



Association for Teacher  
Education in Europe



University of Genoa  
Department of Education



Italian Society for Research  
on Education and Media



Edited by  
Parmigiani Davide, Pennazio Valentina & Traverso Andrea

Published in 2013 by  
Association for Teacher Education in Europe  
ATEE aisbl, Rue Hobbema 67, 1000 Brussels, Belgium

ISBN 9789081563956

**ATEE-SIREM**  
**Winter Conference Proceedings**

**Learning & Teaching  
with  
Media & Technology**

**7-9 March 2013, Genoa, Italy**

Edited by  
Parmigiani Davide, Pennazio Valentina & Traverso Andrea

## Table of contents

<b>Learning &amp; Teaching with Media &amp; Technology</b> <i>by Davide Parmigiani, Valentina Pennazio &amp; Andrea Traverso</i>	p. 9
<b>Section 1</b> <b>ICT in Higher Education Contexts</b>	
<b>Developing a Scale to Measure Attitudes of University Students towards E-learning</b> <i>Al-Musawi Nu'man M., Al-Bustan Ahmed A., Sharaf M. Al-Mezel</i>	p. 13
<b>Future Teachers' Views on Using Digital Media in Teaching</b> <i>Daniela Linda, Žogla Irēna</i>	p. 21
<b>Student Teachers' Views on Using and Reusing Online Discussions</b> <i>Deryakulu Deniz, Öztürk Ebru, Erdem Mukaddes</i>	p. 30
<b>Digital Storytelling as an Educational and Training Methodology: a Case Study with Social Educators</b> <i>De Rossi Marina, Restiglian Emilia</i>	p. 38
<b>Moodle in the Middle: VLE as a Medium for Teacher Professional Development</b> <i>Eaton Patricia, McKenzie Lisa</i>	p. 51
<b>Planning Tools as an Aid for Multimedia Didactics for University Students with Visual Impairments: the Communicative Aspects</b> <i>Ganino Giovanni</i>	p. 61
<b>Reconsidering Learners' Attention in Video Conferencing from the Teacher's Perspective</b> <i>Giroux Patrick, Bi Nguema Nadège Bikie</i>	p. 69
<b>Rethinking E-Learning Accessibility. Toward Didactic Guidelines to Design Inclusive Activities</b> <i>Guglielman Eleonora</i>	p. 80
<b>Application of ICT in Pre-Service Teacher Education: The Case of Jimma University, Ethiopia</b> <i>Hunde Adula Bekeke, Tacconi Giuseppe</i>	p. 90
<b>Online Tutoring as a Teacher's Challenge in Higher Education</b> <i>Laajala Tiina</i>	p. 101

<b>Digital Literacy in Teacher Education. An Integration Model</b> <i>Männikkö Barbutiu Sirkku, Käck Annika</i>	p. 111
<b>Scuola 21. A Project to Implement Active Citizenship Skills in the Italian Higher Education: the Role of ICT</b> <i>Matricardi Giorgio</i>	p. 122
<b>From Traditional Usage of ICT to Transformative On-line Learning Environments in Vocational Higher Education</b> <i>Paaso Leena</i>	p. 130
<b>Designing Competence in New Licei. Research &amp; Training by Group DidaSco</b> <i>Perla Loredana, Vinci Viviana, Schiavone Nunzia</i>	p. 140
<b>Learners of Digital Era between Data Evidence and Intuitions</b> <i>Rapetti Emanuele, Cantoni Lorenzo</i>	p. 148
<b>An Intelligent Tutoring System to Support Student and Teacher Activity</b> <i>Rossi Pier Giuseppe, Fedeli Laura</i>	p. 159
<b>Fear and Fascination of Media: Discussion of the New Dimension of Educators' Competence in Latvia</b> <i>Rubene Zanda, Valdmane Liene</i>	p. 166
<b>Digital competence in teacher education</b> <i>Tømte Cathrine</i>	p. 173

## Section 2 Teaching and assessing with ICT in the classroom

<b>Virtual Museums, Cultural Heritage Education and 21st Century Skills</b> <i>Antonaci Alessandra, Ott Michela, Pozzi Francesca</i>	p. 185
<b>Laboratory Based Didactics and Cooperative Strategies for a Feeding Study Report</b> <i>Azzariti Albalisa</i>	p. 196
<b>Rimapping the Educational Spaces. The Emergence of Embodied Education and Digital Epistemology. A School Experience</b> <i>D'Ambrosio Maria</i>	p. 202
<b>Technology at School: Special Event or Everyday Practice?</b> <i>Di Blas Nicoletta</i>	p. 210
<b>Technology and Group Work: Inclusion or Diversification of Talents?</b> <i>Di Blas Nicoletta, Paolini Paolo</i>	p. 218
<b>Primary Teachers' Professional Development in Portugal. The Contribution of ICT and Problem-Based Learning</b> <i>Fartura Susana, Pessoa Teresa</i>	p. 232

<b>How to Improve Quality in Media Education? A Tool for Teachers and Teacher Educators of Italian Primary Schools</b> <i>Felini Damiano</i>	p. 243
<b>Needs analysis in classroom digitalization projects</b> <i>Garavaglia Andrea, Petti Livia</i>	p. 251
<b>The Methodological Value of Collaborative Work in the Teaching-Learning Process: Explanatory Variables</b> <i>Garcia-Valcarcel Munoz Ana, Tejedor Francisco Javier</i>	p. 259
<b>Integrating Technology and Teaching with Learning Solutions</b> <i>Gentile Maurizio, Pisanu Francesco</i>	p. 272
<b>A Literature Review on Intelligent Tutoring Systems and on Student Profiling</b> <i>Giannandrea Lorella, Sansoni Marilena</i>	p. 287
<b>Can Computers Teach Students Biomedical Laboratory Technology?</b> <i>Jelsbak Vibe, Georgsen Marianne</i>	p. 296
<b>Multiliteracies in Primary School Mathematics Learning</b> <i>Jones Anthony</i>	p. 308
<b>How to Improve the Earth Science Teaching at School Using the Web</b> <i>Lancellotti Lorenzo, Invernizzi Chiara, Paris Eleonora</i>	p. 318
<b>Use of Multimedia, Virtual Field Trips and Geomatic Tools in Earth Science Education</b> <i>Magagna Alessandra, Ferrero Elena, Giardino Marco, Perotti Luigi</i>	p. 325
<b>The “Behind the Scenes” of Teaching with Digital Media: why are Teachers not really Interested in the Use of ICT in their Pedagogical Practice?</b> <i>Mamede-Neves M.Apparecida C.</i>	p. 337
<b>Use of Tablets for Instruction and Learning in Microbiology Labs</b> <i>Møller Karen Louise, Georgsen Marianne, Jelsbak Vibe</i>	p. 345
<b>Assessing Students with Media and Technologies: Opportunities and Limits from Teachers’ Point of View</b> <i>Pandolfini Valeria</i>	p. 356
<b>The Role of Representations for the Development of a Participatory Culture of Learning Design among Educators</b> <i>Persico Donatella, Pozzi Francesca</i>	p. 365
<b>An Artifact for Assessing Students' collaborative and Individual Activities</b> <i>Romano Luigi</i>	p. 373
<b>Digital Learning in Classroom: Diffusion, Use and Evaluation of Digital Learning Environments in Apulian Schools</b> <i>Romito Gianfranco, Baldassarre Michele, Scarinci Alessia</i>	p. 382

**Sustaining Innovation: a Research on the Variables that Enable ICT-Based Educational Innovation** p. 404  
*Taddeo Gabriella, Tirocchi Simona*

**Redundant and Scrambled Information on Presentation Manager** p. 413  
*Zanon Francesca, Bortolotti Elena, Paoletti Gisella*

### **Section 3**

#### **Games, Videos and Simulations for Learning**

**Tell a Story. Becoming a Lifelong Learner** p. 423  
*Baldassarre Michele, Brunetti Immacolata, Brunetti Maria*

**Empathy and Intercultural Games** p. 431  
*Bruni Filippo*

**Learner Collaboration in Digital Game Making: An Emerging Trend** p. 439  
*Earp Jeffrey, Dagnino Francesca Maria, Kiili Kristian, Kiili Carita, Tuomi Pauliina, Whitton Nicola*

**Human Machine Interaction, Embodied Cognition and Phenomenology: the Body in Digital Storytelling** p. 448  
*Di Tore Alfredo, Mangione Giuseppina R., Corona Felice, Di Tore Stefano, Aiello Paola*

**Media Education and Video Games. An Action-Research Project with University Students** p. 460  
*Felini Damiano*

**Print Quest: A Learning Adventure** p. 474  
*Kulbida Jasmine, Maguire Brien*

**Digital Games as Systems & Design Literacy: a Review and a Proposal** p. 494  
*Morini Luca*

**Digital Storytelling as New Meaningful Teaching/Learning Strategy for Mathematics and Geometry** p. 503  
*Petrucchio Corrado, De Rossi Marina, Personeni Fabrizio*

### **Section 4**

#### **Mobile, Web 2.0 and Social Networking in Education**

**What do the Parents of Students Think about Online Social Networks? Polarized Visions about the Uses of Connected Digital Support** p. 511  
*Da Silva Rosado Luiz Alexandre, De Oliveira Tatiane Marques*

**A Digital Learning Environment [www.coloredellastoria.unifg.it](http://www.coloredellastoria.unifg.it): Didactic Methodologies, Interactions and Guidelines for the Participatory Design of Digital Tools** p. 522

*De Santis Annamaria, Scarinci Alessia*

**Social Media As a Tool That Transforms the Collegiate Classroom** p. 533

*Lundy April L., Stephens Alice E.*

**Inclusive Society, Web Accessibility and Social Networks: the Case of Facebook** p. 537

*Pinnelli Stefania*

## Section 5 Insegnare e apprendere con le tecnologie

**Tecnologie digitali per l'apprendimento: iniziativa per la valorizzazione e l'ampliamento della didattica digitale** p. 549

*Baldassarre Michele, Averna Anna Lucia*

**Dal Q.I. al Q.E. Traiettorie emozionali nei contesti organizzativi. Una proposta per la formazione** p. 556

*Belvedere Giuseppe, Baldassarre Michele*

**Slow food: analisi degli enunciati in "Alle origini del gusto"** p. 564

*Cirulli Federica*

**La scrittura multimediale: una strategia didattica all'interno del progetto cl@ssi 2.0** p. 575

*Ena Anna Erika*

**Sviluppare conoscenze e competenze per l'espressione verbo-sonora attraverso il medium radio. L'insegnamento laboratoriale di scrittura radiofonica del Corso di Studi in Teorie e Metodologie dell'e-learning e della media education (E-Media)** p. 586

*Luciani Luca*

**Cambiamenti in atto: dallo "spazio" fisico allo "spazio" virtuale. Riflessioni pedagogiche attorno al tema** p. 597

*Orsenigo Jole, Selmo Laura*

**Accessibilità e inclusione. Kirikù e la strega Karabà-AD: una ricerca intervento in classe** p. 607

*Pinnelli Stefania, Fiorucci Andrea*



# **A digital learning environment [www.coloredellastoria.unifg.it](http://www.coloredellastoria.unifg.it): didactic methodologies, interactions and guidelines for the participatory design of digital tools**

*Annamaria De Santis*

ERID Lab (Educational Research & Interaction Design Laboratory), University of Foggia (Italy)  
am.desantis@unifg.it

*Alessia Scarinci*

Department of Biomedical Sciences, University of Foggia (Italy)  
s.alessia81@gmail.com

## Abstract

An interdisciplinary analysis of the social context reveals the signs of digital revolution, meant as redefinition of the Western culture paradigm. This change involves educative context and, particularly, didactic methodologies, learning strategies, educative communication and didactic tools. [www.coloredellastoria.unifg.it](http://www.coloredellastoria.unifg.it) is a digital learning environment for history teaching in middle schools, realized for the MediaEvo project by ERID Lab, a research laboratory of University of Foggia. The quoted environment was tested in four middle school classes using a constructivist didactic methodology, Problem based Learning. The selected methodology promotes team working, learning goals personalization, development of problem solving skills and enables an integration of new technologies in the didactic practices. What are the interactions generated in a digital learning environment between students and teachers and among students? What are the students' guidelines to design a digital learning environment? The present research points out the reflections about interactions and competences of students in the didactic context described above through the use of questionnaires among students and data analysis obtained by the observation of the didactic experience.

## Keywords

digital learning environment, problem based learning, digital book, participatory design, constructivist didactic methodologies

## 1. Digital revolution and didactic strategies

Rethinking process of traditional textbooks is more and more present in the reflections on didactics and school innovation at international level.

Digital or mixed textbooks are mandatory since the school year 2011-2012, according to the Italian Law (30 October 2008, n. 169; 6 August 2008, n. 133); pedagogical and technological features of new textbooks are defined by the Ministerial Decree n. 41/2009.

Schoolbooks should be «scientifically accurate», «up-to-date», they should promote «autonomous activities for students» and include a glossary and in-depth resources. Their technology should be compatible with the commoner softwares and hardwares, they should allow dynamic lectures and network usage to upload integrative services and news (Vincelli, 2011).

The introduction of digital textbooks is changing publishing industry. The 2012 report on the situation of Italian publishing industry by the AIE, “Associazione Italiana Editori” (Italian Association of Publishers) states that the supply of e-books increased to 31,416 volumes until May, compared to 1,619 in December 2009. E-books reading and purchasing doubled. It is interesting to consider the quantitative framework of registered changes, even if the term “e-book” is not unequivocal and does not refer to textbooks only.

Textbooks production involves a considerable number of actors: publishers, authors, computer technicians, final users (teachers and students), therefore its implementation in everyday teaching practices is slow when compared to normative choices and educational needs of young generations, that are the result of an international change.

This transformation depends on a «phenomenon of the second digital revolution taking place in the education world: the change in socio-economic and communication contexts (Ferri 1998, 2004) which characterized the transition of advanced capitalist societies from the post-industrial (Bell 1973) to the informational model.» (Ferri, 2011, p.102)

Since 90s, the scholars from the New London Group (1996) have promoted a new Pedagogy, a Pedagogy for Multiliteracies that considers learning a practice strongly related to social and informal experiences (Kalantzis & Cope, 2012). In the educational field, the changes in social and cultural communication, caused by the introduction of digital tools, are converted to the choice of new forms of educative communication and storytelling, innovative didactic strategies, different learning styles.

Based on these premises, teaching tools are not simply transformed to cultural artifacts (as described by Vygotsky), but frequently to learning environments (see Cattaneo, 2010).

Textbooks remain the favourite instrument for didactic communication (Anichini, 2006; Vincelli, 2011) but, in the international complex scenario described, we need to study and update its features to make them effective for the learning strategies of new generations.

We can define two main digital production methods of publishing content (Limone, 2011; 2012a; 2012b):

- INDUSTRIAL MODEL. The digital books for school activities are produced by authors and publishers; they can be easy pdf or ePub files, but also excellent transmedia environments that match the textbook with students and teachers communities and interactive online activities. In this more complex form, they can include contents that cannot be part of a printed textbook: videos, 3D objects, virtual games, online questionnaires, continuously updated contents thanks to the “perpetual beta” status of software and digital tools. (Moriello, 2009, p. 10).

- SELF PUBLISHING. Web 2.0 tools are significantly employed in several didactic contexts: blog, wiki, interactive maps (Petrucco, 2010); the interactive multimedia board literally came into classrooms; several educational projects were developed using teamwork and digital technologies (Parmigiani, 2009). According to the vision of the *user generated content*

(Cattaneo & Rivoltella, 2010), every user can become a knowledge and learning objects producer by simple *authoring tools* and *open source* softwares.

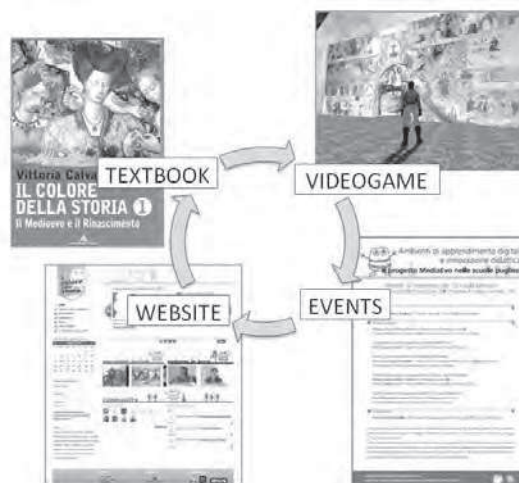
The grassroots participation moves forward self publishing events which are becoming popular for ethical and economic reasons and are involving the world of education to produce printed textbook (see “Book in progress” project), but also multimedial products, videogames, class blog that partially replace the institutional textbooks edited by publishing houses. Teachers increase their energy and tasks with respect to the possibility to customize content, language and textual forms while costs for families are significantly lowered.

The finalized digital textbook is a digital learning environment, [www.coloredellastoria.unifg.it](http://www.coloredellastoria.unifg.it), and represents a third proposal of digital publishing production which exceeds the distinction between self publishing and industrial model and involves the academy as a link between school and industrial publishing (Limone, 2012a; 2012b).

## 2. [www.coloredellastoria.unifg.it](http://www.coloredellastoria.unifg.it): a prototype of digital learning environment

The ERID (*Educational Research & Interaction Design*) Laboratory research team at the University of Foggia designed and realized a digital learning environment: [www.coloredellastoria.unifg.it](http://www.coloredellastoria.unifg.it) during the MediaEvo project financed by European and Apulia Region Funds for the three-year period 2007-2010 in order to realize a multichannel platform for the edutainment of Medieval History.

Starting from the content of school educational program, the project developed a complex and integrated system prototype that puts together the formal and informal contexts through the use of multimedia contents and transmedia architecture of teaching actions (Figure 1): transmedia refers to the ability of distributing and rebuilding the educational narrative across different media (Jenkins, 2007; Rodriguez Illera, 2012).



**Figure 1.** Transmedia architecture of MediaEvo project. (Limone, 2012a, p.133, our translation)

The website (Figure 2), planned through the MUST participatory design model (Kensing, Simonsen & Bødker, 1996; Kensing, Sigurdardottir & Stop, 2007) is largely described in previous works by Pierpaolo Limone (2011; 2012a; 2012b) and Rosaria Pace (2012; Pace & Demarco, 2012). [www.coloredellastoria.unifg.it](http://www.coloredellastoria.unifg.it)<sup>1</sup> collects texts, links, images, videos,

<sup>1</sup> The learning environment in the quoted papers and volumes (Limone, 2011; 2012a; 2012b; Pace, 2012; Pace & Demarco, 2012) at [www.coloredellastoria.it](http://www.coloredellastoria.it); is currently available at [www.coloredellastoria.unifg.it](http://www.coloredellastoria.unifg.it).

interactive exercises; it provides access to area univocally dedicated to students or teachers; besides several discipline contents, it uses the Web 2.0 communication tools, such as a blog and a community where students can share ideas and abilities, update contents, informally communicate after school time.



Figure 2. Homepage of [www.coloredellastoria.unifg.it](http://www.coloredellastoria.unifg.it).

Table 1 describes the website contents.

CATEGORY	CONTENTS AND TARGETS
<i>I secoli della rinascita</i> (The Age of Rebirth)	Digital and hypertext version of printed textbook enriched with multimedial synthesis, conceptual maps, navigable charts and exercises for each chapter.
<i>Studentario</i> (Students area)	Video-lectures, in-depth links, tridimensional reconstructions of medieval daily objects, forms, games and free time resources.
<i>Community</i>	<i>Social networking</i> area that allows communication among users, multimedia resources publishing and sharing.
<i>Blog</i>	Area for collaborative writing.
<i>Area docenti</i> (Teachers area)	In-depth resources, didactic materials, methodology sheets, classroom or home assessment exercises.
<i>Medioevo nelle arti</i> (Medieval Arts)	Reviews, didactic sheets and multimedia insights about Medieval literature, cinema and theater.

Table1. Categories, contents and targets of the web portal [www.coloredellastoria.unifg.it](http://www.coloredellastoria.unifg.it). (Limone, 2012a, p. 128, our translation)

### 3. The experimentation: digital environments and constructivist didactic methodologies

A learning environment (such as the described one) changes the didactic setting, methodologies, communication among teachers and students, and further students learning behaviors.

What are the didactic methodology features which allow the simultaneous utilization of a digital learning environment as [www.coloredellastoria.unifg.it](http://www.coloredellastoria.unifg.it)? What are the interactions generated in an online students environment? And between teachers and students? What are the students main strength points to design a digital learning environment effective for knowledge acquisition and for the participation to the current digital democracy?

100 students from 4 middle school first-year classes were enrolled in an experimentation: two classes completed the activities, while these are in progress for the other two.

This experimental activity aims to verify the ideal features of a didactic method when used simultaneously with a digital environment for Medieval History teaching; the analysis wants to identify mechanisms and interactions generated by this didactic situation and to provide guidelines for a participatory design of online learning environments.

As stated by Rosaria Pace (2012), “Colore della storia” is a constructivist digital environment featured by «community dialogue spaces; a link to the out-of-school time learning; a focus on didactic “deeds”; a negotiation of goals and processes; a reflection on methods and reasons, not only the contents for assessment; a reading of different languages; writing and producing; possible interpretations, not solutions; autonomous cooperation and a students’ opportunity to explore and not just “to attend” the lesson; making mistakes, and not merely getting a bad vote» (ivi, p. 176, our translation).

Constructivist didactic methodologies are defined by this statement and a literature survey as the most comparable with digital books, since they in the same ways try to develop collaborative processes in team activities that lead to co-construction of knowledge, enhance motivation and *self-directed* study.

In particular, the choice has fallen on Problem based Learning (PBL), a *student centered* methodology introduced since 60s in the Canadian Faculties of Medicine by a physician, dr. Howard Barrows.

This methodology, currently widespread all over the world and in all levels of education (Lotti, 2005), is based on problem solving through its process analysis in a peer group. Compared to realistic problems, students perform problem solving activities, they set autonomously learning goals, search for materials and are motivated to learn by teamwork (Barrows & Tamblyn, 1980; Schmidt, 1983).

Timing of activities in PBL allows the introduction of digital tools in didactic actions; for this reason, PBL was selected for this experimentation between the constructivist didactic methodologies analyzed. In fact, in PBL there are two sessions: in the first one, the tutor asks students to analyze a problem, to explain unclear terms, to define the problem, to identify, outline and prioritize hypotheses to solve it. In a perspective of *self-directed learning*, students define learning goals as «arguments, data and concepts to search out of the group, through individual study, in order to explain and solve problems. Students state what they are going to look for and what bibliographic or informative sources they will use» (Lotti, 2005, our translation). In the second session, students share the collected information, describing a possible framework to solve the problem.

There is a period of individual study between the sessions (from 3-4 days to 2 weeks), when it is possible to introduce the online activities related to the digital learning environment.

Other than didactic reflections, the experimentation adds considerations about participatory design of digital environment for learning through the use of didactic methodology identified as a design methodology. As stated in *Projects Method* by Kilpatrick, if the cognitive process begins with action, teaching should deal with the design; between the different projects, the author identifies the ones that start from a problem and drive students to invention and discovery, as in the PBL (Bottero, 2007, p.140).

Table 2 schematizes experimentation activities: the first three meetings are focused on history contents; the fourth one is centered on design of digital book as learning environment.

MEETING	HOURS	ACTIVITIES
1	2	Introduction to the activities Ex ante questionnaire Split into groups of 5-8 students Start of the first problem "La lettera di Ascanio" (Ascanio's letter) (Theme: agricultural innovations) Search on <a href="http://www.coloredellastoria.unifg.it">www.coloredellastoria.unifg.it</a>
2	2	End of the first problem Start of the second problem "The economist" (Theme: urbanism and trade) Search on <a href="http://www.coloredellastoria.unifg.it">www.coloredellastoria.unifg.it</a>
3	2	End of the second problem Start of the third problem "Indovina, indovinello" (Guessing game) (Theme: Maritime republics) Search on <a href="http://www.coloredellastoria.unifg.it">www.coloredellastoria.unifg.it</a>
4	2	End of the third problem Start of the last problem "A lavoro per mamma" (Working for mom) (Theme: digital book) Discussion and team work End of last problem Ex post questionnaire

**Table 2.** Experimentation activities.

Students split into groups of 6-8 members, choose a moderator and a secretary, as required by the proposed method, and analyze problems using the scheme in Figure 3, adapted from Ann Lambros (2002).

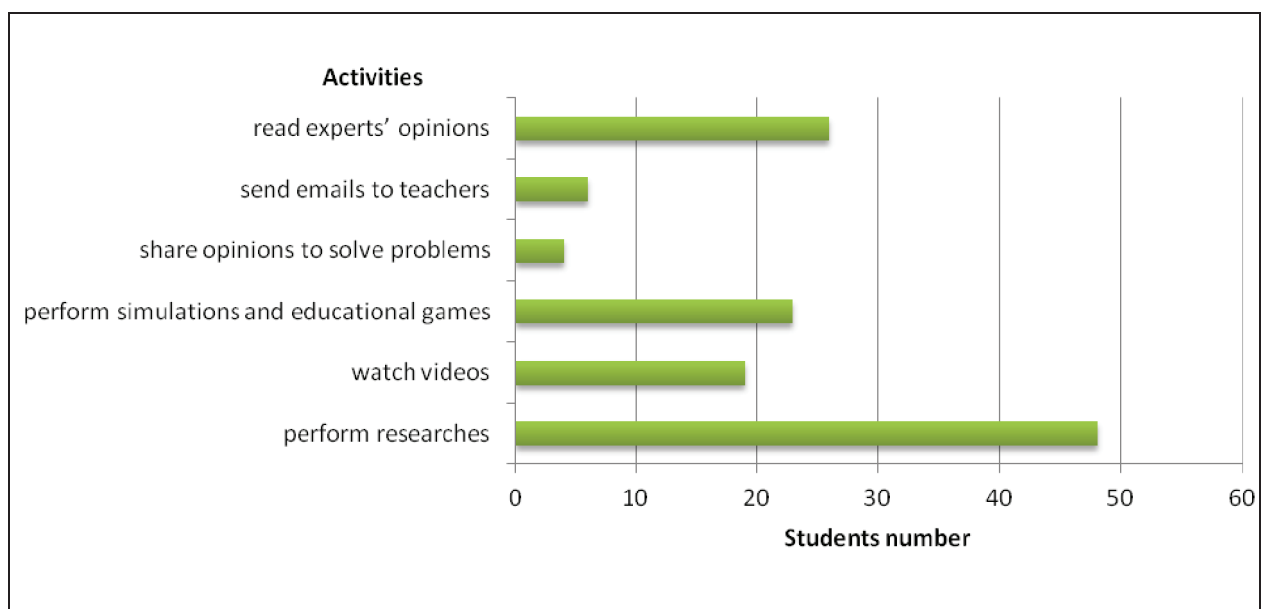
<b>UNCLEAR TERMS</b>	
<b>FACTS LIST</b>	<b>NEED TO KNOW</b>
<b>LEARNING TOPICS</b>	
<b>WHERE'S THE INFORMATION?</b>	

**Figure 3.** Scheme for problem analysis in PBL (adapted from Lambros, 2002, p. 8)

According to 7 steps of PBL (Schmidt, 1983), the Ann Lambros scheme (2002) simplifies the phases of problem analysis for students' use. Middle school students, as stated by the researcher, have «more and more independence from adults, they appreciate the opportunity to work things out for themselves. These students are developmentally ready not just to access new information but also to determinate its relevance and to apply it.» (ivi, p.48)

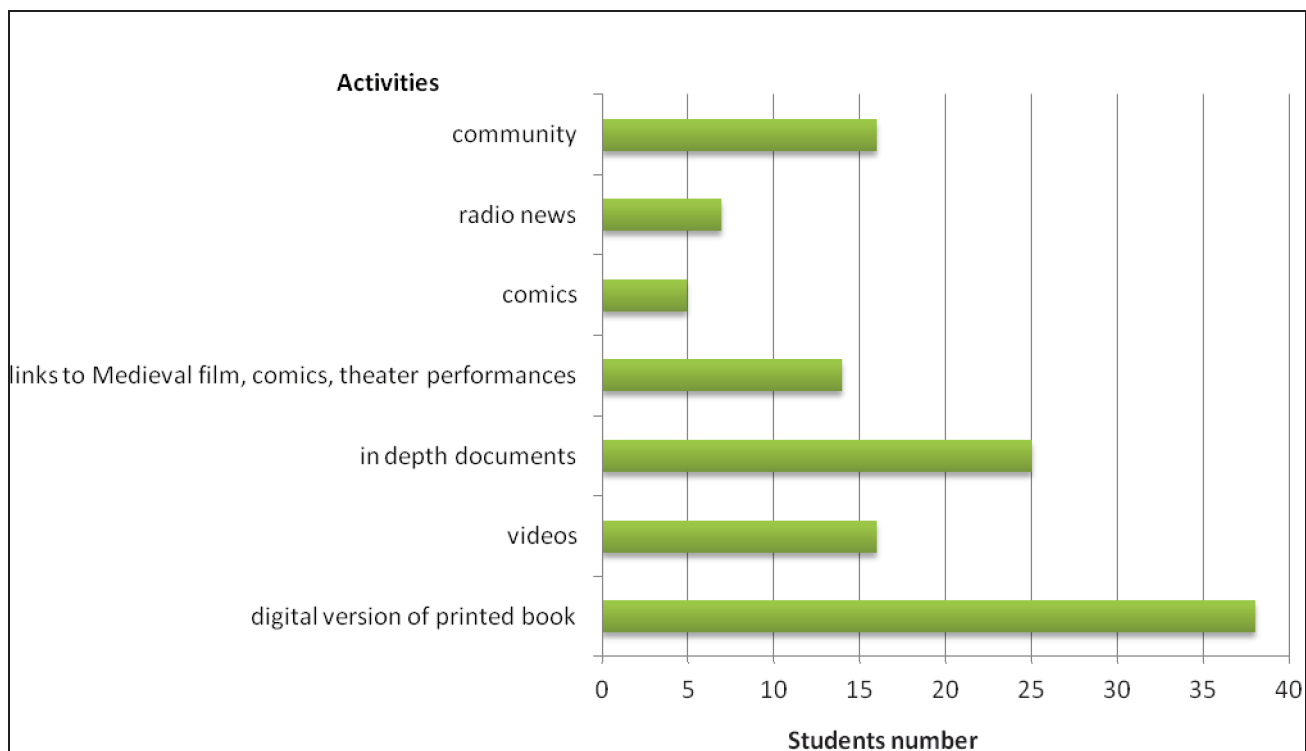
#### 4. Results

In the questionnaire administered at the beginning of the activity, half of the students involved in the first phase of the experimentation claim to have a facebook or other social network account, and mainly use it to chat with friends, to upload photos and videos, to comment posts, to play games and to challenge friends in online applications. 50 on 52 students use internet to study. In particular, as shown in Graph 1, students perform internet search (48), read experts' opinions about discipline topics (26), perform simulations or educational games (23), watch videos to clear their ideas (19).



**Graph 1.** Online activities of students enrolled in the first phase of the experimentation

Only one of two classes uses digital communication tools for learning at school. During the first meeting, students received group credentials to access the portal. This choice, suggested by the importance to create a group identity and by the need to speed up the registration process for first access to the portal, constituted a difficulty in the communication platform. The groups customized their profiles by inserting an image, but not all students felt so much involved to operate in the community and to write personal messages. However, some students decided to create a personal account on the portal; 44 on 52 students connected to the portal for the researches related to problems solving at home too. During the experience, students easily discussed about browser, tag, homepage, multimedia materials. The collaborative climate developed in the classes through the use of Problem Based Learning let students share information about the access and navigation modalities of the materials available online. Graph 2 shows the preferred students' resources among those in the portal.



**Graph 2.** Students' use of digital resources available on "Colore della storia".

As shown in the graph, the most used resources are the digital version of history book, in-depth documents, community and, finally, videos and links. Students enjoyed the opportunity to work in teams, to solve problems, to identify themselves in historical characters, to learn in a fun and innovative way and, last but not least, they appreciated the possibility to use network, portal and multimedia for learning.

Students in fact took an active part at the last session of the experimentation dedicated to the design of an online space for history teaching; as observed before, during the meeting the PBL was used as a design methodology and not as a teaching methodology.

After the problem analysis through the scheme proposed in the previous paragraph, students were asked to implement an innovative digital solution to teach history at school, starting from 4 tasks:

- to introduce a list of contents into the portal (topics and types);
- to integrate a list of innovative applications in the portal;
- to design the homepage;
- to advertise a slogan for the project.

Table 3 shows some of the most interesting results obtained from data analysis of the works realized by pupils.

CONTENTS (TOPICS AND TYPES)
medieval music, documents, sport, clothing, religion, art pieces; movies; interactive images; exercises; games; information on daily life, economic activities, historical characters; poems; recipes; comics; 3D museums and statues; aphorisms on famous historical figures; jokes; nursery rhymes; extinct animals; medieval buildings still present; timelines; maps; creative activities; news and events; content to download; support page link.
INNOVATIVE APPLICATIONS
online auction; animations where historical characters tell events and lead users to the website navigation; virtual museum; virtual reality where users design their own city, create statues, perform the role of medieval characters and live historical adventures; voice command; online souvenir shops; history magazine; webcam communication with students from foreign countries.



SLOGAN ( <i>in brackets the original version</i> )
Entry history village (Entra nel villaggio della storia)
Funny history, wise student (Storia divertente, bambino sapiente)
If you want to learn history, come and study with us on the website (Se la storia vuoi imparare, vieni con noi nel sito a studiare)
History according history (La storia secondo la storia)
Learn history together with us (Conosci la storia insieme a noi)
Learn new things (Scoprire cose nuove)
The history is funny (The history is funny)
If you want to learn on our website you have to search (Se vuoi imparare sul nostro sito devi cercare)
The history web: history explained for you (The history web: la storia spiegata per te).

**Table 3.** Results of the meeting dedicated to the design of a digital learning environment

In the graphic design of the homepage, pupils demonstrated that they know how to balance the spaces of the page, alternating images to written texts.

They proposed some of the most traditional layouts (for example by placing the main menu on the left), or innovative solutions such as a homepage with central images and videos. In most groups the homepage contains the login box, the search engine, the support page link.

In conclusion, we present a final observation on the logistical aspects of the activities. For both classes, group activities of PBL were carried out in the classroom; on the contrary, the research on the portal in the computer lab. This means the activities were always “interrupted” to allow the shift of classes from one environment to another. Equipment and internet connection proved to be adequate and accessible in one of the two schools, thus students accessed the lab with the teachers even out of the experimentation time; in the other school, access to the computer lab and secondly to the network was difficult: tools and materials of the portal [www.coloredellastoria.unifg.it](http://www.coloredellastoria.unifg.it) were only available through the interactive blackboard because of a very slow connection.

If technologies integration in training courses can take place only when the accessibility is guaranteed (Technology in Schools Task Force, 2002 in Messina, 2012, p. 65) we urgently need to pay attention and solve situations like the one described, which are common to many schools in our area.

## 5. Conclusions and perspectives

This experimentation is still in progress. The two new classes involved (44 pupils) will use the same timing of Table 2, but with a different access to the portal. Students will receive personal credentials to login instead of group credentials, in order to verify the personal participation and not the group participation to the proposed online activities.

At the end of this second phase, the reflections resulting from students’ activities and their own proposals will let formulate guidelines for the design of digital learning environments, which will contain observations on didactic and design methodologies, analysis tools, ideas on the new role of students and on teachers training.

The results obtained, however, allow us to considerate the following issues:

- Students demonstrate a good management of media languages and fine abilities to organize self directed study;
- The ability to work in teams solving real problems motivates students and makes them active protagonists of educational activities;
- Students have a clear idea on the graphic rules for the construction of an online portal, they know digital tools and are able to imagine future scenarios for the evolution of

online learning, even though they never attended training courses on the design issues of web environments;

- Teaching actions require time, space and logistics that do not fully fit in the present organization of daily school-life;
- For the new generations, access to digital tools such as computers, tablets, smartphones, is set free from the technical experience hidden behind the most complex available communication objects;
- It is shown the need for teachers training in order to use innovative teaching methods and digital learning environments because, despite the promotion of digital books use by Italian law, their implementation in daily school-life involves training of trainers.

Idit Harel (2002 in Ferri & Marinelli, 2009) states it is necessary to add three X to the three R for students training (*Reading, wRiting, aRithmetic*):

- «*eXploration*: the ability of a selective search for information in order to be principal actors in personal learning;
- *eXpression*: the ability to use digital media to represent and communicate knowledge and ideas;
- *Exchange*: the ability to ask questions, share ideas and work in team» (ivi, p. 23, our translation).

The first step to translate into reality the warning of Idit Harel are represented by the integration of digital technologies in classrooms, experimentations carried out with the digital language, group activities, protagonism of the youngsters.

## References

- Anichini, A. (2006). Comunicazione formativa e scuola. In F. Cambi, & L. Toschi (Eds.), *La comunicazione formativa. Strutture, percorsi, frontiere* (pp. 131-156). Milano: Apogeo.
- Associazione Italiana Editori (2012). *Rapporto sullo stato dell'editoria in Italia 2012. Un consolidato del 2011 e primi elementi sul 2012. Una sintesi*. (Retrieved from [www.aie.it](http://www.aie.it))
- Barrows, H.S., & Tamblyn, R.M. (1980). *Problem based learning in medical education*. New York, NY: Springer Publishing Company.
- Bell, D. (1973). *The coming of post-industrial society*. New York, NY: Basic Books.
- Bottero, E. (2007). *Il metodo di insegnamento: i problemi della didattica nella scuola di base*. Milano: FrancoAngeli.
- Cattaneo, A. (2010). Costruire. Modelli teorici, ambienti, artefatti. In A. Cattaneo, & P.C. Rivoltella (Eds.), *Tecnologie, formazione, professioni. Idee e tecniche per l'innovazione* (pp. 77-105). Milano: Unicopli.
- Cattaneo, A., & Rivoltella, P.C. (Eds.). *Tecnologie, formazione, professioni. Idee e tecniche per l'innovazione*. Milano: Unicopli.
- Ferri, P. (1998). *La rivoluzione digitale. Comunità, individuo e testo nell'era di Internet*. Milano: Mimesis.
- Ferri, P. (2004). *La fine dei mass media. Nuove tecnologie e trasformazioni dell'industria della cultura*. Milano: Guerini Studio.
- Ferri, P. (2011). *Nativi Digitali*. Milano: Mondadori.
- Ferri, P., & Marinelli, A. (2010). New Media Literacy e processi di apprendimento. (Introduction). In H. Jenkins, *Culture partecipative e competenze digitali. Media education per il XXI secolo* (pp. 7-53). Milano: Guerini Studio.
- Harel, I. (2002). Learning new media literacy: a new necessity for the young clickerati generation. *Telemidium. The journal of Media Literacy*, 48 (1), pp.17-26.
- Jenkins, H. (2007). *Cultura convergente*. Milano: Apogeo.
- Kalantzis, M., & Cope, B. (2012). *New Learning: Elements of a Science of Education*. Cambridge, MA: Cambridge University Press.
- Kensing, F., Sigurdardottir, H., & Stop, A. (2007). MUST - A Participatory Method for Designing Sustainable Health IT. In K.A. Kuhn, J.R. Warren, & T-Y. Leong (Eds.), *Medinfo 2007: Proceedings of the 12th World Congress on Health (Medical) Informatics; Building Sustainable Health Systems* (pp. 1204-1208). Amsterdam: IOS Press.

- Kensing, F., Simonsen, J., & Bødker, K. (1996). MUST - a Method for Participatory Design. In J. Blomberg, F. Kensing, & E. Dykstra-Erickson (Eds.), *Proceedings of the Fourth Biennial Conference on Participatory Design* (pp. 129-140), Cambridge, MA, 13-15 November 1996, Computer Professionals for Social Responsibility, Palo Alto, CA.
- Lambros, A. (2002). *Problem based learning in middle and high classrooms*. Thousand Oaks, CA: Corwin Press.
- Limone, P. (2011). Design partecipato ed innovazione degli ambienti di apprendimento: sviluppo del sistema cross-mediale “Coloredellastoria.it”. In I. Loiodice (Ed.), *Università, qualità didattica e lifelong learning: Scenari digitali per il mutamento* (pp. 97-113). Roma: Carocci.
- Limone, P. (2012a). *Ambienti di apprendimento e progettazione didattica. Proposte per un sistema educativo trasmediale*. Roma: Carocci.
- Limone, P. (Ed.) (2012b). *Media, tecnologie e scuola. Per una cittadinanza digitale*. Bari: Progedit.
- Lotti, A. (2005). Il tutor facilitatore dell'apprendimento di competenze intellettive. In L. Sasso, A. Lotti, & L. Gamberoni (Eds.), *Il tutor per le professioni sanitarie*. Roma: Carocci.
- Lotti, A. (Ed.) (2007). *Apprendere per problemi. Una sperimentazione didattica nelle Facoltà umanistiche*. Bari: Progedit.
- Messina, L. (2012). Integrare le tecnologie nella formazione degli insegnanti, in prospettiva istituzionale e cognitiva. In P. Limone (Ed.), *Media, tecnologie e scuola. Per una cittadinanza digitale* (pp.65-93). Bari: Progedit.
- Morriello, R. (2009). Web 2.0: la rivoluzione siamo noi: Strumenti, servizi, prospettive del web sociale. *Biblioteche oggi*, pp. 9-30.
- New London group (1996). A Pedagogy of Multiliteracies: designing social futures. *Harvard Educational Review*, 66, pp. 60-92.
- Pace, R. (2012). *Nuovi media e interfaccia. Linguaggi e strumenti per la comunicazione e la didattica* (doctoral thesis). Università del Salento.
- Pace, R., & De Marco, E. (2012). Narrazioni digitali e social networking a scuola. Il caso di Mediaevo. In P. Limone (Ed.), *Media, tecnologie e scuola. Per una cittadinanza digitale* (pp. 173-194). Bari: Progedit.
- Parmigiani, D. (2009). *Tecnologie di gruppo: Collaborare in classe con i media*. Trento: Erickson.
- Petrucco, C. (2010). *Didattica dei social software e del Web 2.0*. Padova: CLEUP.
- Rodríguez Illera, J.L. (2012). Integrare la narrazione transmediale nel setting educativo. In P. Limone (Ed.), *Educazione, scuole e musei. Un progetto collaborativo di innovazione didattica* (pp. 86-102). Roma: Carocci.
- Schmidt, H.G. (1983). Problem-based learning: rationale and description. *Medical Education*, 17.
- Technology in schools task force (2002). *Technology in Schools: Suggestions, Tools, And Guidelines for Assessing Technology in Elementary and Secondary Education*. U.S. Washington (DC): Department of Education – The National Center for Education Statistics.
- Vincelli, M. (2011). E-books for Italian school, between Law Requirements and Publishers' Choices. *JLIS – Italian Journal of Library and Information Science*, 2 (2).