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## O1 Intellectual Output – Best practices analysis – Italy

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### Contents

EO1 Intellectual Output – Best practices analysis – Italy.....	1
1) Description of Education System of Portugal and correspondence school levels of 8 to 12 age (Eurydice) and related school curriculum.....	2
2) National recommendations and guidelines for preparation and implementation of curricular materials.....	4
3) Experiences or recommendations about the use of cultural heritage, especially if issued from scientific museums, and about the use of ICTs by science teachers.....	6
4) Experiences and materials for making cross-disciplinary didactic units.....	7
5) Experiences of innovative practices in science teaching and in evaluating the impact for learning improvement.....	8
6) Possible issues and concerns.....	9
7) Do you know any concrete museum experience of museums using/share its heritage, also online, to help teacher to teach science? If yes, please describe and provide references... References.....	10 15



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**1) Description of Education System of each country and correspondence school levels of 8 to 12 age (Eurydice) and related school curriculum (max 1 page)**

The education system in Italy is organized according to the principle of autonomy of schools. The schools are autonomous with regard to educational activities, organization, research and development. The Italian education system currently provides the following:

- **Pre-school** (not compulsory) from 3 to 5 years
- **Primary school** (last 5 years) for children aged 6 to 10 years
- **Secondary school level I (lower secondary school)**, (last three years) from 11 to 14 years
- **Secondary school level II (high schools)**, (lasts 5 years) aimed at students aged 14 to 19 years. It includes high schools, technical colleges and vocational schools.
- **Higher Education:** Universities and Schools of Higher Education

Education is compulsory in Italy for 10 years, from 6 to 16 years, and covers the eight years of the first cycle of education (5 years of primary school and three years of secondary school level I) and the first two years of the second cycle (DM 139/2007).

Children aged 8 to 12 years attend the following classes:

- 8 years – III class primary school
- 9 years - IV class primary school
- 10 years – V class primary school
- 11 years - I class lower secondary school
- 12 years – II class lower secondary school



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### TIMETABLE PRIMARY SCHOOL

Time school	Days a week	Entry/exit
FULL TIME	5 days	8.30-16.30
PART TIME	6 days or 5 days	8.30-13.30 3 days 8.30-13.30 2 days 8.30 – 16.30

### TIMETABLE LOWER SECONDARY SCHOOL

Time school	Days a week	Incoming and outgoing
	6 days	8.00-14.00

The subjects studied by students from 8 to 12 years are:

Italian, English and another second foreign language, history, geography, math, science, music, arts, physical education, technology. Religion is not compulsory, students who do not wish to participate in religion classes can choose to participate in optional activities agreed upon by teachers of different subjects. Students of I and II classes lower secondary school in addition to the subjects already listed, have one hour per week of study in depth of literary subjects.



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## 2) National recommendations and guidelines for preparation and implementation of curricular materials (max 2 pages)

The aim of the Italian education system is to train European citizens with an identity aware, with a view to opening up to the world and to practice equality in the recognition and respect for differences. For this reason, *National Guidelines* for the curriculum in kindergarten and the first cycle of education have been developed, in which are described the skills, related to the subjects of teaching and the full exercise of citizenship, that a student has to show having at the end of the first cycle of education.

Science teaching designed for students aged 8 to 12 years is based on a survey method based on research, observation of the facts and their interpretation. Students at the end of primary school (10 years of age) will have achieved the following aims for the development of scientific expertise:

- development of the attitude to curiosity
- explore phenomena with a scientific approach (observation and description of facts)
- implement small experiments
- identify quantitative and qualitative aspects in the phenomena
- recognize the main characteristics of life of animals and plants
- know the structure of human body
- take care of body and environment
- use of appropriate language to describe what has been experienced
- find information and explanations from various sources

The learning objectives from 8 to 10 years related to the III, IV and V classes of primary school are divided into the following themes:

- ✓ *objects, materials and transformations*
- ✓ *observe and experience in the field*
- ✓ *the man living things and the environment*

The aims for the development of the skills required for students between 10 and 12 years are:

- explore, experiment phenomena and verifies the causes



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- develop simple schematizations and modeling of the facts
- recognize in their body structures and operations
- have a vision of the complexity of the Nature
- connect the development of science in the development of human history
- curiosity and interest towards the main problems related to the use of science in the field of scientific and technological development.

The learning objectives 10 to 12 are related to the class I and II lower secondary school concern and are divided into:

- ✓ *physics and chemistry*
- ✓ *astronomy and earth sciences*
- ✓ *biology*



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**3) Experiences or recommendations about the use of cultural heritage, especially if issued from scientific museums, and about the use of ICTs by science teachers (max 1 page)**

The educational institutions and in particular the comprehensive schools, have undertaken to build a curriculum that follows the new National Guidelines, with a specific focus on skills, including digital competence of primary importance and the ability to be able to use with confidence the information and communications technology (ICT), the use of computers to retrieve, assess, store, produce, present and exchange information, and to communicate and participate in collaborative networks via the Internet. Italian school, at the same time, as quoted in the National Guidelines, "... he has learned to recognize and promote mutual learning outside of its walls, in all areas of life in which children and young people grow up and through new media, constantly evolving, with the participation in different and creative ways." The synergies created between school and education and training organizations to develop the path outlined in the Plan of Studies of three years and the frequent activities related to the relationship between schools and museums, have highlighted the need to modify and implement the methods that favor the integration of cultural heritage with the path curriculum using technology supplied to schools.

In the following few websites:

<http://www.polomuseale.firenze.it/didattica/>

<http://www.assodidatticamuseale.it/ADM/default.aspx>

<http://spm.beniculturali.it/didattica.html>

<http://www.museogalileo.it/esplora/didatticaonline.html><sup>1</sup>

<http://www.museogalileo.it/en/explore/onlinedidactic/scienceplay.html>

<http://mused.uniroma1.it>

In particular, the last site mentioned, gives access to the platform that allows you to browse the catalogs of the Museums of Sapienza University of Rome, with the ability to capture useful information from teachers and pupils to produce hypermedia and implement, thanks to semantic organization, content related to scientific heritage <sup>2</sup>.

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<sup>1</sup> Il Museo Galileo di Firenze ha inserito online giochi interattivi collegati alla discipline scientifiche [Museo Galileo, 2013].

<sup>2</sup> V. FERRARA (a cura di) (2014). Il patrimonio digitale per la didattica. Di V. Ferrara, S. Sapia e altri., Roma: DIGILAB, ISBN: 978-88-909933-0-5



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#### 4) Experiences and materials for making cross-disciplinary didactic units

The renovation of the school in today's society goes through the interdisciplinary perspective, the best possible approach to building bridges between different disciplines and areas of knowledge more and more specialized.

The various subjects become the goal of the learning process, teachers enrich the educational environment with all their professional and human skills: there is no knowledge or a skill set that can be referred to a disciplinary dimension unique and exclusive<sup>3</sup>...

In this context, the possibility of exchanging and sharing digital material freely for the construction of interdisciplinary teaching units, is really strategic.

Here are some Italian experiences that go in this direction:

[http://www.indire.it/dia/cosa\\_generale.php](http://www.indire.it/dia/cosa_generale.php)

The DIA is a database of images that can be used in many different activities for schools and universities, for multidisciplinary research and finally as a specific resource for teaching with multimedia.

<http://www.culturaitalia.it/>

CulturaItalia offers integrated access and innovative in the world of Italian culture.

Digital resources are provided directly by those who own and manage the cultural content in digital form of the Belpaese. The user, through the Portal, consult a base of "metadata", which aggregates and organizes information from all suppliers affiliated with Culture Italy.

<http://www.raiscuola.rai.it>

RAI website that allows the creation of lectures using audiovisual television.

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<sup>3</sup> **Indicazioni per il curriculum della scuola dell'infanzia e del primo ciclo di istruzione**, D.M. 254 del 16 novembre 2012.



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## 5) Experiences of innovative practices in science teaching and in evaluating the impact for learning improvement

Italy has acquired full awareness of an improvement of science, stimulated by : difficulty of student learning of various kinds and levels, from new opportunities offered by information technology (ICT) and from digital assets more freely available on-line.

The need for innovation in the teaching of science, moreover, requires an increasing dialogue between school and the world of educational research as well as between science and the humanities. It is increasingly necessary in the study of the sciences investigate the possible intersections between language, origin and structure of meanings.

it is important to encourage exploration and observation of scientific phenomena, construction of definitions based on direct experience, social and problem-solving skills.

[http://www.liquida.it/didattica-delle-scienze/?coolbox=0\\_99\\_0\\_35734594](http://www.liquida.it/didattica-delle-scienze/?coolbox=0_99_0_35734594)

The first Italian search engine of 2.0 information, provides a specific section dedicated to Education Sciences .

<http://qui.uniud.it/notizieEventi/ricerca-e-innovazione/innovazione-didattica-15-progetti-dellateneo-in-collaborazione-con-le-scuole-regionali/#null>

There are 15 projects of educational innovation (PID) centered on research proposals for new ways of learning for young people established in 2015 by the University of Udine.

An evaluation of the use of digital cultural heritage in museums and 'took place as part of the Musa with the administration of specific questionnaires. **Use of cultural heritage for the creation of multidisciplinary teaching units**

<http://didattica.museodiffusotorino.it/>

The site was created with two objectives: first, as a network to improve the production of educational museum since 2003, the other as a tool to facilitate the sharing of experiences, ideas and teaching materials among teachers working around the fundamental themes the museum reality.





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## 6 Possible issues and concerns

The critical issues arising from the use of technologies in Italy are organizational and infrastructural.

Not all schools are equipped with technologies and multimedia laboratories and if they are, not all teachers have the skills to manage ICT. To date, there is a serious lack of uniformity in the ability of teachers to master the use of new technologies.

This is mainly due to the unresponsiveness towards educational innovation, use of new media and the hardening of traditional educational methods.

The use of online resources also poses problems related to the complexity of the organization of the information, the selection of the assets and the construction of original learning paths.

The use of ICT is revealed, however, essential to encourage interaction and activate self-correction processes. They increase during use, levels of understanding, attention and memory, thanks to images, immersive environments, methodologies based on playing and interacting. This approach overcomes the barriers between natives and immigrants favoring equal approaches in the process of learning and building skills in preparation to lifelong learning.

The interdisciplinary synergy among the teachers gives students the opportunity to expand the vocabulary, improve communication skills, including language other than that of origin, and to build cognitive maps non sector. The exchange between the various teachers of the projects, even at a considerable geographical distance, beyond the borders of the classroom until arriving in the global community to find, share, experiment and get feedback.

The proposed approach makes it possible to counter the decline of educational disciplines and the existential impoverishment of the teacher raising his professionalism. At the same time, it aims to provide students with a cultural proposal more appropriate to our times, on a European, open to new cultural contexts. It supports more effective learning and expendable in the complexity of the company, in a perspective of greater responsibility of those involved.



**7 Do you know any concrete museum experience of museums using/share its heritage, also online, to help teacher to teach science? If yes, please describe and provide references.**

One of the experiences is the Mused platform ([mused.uniroma1.it](http://mused.uniroma1.it)). Teachers have built custom catalogs related to topics of interest to them through the download of such content on their computer for reuse in the construction of multimedia lessons. The user chooses the custom path previously saved on your computer and with the editor ASDscuola inserts images and content within the hypertext lesson<sup>4</sup>, which will lead the students in a virtual path in preparation for the next visit to the museum. Students, under the guidance of the teacher, will use the same system to build their elaborate multimedia combining theoretical knowledge with the experience of objects.

Below the multimedia lessons that can be consulted on the MUSED<sup>5</sup> platform.

TOPIC:	TITLE:	CYCLE	CLASS:	OBJECTS:
Educazione	Alcool e Salute	Secondaria	II	5
Salute		Igrado		
Scienze	Dalla Vite al Vino	Primaria	IV e V	14
Scienze	Il Viaggio degli Alimenti nel Corpo Umano	Primaria	V	24
Scienze	La Rosa	Primaria	III	6

<sup>4</sup> FERRARA V. (2009). *ASD (Accessible Site Developer): un CMS per i Musei*. In CONGRESSO NAZIONALE AICA 2009 Un nuovo “made in Italy” per lo sviluppo del Paese ICT per la valorizzazione dei beni e delle attività culturali. Roma, 4-6 novembre 2009

<sup>5</sup> <http://mused.uniroma1.it/index.php?p=utente/lezioni>



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Chimica- Fisica	Modelli Atomici	Secondaria grado	I II	6
Scienze	Il sistema Nervoso	Primaria	V	3
Scienze	Oro: antico e prezioso minerale	Primaria	IV	17
Scienze	Apparato scheletrico	Primaria	V	9
Scienze	Noi e le piante	Primaria	IV	4
Scienze- Storia-	I Minerali	Primaria	III	6
Scienze-	A come Alimentazione	Primaria	V	13
Scienze	Educazione Alimentare	Primaria	V	4
Scienze	Le piante Aromatiche	Primaria	III	12
Chimica	La Chimica delle erbe	Altro	II	2
Scienze- Storia-	Un giorno al Museo	Primaria	III	8
Scienze	Plants and us	Primaria	IV	6
Chimica	Test lezione	Secondaria I grado	II	13



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The described system allows you to insert museum objects decontextualized and re-contextualized in the hypertext. Museum object, identified in the online catalog and used in the construction of hypertext, has considerable potential information related to its physical and materials characteristics, to its geographic location, its purpose or function in the context in which it is included, its relation to the various disciplines of study. Thus the museum object is used as an image associated with a concept, as in the lessons before mentioned; the visit to the museum, after the lesson in class, can improve the learning level of student through the experience of object. The application of technology to museums allows the definition of the different contexts in which the object can be inserted, changing its meaning or value every time and supporting the dissemination of culture within multidisciplinary and with the use of museum objects relating not -scientific subjects (for example in archeology fig.1).

### Risultati progetto – lezione multimediale



Fig.1

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The following describes a multimedia lesson "From vine to wine" in order to give a brief overview of how to develop a process of collaboration between universities and schools involving teachers, pupils aged between 9 and 10 years and experts to build a multimedia lesson.



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The first step taken by the team of teachers from different subjects (Italian, history, science, technology and art) was to choose together to develop an argument that would integrate various cross disciplines, focusing on different skills encompassing language, history, science, technology and art.

The goal was to create a hypermedia product in the round. The team then developed a concept map that was the canvas on which they worked then all the teachers involved in the project.

The search for content and storyboard took place through collaboration and the exchange of e-mail. All the way was done using the software ASD-school and Museum Sapienza University objects, with the advice of the tutor of science museums of the University, who gave some guidelines for materials research.

Museum objects downloaded from the online catalogs of various museums have emphasized the importance multidisciplinary hypertext (figg.2-3-4)

Fig.2

Nome:*Giara/anfora*



Descrizione:*Orlo arrotondato, labbro indistinto, collo cilindrico, anello rilevato alla base del collo, due anse verticali a sezione ovoide impostate sulla spalla e sul corpo, spalla arrotondata, corpo piriforme, fondo convesso. Decorazione a pettine sul corpo: stria*

Museo:*Museo del Vicino Oriente*

Fig.3

Nome:*Humulus lupulus*



Descrizione:*Famiglia: Cannabaceae; Genere: Humulus; Specie: lupulus L.*

Museo:*Erbario - Museo di Botanica*



Fig. 4



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Nome:*Vetreria*

Descrizione:*Elmo da alambicco a testa di Moro*

Museo:*Museo di Storia della Medicina*

It was presented to the pupils the hypertext using LIM. Technological, scientific, geo-historical and anthropological value of hypermedia, has aroused great curiosity and interest of the students who were able to navigate freely 'hypertext using computers in the ICT lab. Visiting the museum, university, it was experienced by all with great participation and interest, because at that time it was possible to verify the correspondence between hypertext and museum object by direct experience.



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## References

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*Developing Key Competences at school in Europe, pp17-22, Eurydice Report 2012, Eurydice/EACEA*

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