



## INTERNATIONAL CONFERENCE

Successful Experiences and Good Practices  
in Chemistry Education

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# Conference Proceedings

Eds. - M. F. Barreiro, O. Ferreira, A. I. Pereira



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#### SCIENCE PROJECTS



Ciência Viva, PVI-0355



Ciência Viva, PVI-1228



Ciência Viva, PVI-1386

## **ORAL PRESENTATIONS**

## INTACT PROJECT: BRINGING TEACHING RESOURCES TO MOBILE LIFE

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### Abstract

*This article aims at presenting the Multilateral Comenius Project INTACT (Interactive Teaching materials Across Culture and Technology), its several work groups and consequent tasks. INTACT will present teaching resources through a platform which ultimately allows an international collaborative classroom. The project aims to develop reliable teaching materials for Mathematics, Geography, Technology, Second Language learning, Primary Science and Environmental Education, Secondary Science and Environmental Education or other subjects in natural and social sciences to be used on such platforms as interactive whiteboards, tablets and smart phones in order to promote a culture of collaboration among students and an interactive approach to learning. The significance of the project is clearly focused on the fact that the teaching resources can be viewed in a multi-faceted perspective and applied in different settings using several media. Apart from that, the bilingual aspect must also be highlighted. In many partner countries schools are not used to a bilingual setting in the classroom, and this constitutes a real breakthrough in this project.*

### 1. Background and objectives

In recent years many projects and initiatives have been developed to face new challenges in the classroom, especially since interactive whiteboards were introduced. The European Schoolnet Interactive Whiteboard Working Group is particularly focused on that but bearing in mind that IWB (Interactive Whiteboards) are just one of many tools to be used in a technological equipped classroom.

The recent growth of the mobile market has been viewed as a challenge in the teaching/learning environment. The amount of tablets and smartphones being sold make us believe that students can be permanently surrounded by an everywhere going learning environment. Several scholars have dedicated themselves to this new aspect providing examples in several fields of knowledge, namely foreign languages and biology at beginner's level [1].

Specific platforms demand specific software and this seems to be a drawback for this breakout of mobile teaching and learning, since IWB and mobile media are connected to big companies and therefore difficult to reach from the didactic point of view. That is the reason why portals have been created, they are an accessible way to provide information, many times just for fun.

This is the background of the Comenius project INTACT (Interactive Teaching Materials across Culture and Technology), which brings together the Pedagogical University Ludwigsburg in Germany, Complutense University, Spain, Kecskemét College Teacher Training Faculty, Hungary, St. Patrick's College Dublin, Ireland, Polytechnic Institute Bragança, Portugal, Babes-Bolyai University in Cluj, Romania.

Thus, the main goals of the project are: (i) to develop reliable teaching materials for mathematics, natural and social sciences to be used on such platforms as whiteboards, tablet-PCs and smart phones; (ii) to promote a culture of collaboration among students and an interactive approach to learning; (iii) to develop materials in accordance with the national curricula of all the countries

involved (DE/HU/IE/PT/RO/ES); (iv) to connect in real time the schools from all over the continent and to provide the students with a truly European education.

Consequently, the aims of the INTACT online platform are focused on: interactivity, bilingual education, social and collaborative learning, independence from specific technology and description of successful learning scenarios.

## **2. Development of the project**

The project began its work in December 2012 and is therefore in the middle of it, a very important phase, since most of its rudimental work has actually been done and must be followed by another important stage which is the actual outcome and testing of materials.

The consortium is divided in three working groups with very different roles in the project. Group 1 dedicates itself to dissemination and exploitation of the project, thus establishing dissemination products such as the logo, the website ([www.intact-comenius.eu](http://www.intact-comenius.eu)), newsletters, flyers, posters, publicizing the project via social and professional networks. At the same time this group, led by the Portuguese institution, defines target groups and audiences for the result of the project, namely educational staff: teachers at the several levels we are dealing with; young people: students from the secondary and kindergarten; Senior students at universities: students who are in their last year of a teaching degree; Institutions: education providers, universities and research groups, national and umbrella associations in education and networks.

Work performed by Group 1 is ongoing and depends on the different outcomes and phases of the whole project, since it will boost research and academic writing on the project as well as its publishing in the present and near future.

Group 2 is dedicated to the teaching material and testing. Ireland and Romania lead this group which involves not only the direct members of INTACT, but also experts from the partner institutions and the extensive group of pilot teachers which will test the resources in the future. This group works in close collaboration with Group 3 whose task is to create the platform and then test the resources from the practical point of view, in other words, they are responsible for the conceptual design of the online platform for an interactive collaboration classroom as well as for the testing and evaluating of the online platform implemented for an interactive collaboration classroom.

In group 2 a real network of teachers and experts was created in order to achieve the perfect learning resource. All resources went through a long and thorough process. Initially partners established their interests according to their own experience but also according to the pilot teachers. Nations were then paired according to fields of interest and age groups, since the platform will provide resources for a wide range of students and learners, starting at kindergarten until secondary school.

Each resource within the fields of Mathematics, Geography, Technology, Second Language learning, Primary Science and Environmental Education, Secondary Science and Environmental Education was carefully designed from the theoretical point of view (pedagogy and didactics underlying the resource) and were then developed according to a conceptual framework which was distributed to every member in form of a template. The design of resources involved a previous discussion with pilot teachers, language review, peer review, experts review. After all these steps the final and definite resources were already presented to every participant in the project in a meeting in Romania, last March. All participants had the task to question the presenter of the resource in order to analyze whether the pedagogical and programming perspective were taken into account.

At this point it is relevant to move on to Group 3 whose main tasks are the Server & Testing, meaning the conceptual design of the online platform for an interactive collaboration classroom and the testing and evaluating of the online platform implemented for an interactive collaboration classroom. Group 2 and 3 are closely linked in this project. The latter allows the first one to exist. Group 3 allows Group 2 to operationalize its pedagogical concepts.

### 3. Resources: from paper to the mobile classroom

The conceptual design of the platform for an interactive collaboration classroom is the main purpose of Work Package 6. The aims of the platform are focused on: interactivity, bilingual education, social / collaborative learning, independence from specific technology and description of successful learning scenarios. Therefore, the methodology of this workgroup involves the following stages:

- To clarify the concept of a platform for an interactive collaboration classroom.
- To define functional requirements of the platform for an interactive collaboration classroom. Based on the requirements identified by Spain, Germany and Portugal during several meetings all partners agreed that, the proposed solution (online platform) should integrate three types of systems or Web applications in a transparent way for the users (teachers, instructional designers and students. As such the INTACT platform will not be just another repository of learning objects. It will go beyond that concept, however that feature has to co-exist with others.

It will therefore have a component database to store learning objects created or imported into the system and semi-automatically described through metadata (LOM - Learning Object Metadata) and Content Management System (CMS - Content Management System) thus allowing access and managing permissions to the contents and functionality from each type of user.

Apart from that the online-platform will comprise a system creating contexts and content or learning objects: component for the production of learning objects and learning contexts, allowing to create, combine, modify, reuse, and share content or learning objects once or to aggregate them in already existing learning contexts or absolutely new ones.

Finally it will act as a virtual community, a truly working, communication and interactivity tool among teachers, instructional designers, students and even parents or educators allowing synchronous or asynchronous interaction. The intention is to create a space for interaction among peers, not only among teachers, students, teachers and students. The aim is to foster a community that will grow and develop synergies thus allowing reflection and interaction with objects and learning contexts.

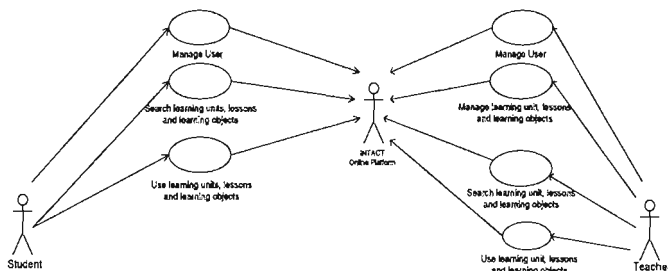


Fig.1. Global overview of the INTACT platform

This is the idea underlying all work performed in group 2 while designing the resources. All lessons had to answer to a specific set of questions which are to be taken into account when the resource is actually being brought to life. The Learning Objects (LO) and communication tools were a very enthusiastic part of the work undertaken by the teachers and members of group 2, since they make the difference from what is done on paper to what goes on in a mobile app or platform. An LO ranges from: Exercise; simulation; questionnaire; diagram; figure; graph; index; slide; table; narrative text; exam; experiment; problem statement; self-assessment; lecture; animation; video; simulation; diary; forum; chat; videoconference; others synchronous or asynchronous applications, among many others and the teachers had to design their lessons bearing in mind the multiplicity of LO to be

introduced, as well as the level of interactivity, semantic density or difficulty it poses for the different age groups.

So, the main functionalities of INTACT online platform are: (i) to create and describe learning units, lessons and learning objects. (ii) to store learning units, lessons and learning objects (stop-store-continue); (iii) to manage learning units, lessons and learning objects (Delete, Reuse, Modify, Share, Export SCORM); (iv) to search learning units, lessons and learning objects by categories and elements of metadata LOM; (v) to run and use learning units, lessons and learning objects by teachers and/or by learners, independently from specific technology (PC, tablet, smartphone) and it would be desirable that LO do not depend on software (therefore HTML 5 is the obvious solution). It should be possible to download the learning units and lessons on computer, tablet or smartphone in case there is internet available in school. A mobile app is needed for using the teaching materials by the learner; (vi) to manage users (teachers, students, country administrators, instructional designers or INTACT team); (vii) to facilitate the connection of teachers and students of one country with teachers and students of another country aiming at social and collaborative learning, using a specific bilingual learning unit, with some lessons which contains several LO and the adequate communication and collaborative tools.

The platform should ensure interoperability with other platforms such as repositories and LMS or LCMS (eg. Moodle) through the SCORM standard, providing also the possibility of integration with other systems through the provision of a WebServices API (XML or JSON REST API) which enables the delivery of content and realization of the main system operations, including: searches, listings content, obtaining details of contents.

When a teacher or an instructional designer creates a learning unit, he has to define the number of lessons and the template of those lessons. After, for each lesson, he can create new LOs (lesson summary, bibliography, narrative text, lecture, webpage, animation, webquest, quiz, exercise or work, assessment, questionnaire, activity, experiment, etc.); select existing INTACT LO; reuse INTACT LO; select an external LO from INTACT DB; upload external LO or upload a SCORM package; configure simulation; configure forum; configure wiki; configure diary; configure chat; configure videoconference; etc. Many of those LOs can be used singly, but INTACT's vision focus on its integration in a specific learning scenario (learning unit with several lessons).

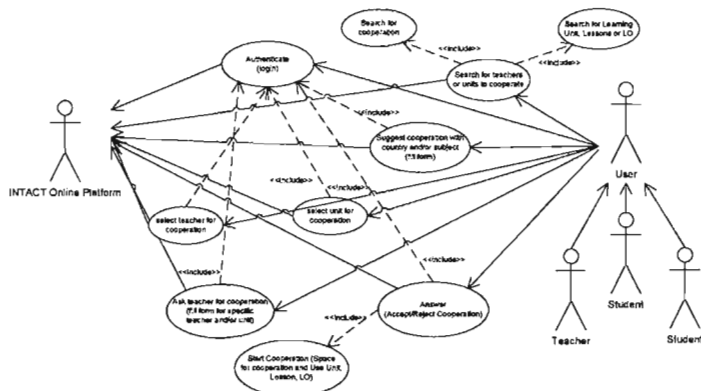


Fig.2. Use case for the communication and collaboration among different users and actors.

#### **4. Near future**

At this moment group 2 has finished and delivered all the teaching resources from the different fields and they will be checked against all requirements group 3 has outlined. Group 3, led by Portugal and Spain, has the tasks to deliver all this information to the external company which will actually bring the resources into life.

As a matter of fact at the beginning of the next year the resources are ready to be tested in classroom environment by members of group 3 and pilot teachers at the different schools who have signed a partnership with INTACT. The project has a life span until July 2015 but is working to live beyond that point in time. All the work done during the project will be reported at conferences, seminars, in best practices manuals, booklets and other type of exploitation products.

The relevance of the project is clearly focused on the fact that the teaching resources can be viewed in a multi-faceted perspective and applied in different settings using several media. Apart from that the bilingual aspect is also to be highlighted. In many partner countries schools are not used to a bilingual setting in the classroom, especially not at kindergarten level and this constitutes a real breakthrough in this project.