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CIELO@SCUOLA**

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# THE INTEGRATED SYSTEM FOR THE DISSEMINATION OF THE ASTRONOMICAL AND ASTROPHYSICAL KNOWLEDGE: CIELO@SCUOLA

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## ABSTRACT

The fast growing World Wide Web has rapidly transformed everyday life and it has forced institutions to adopt completely new ways of teaching.

CIELO@SCUOLA is an integrated system for the dissemination of the astronomical and astrophysical knowledge, born from a project developed by INAF-Astronomical Observatory of Torino, Infini.to Planetarium of Torino and Museum of Astronomy and Space, the University of Torino, and CSP - innovazione nelle ICT.

The aim of this project is to support high-school science teachers and in this way to increase the students interest in astronomy and astrophysics.

The system adopts innovative WEB systems and tools to hold interactive remote courses and exchange experiences.

In this paper we present our activities and the first up-to-date educational on-line courses for science teacher held during winter-spring 2012, when about 50 teachers have followed the course in four different multimedia laboratories dislocated on the Piedmont territory.

## INTRODUCTION

Since the fast growing World Wide Web has rapidly transformed everyday life, institutions had to adopt new ways of thinking, working, doing business and, last but not least, teaching. Some pedagogical theories assume that all human actions are mediated by tools. From these point of view, our project attempts to orchestrate different tools into a collaborative learning framework with ubiquitous computing technology to realize an Astronomy and Astrophysics course for science teachers. Three high schools are involved in the project:

- Liceo Scientifico Statale E. Fermi – Arona
- Liceo Scientifico Statale "Alessandro Volta" – Torino
- IIS "Giancarlo Vallauri" - Via S. Michele 68 – Fossano

These schools, fully equipped with Information and Communication Technology (ICT) facilities, hosted the Virtual Classroom where teachers (from these and other schools) take part to the on-line courses. In addition to the three virtual classes, a real classroom was at the Observatory, just to don't leave the teacher alone (it's important for the people who teach by this kind of ICT framework to feel really the student).

## E-LEARNING WEB PLATFORM

The project started in March 2011, with the developing of the necessary ICT infrastructure at the Observatory. The WEB site CIELO@SCUOLA (<http://cieloascuola.oato.inaf.it>) become operative during September 2011.

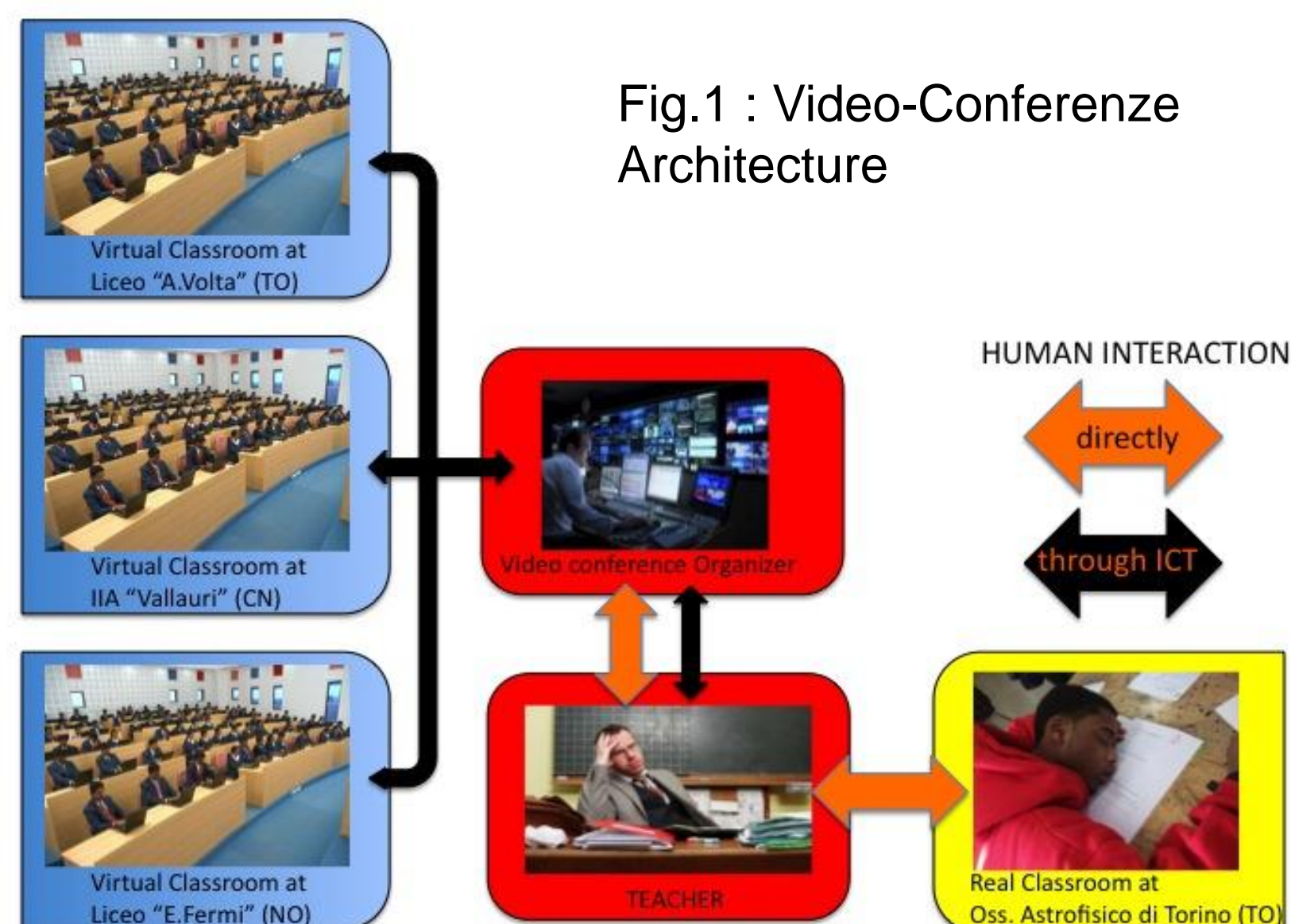


Fig.1 : Video-Conferenze Architecture

The WEB site was once used to distribute the news and to subscribe to the meeting held to Pino Torinese at November 21, 2011, where we give the first announcement of the on-line courses. The site is focused not only on the distribution of documents and teaching materials, but also open for different purposes, such as the production of internet-based courses. It was developed using open source resources, with a LAMP<sup>(1)</sup> Web Server and it adopts WordPress as Content Management System (CMS) furthermore we have also install MOODLE<sup>(2)</sup> as Learning Management System (LMS) and BigBlueButton as Web Conferencing System (WCS). Both: Moodle and BigBlueButton, are under integration and testing process. Infact, due to various problems, the on-line lessons were held using an other WCS: GoToMeeting. In order to avoid problems with the network's bandwidth, the ability to follow video-lessons was limited at the three virtual classroom.

<sup>(1)</sup> LAMP: Linux, Apache 2, MySQL 5 e PHP 5

<sup>(2)</sup> MOODLE: Modular Object-Oriented Dynamic Learning

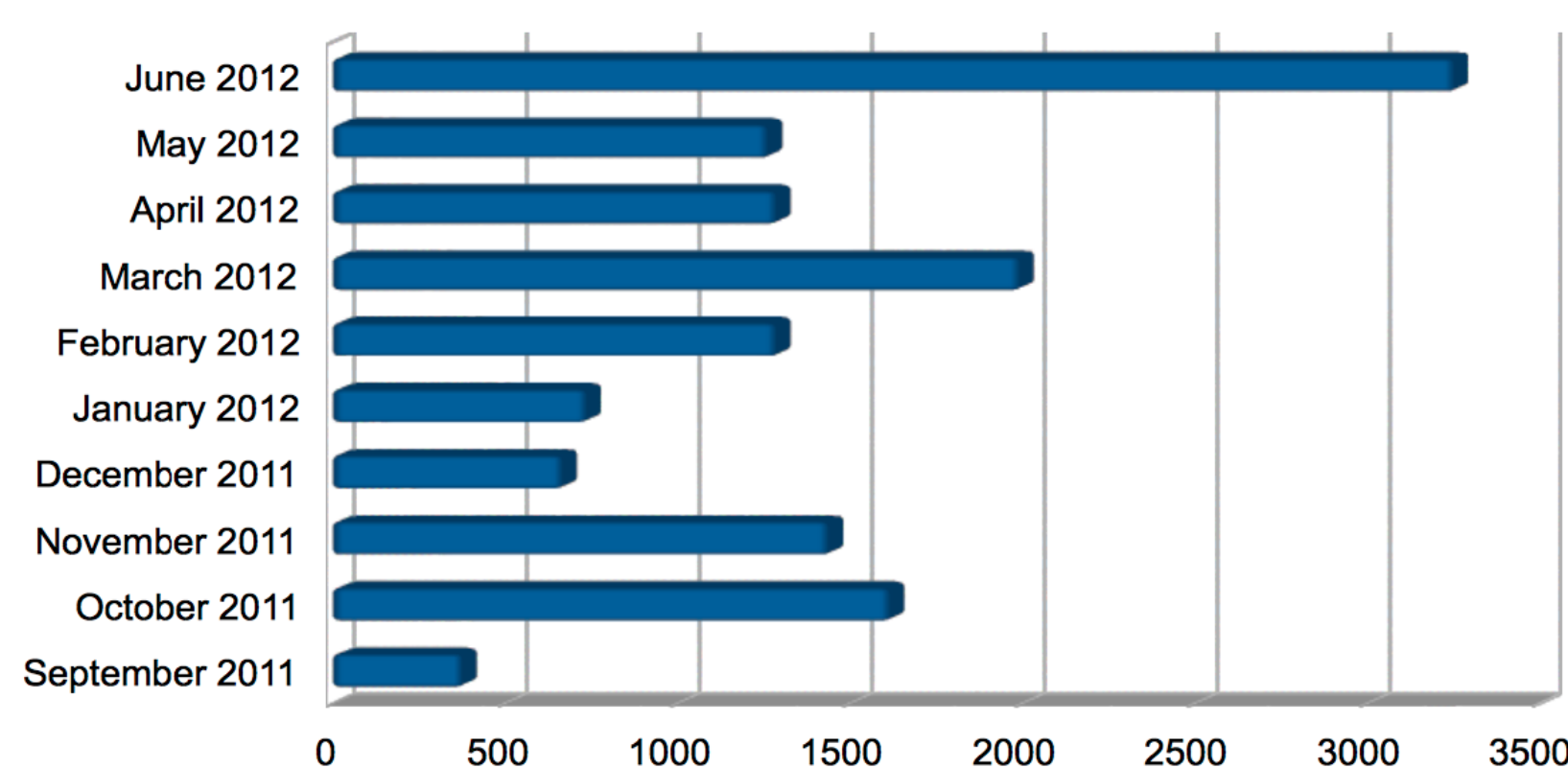


Fig.2 : Number of monthly access to the WEB site:  
[HTTP://CIELOASCUOLA.OATO.INAF.IT](http://CIELOASCUOLA.OATO.INAF.IT)

## COMMUNICATION

During the project, it was critical organize communication initiative. We wanted to inform a pool of teachers, so we used the official channels of communication, which are the regional and provincial education offices. But apart from this institutional communication we organized a meeting to promote the course. Immediately after the development of the website, we held on November 21, 2011 at the Planetarium a conference with title: "CIELO@SCUOLA: notes for a virtual school of Astrophysics". The scope of the one-day meeting was to inform the teacher of the new WEB portal, and about the on-line training course. The news appeared on the site and communicated via e-mail to 1311 school of the 7 provinces of our region. As a response of our invitation 58 teachers and colleagues, coming from 31 different institutions, subscribe themselves to the meeting. 28 participants to the autumn conference will follow the training course during the next spring.

## ON-LINE COURSES

Astronomy and Astrophysics are the ideal vehicle for handling a large number of topics related to various scientific disciplines as Physics, Mathematics, Sciences of the Earth, Geography, and Chemistry. All these topics are included into reform of the Italian educational system (L. 133 August 6, 2008). But we are extremely happy that our course were attend also by teachers who taught in humanities (see fig. 3)

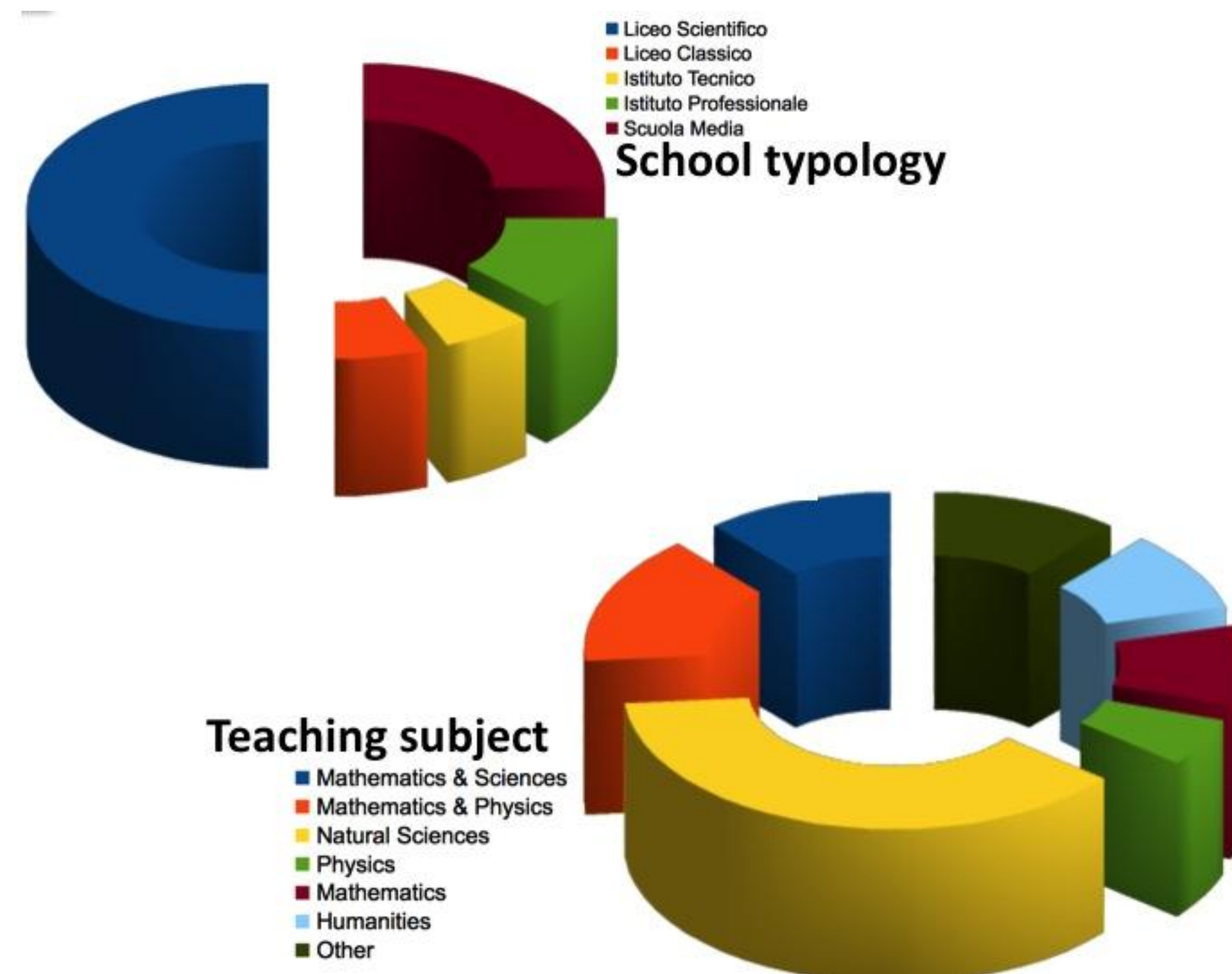


Fig.3 : Participants vs .....

We was able to deliver the first (almost entire on-line) course for teachers during the months of March April 2012. On a total of 16 teaching hours, only 4 hours were held physically at the Observatory/Planetarium.

## EVALUTATION

## CONCLUSIONS

## REFERENCES

### Acknowledgements

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