handbook/
4. SPreaD - Strategic Project Management Tool-Kit for Creating Digital Literacy Initiatives http://wiki.spread-digital-literacy.eu/
5. DLESE Digital Library for Earth System Education http://www.dlese.org/library/index.jsp
6. OER Commons Open Educational Resources http://www.oercommons.org/
7. LRE Learning Resource Exchange for Schools http://lreforschools.eun.org/LRE-Portal/Index.iface
8. NSTA National Science Teaching Association /http://www.nsta.org/
9. ODP Ocean Drilling Project http://www-odp.tamu.edu/
10. Draft Standard for Learning Object Metadata IEEE 1484.12.1-2002 Institute of Electrical and Electronics Engineers Standards Association, New York
11. Dublin Core Metadata Initiative http://dublincore.org/
12. European Schoolnet Transforming education in Europe http://europeanschoolnet.org
13. http://www.oer-quality.org/
14. SCIENTIX The community for science education in Europe http://www.scientix.eu

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inquiring on climate and energy
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