

Education and Museum: Cultural Heritage and Learning



**Final event and
International Conference
Proceedings
Roma, 26-27 June 2017
Sapienza Università di Roma**

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Editor-in-chief:

Vincenza Ferrara

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CONTACTS

Contact us at edmuse2015@gmail.com

Visit our website at www.edmuse.eu

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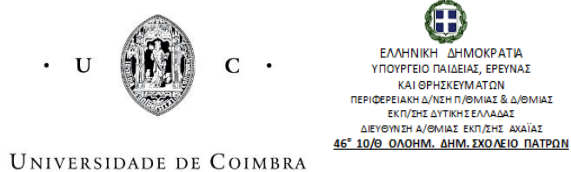
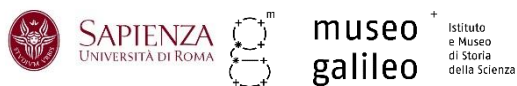
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EDMUSE

Education and Museum: Cultural Heritage for science learning

Start: 01-09-2015 - End: 31-08-2017
Project Reference: 2015-1-IT02-KA201-015013

Programme: Erasmus+

Key Action: Cooperation for innovation and the exchange of good practices

Action Type: Strategic Partnerships for school education

Topics: Pedagogy and didactics

Key Competences (incl. mathematics and literacy):

basic skills ICT - new technologies - digital competences

Project Coordinator

Università degli studi di Roma La Sapienza

Piazzale Aldo Moro 5, 00185 Roma, IT

www.uniroma1.it

Contact person: Vincenza Ferrara, vincenza.ferrara@uniroma1.it

Partners

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Summary

The project proposal is connected to the promotion of initiatives, starting in primary school, for using ICT, the open educational resources and digital resources of cultural heritage for the improvement science learning. The Project aim is to promote a new ways of learning and teaching through innovative method, using technologies and open digital resources that can be non-formal content for design curricula. It also proposed a new way for schools and museums cooperation; Teachers of primary school partners are involved in the project through the learning experience with students of their classes.

PROJECT ACTIVITIES

- State of the art analysis in the use of innovative practices in science education in country partners;
- Define methodology of using technologies and digital resources for making learning units;
- Design and development platform to access and re-use digital resources of cultural heritage in education field;
- Design and development tool for making interactive and open educational resources.

Oriented educational, research-technology and museum Partners will analyze the practices adopted by different countries connected to Science teaching, European Commission document and recommendations in educational field. They also will discuss on some experiences of "best practices" to identify access modality, use and reuse of cultural heritage and the arrangements for making learner-centered teaching unit. The partner will be able to define such skills needed by teachers for working in an innovative way and therefore which practices for permanent professional development and experience sharing among teachers of different countries of the Union should be adopted.

The partners expect positive results related to:

- Teach in the classroom through multimedia tools with new approaches to the scientific disciplines for learning enhancing;
- Propose a trail for reality perception by students as an open system in which you can draw and exchange information with the help of technology;
- Constructivist theory application, creating a synergistic relationship between different learning environment;
- Develop relationships between schools, cultural institutions and in general between school, research and culture environment;
- Increase and stimulate students for Science learning.

The Project goal will be to share and exchange best practices and applications among school models of different countries, to enable the teachers training on how to design cross-disciplinary learning activities for improving a collaborative work to include scientific issues in different areas of the school curricula. Important aims will be innovative relationships between teachers and museum staff, the accessibility to resources as tools to enable teachers to create teaching units to be shared as OER (Open Educational Resources), providing students formal and no formal educational content adopting a language close to the one they use on every day. Dissemination and communication plan provides information and content of Project activities for involving and stimulating stakeholders, national and international educational agencies to replicate experimental methodology and instruments for increasing motivation of the students to choice of higher studies in science field.

DEVELOPMENT OF METHODOLOGY AND RESULTS

Previous studies show that museum resources are not systematically used in the framework of classrooms and that on site visits are not always producing the expected results in terms of learning.

These institutions also highlight the importance of emerging Information and Communication Technologies (ICT) tools to allow the embedding of such resources in the learning environment.

However, the relationship between school and museum, with the scientific and digital realities that compose it, is both an expansion of training and a fun and valuable experience for the training of students and teachers. Especially the university museum is a place of integrated culture, based on the observation of objects and the possibility of interacting with them, where the student may track through the use of "exhibits", what he has learned, theoretically, in connection with the historical and artistic disciplines.¹

The Erasmus + Project "Education and Museum: Cultural Heritage for learning science" aims to promote innovative methods of teaching and learning through reusing digital learning objects of museums. This aim can be achieved through the EdMuse platform that enable personalized and adaptive eLearning pathways.

THE EDMUSE PLATFORM

In the scope of EdMuse, teachers are invited to plan "teaching" units on a topic of science, selected from among the contents of the programming for targets, so as to ensure the development of core concepts of the discipline in question² in a multidisciplinary and transversal perspective. The goal is to give students the tools to understanding and acquire the skills as the ability to use the new knowledge. Integration with digital assets is useful when the teacher prepares his lectures. In this phase, the opportunity to

¹ V. Ferrara, S. Sapia et al., *Il patrimonio digitale per la didattica*, a cura di V. Ferrara, Roma: Digilab, 2014.

² C. Piu, *Problemi e prospettive di natura didattica*, Roma: Monolite Editrice, 2009.

gain access to the digital resources of museums, constitutes a valuable support to capture images of museum objects and information connected to content related to the topic discussed in the classroom.

EdMuse methodology also allows teachers to build a custom path online. Using programs or software products, teachers can create an e-book, according to a communication strategy based on a continuous process of collaboration between the museum and the teacher, according to which they can:

- connect to the catalogue of museum objects;
- choose the content and the related images useful to describe the subject of a curricular discipline.

The student, through the thematic routes and the observation of the museum object, is involved in the discovery of ancient history, science, art and technology in a context certainly more appealing than the “traditional” classroom³: peoples, events of the past, tools, inventions that have been realized through the collections, the objects, the evidence preserved in the museum environment.

In summary, teachers, thanks to the methodology proposed in EdMuse:

- Acquire the skills to access the online digital resources of various museums;
- Register on the website made available to create custom locations for the storage of museum objects and the link information selected;
- Trigger the download of custom locations on your computer.

EU RECOMMENDATIONS FOR USING CULTURAL HERITAGE IN EDUCATION

The European Digital Agenda identifies as a priority the re-use of digital content related to the cultural heritage to develop learning content [EU Commission Recommendation, 711/2011 / EU]. The presence of numerous digital resources made available in open data mode of the museums will ease their reuse (EU Commission Recommendation 2011/711 / EU).

The museum objects can become a vehicle for educational content, as they can provide information related to its nature, to its use, to its representation in different historical contexts and disciplines. Being "image" and "content" they are candidates to become an effective contribution to the production of multidisciplinary and personalized educational courses.⁴

NATURAL SCIENCES DIDACTICS AND MUSEUM EDUCATION THEORETICAL MODELS

The Natural Sciences Didactics and the Museum Education followed an almost common theoretical process, passing from the behaviourism to the social constructivism, more recently combined with sociocultural approaches. That process affected the Natural Sciences Curriculums and the Educational programs of the museums, which changed their focus from the “subject” to the “learner”.

Nowadays the common ground between museum education and Didactics of Natural Sciences is the theory of the constructivism. The educational theory of the constructivism considers that students construct the knowledge themselves, through social interaction and language use, and they interpret the various concepts and ideas through their personal models, which are concerto constructions, widely known in natural sciences didactics as conceptual representations. Constructivist educational theory argues that in any discussions of teaching and learning we should focus on the learner. The main teaching goal on Natural Sciences Didactics is to help students to learn how learn, through multidisciplinary approaches, immediate experience, use of original resources and interactive initiatives.

The “hands on” and “minds on” activities of Dewey, the theories of Vygotsky and Bruner, which highlights the role of cultural background of learning and the theory of multiple intelligences of Gardner converge on using museum education in order to design and implement multidisciplinary teaching approaches.

CONSTRUCTIVIST TEACHING AND LEARNING METHODS

In order to facilitate the full development of each student, it is necessary to provide an effective strategy for learning through various educational procedures. Teachers must develop teaching learning scenarios on how to use the platform in a constructivist model. The constructivist-teaching model for the Natural Sciences evolves into five phases and is proposed to develop EdMuse multimedia lessons:

- Orientation,

³ S. Sapia and V. Ferrara, *Al Museo per fare didattica*. Education 2.0, 2013.

⁴ Cf. Europeana Foundation (2015). *Europeana for Education and Learning: Policy Recommendations*, <<http://pro.europeana.eu/publication/europeana-for-education-policy-recommendations>>, accessed 22 June 2017.

- Promotion of children's representations,
- Reconstruction of children's representations,
- Implementation to everyday life,
- Review.

Concern of the teacher: to challenge students' interest in such a way that they feel the concept negotiated concerns them.

The stimulus must be appealing and targeted to multifaceted (emotional and cognitive) engagement of the student.

The use of interdisciplinary stimuli can reinforce the impression caused: e.g. a collection of newspaper headlines or a photographic collage of the events of an earthquake can contribute to this.

Children's representations are very important:

- Dialogue is sought to enable students to explain their views;
- Trying to explain, the student is forced to organize what he/she thinks and thus perceive possible confusions. They also have the opportunity to compare the views of their peers.

The class checks the correctness of their ideas with scientific documentation, which is experimentation and the so-called guided discovery approach.

At this point, the contribution of the platform and the museum exhibits can be decisive.

The exhibits and their observation contribute to the discovering of the scientific principles and laws labelling. Choosing the right exhibit and the didactic handling with proper presentation and appropriate questions will lead to reconstructing the previous views into scientific representations.

The platform may include proposals for teaching manipulations of exhibits or suggestions on the suitability of each exhibit for the reconstruction of certain erroneous representations of the students.

The ability of the new cognitive achievements to solve problems of reality with the scientific process is judged- checked.

The variety of everyday sectors in which everyone meets science applications can be served by the interdisciplinary approach.

The students compare their initial ideas to their reconstructed ones and a cognitive imbalance arise. Discussion leads to conclusions adopting the new knowledge.

METHOD FOR USING THE EDMUSE PLATFORM

The EdMuse Platform collects the metadata of cultural heritage objects extracted from museum catalogues, using API service, involved in the project and from the Europeana Digital Library. EdMuse Platform is a virtual learning environment based on collaborative work to share content and Learning Objects among many schools.

It aims to allow teachers to build a personalized path through web access to the Museums Catalogues and to download images and information on museum objects to be used in the production of multimedia lessons

Different modes and content have been provided in a reserved area for teachers to make online lessons integrating museum objects.

Cards and catalogues are available on the EdMuse platform, usable to any visitor who can look up and see what interests them; teachers and students logged in the project have an opportunity to create their own catalogues structuring specific paths in which they're going to insert the objects of their interest; they have also the option to add other descriptions visible to all using the annotation tool.

The Educational Partners of Edmuse Project have access to EdMuse platform and have managed the data downloaded from it. The teachers made multimedia lessons and upload them on the platform so other teachers and student can access to this educational content. (<http://www.edmuse.eu>).