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518300-LLP-2011-IT-COMENIUS-CNW

Chemistry Is All Around Network Workshop on "Teacher Training" Genova, Italy, 28 May 2013

Agenda

- 1) Methodologies to teach a specific topic: analysis and comparison between positive and negative experiences
- 2) Consequences of lack of opportunities to experiment different approaches and methods for teaching and learning chemistry
- 3) Importance of training science teacher keeping them updated with the continuous progress of the research
- 4) Use of simulations: pros and cons
- 5) Identification of recommendations, guidelines for teachers
- 6) Discussion about international papers and publications

Participants

- Carnasciali Maria Maddalena (DCCI - University of Genova)
- Ricco Laura (DCCI - University of Genova)
- Alloisio Marina (DCCI - University of Genova)
- Cardinale Anna Maria (DCCI - University of Genova)
- Battistin Graziella (Vieusseux Lyceum – Imperia)
- Ghibaudi Elena (University of Torino)
- Lotti Antonella (DISFOR – University of Genova)
- Lucifredi Enza (D’Oria Lyceum – Genova)
- Pavan Anna (I.C. Savona IV)
- Pitto Anna (Cassini Lyceum – Genova)
- Rametta Marco (Cassini Lyceum – Genova)
- Regis Alberto (SENDS Group – University of Torino)
- Saiello Silvana (University Federico II – Napoli)
- Zamboni Nadia (I.C. Cogoleto – Genova)
- Zunino Rosalia (I.C. Voltri 1 – Genova)

The participation in the workshop was not large as expected because meetings for the students’ final evaluation were called by most schools in that date. Meanwhile, some teachers of the associated schools, recently joining the project, accepted the invitation to the workshop and contributed interestingly.

But teachers supporting the project and not present at the workshop asked for an informal meeting in July in order to present their results and to get an update about the activities foreseen for the future.

1) Methodologies to teach a specific topic (e.g. acids and bases, the period table, ...): analysis and comparison between positive and negative experiences



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Textbooks and the indications for the curricolo lead to teach too many subjects and in a premature way. One of the main difficulties is to have to introduce the atom structure even in the lower secondary school. A superficial teaching is one of the consequences of this approach as well as wrong concepts taught to the students. Short lab experiences are often used to help. Teachers realize that learning to use some types of ICT could facilitate to teach some difficult concepts, thanks to the displaying and the mobility of simulations. For example, some simulations of the site <http://phet.colorado.edu/it/> have been tested by teachers (e.g. the simulation about molecular polarity and that about density) and gave good results.

2) Consequences of lack of opportunities to experiment different approaches and methods for teaching and learning Chemistry

Laura Ricco gives evidence of her training work for the teacher training course she is attending (TFA). Her work took place in Anna Pitto's classes, a teacher supporting the project. This drove to discuss about the necessity to have training courses in order to experiment different approaches with the purpose to get a methodology setting-up suitable to teach chemistry better than ever. Laura experimented some ICT resources in the classes; these resources had been selected the previous year and the joint comment from both the trainee and the expert trainer was very interesting. The main emerging consideration is that students, being well skilled on computer science just for playing, are to be trained to suitably use the computer for educational objectives .

Also the cooperative learning has been discussed, because it represents an important resource to stimulate student participation and collaboration in order to get significant learning. Antonella Lotti, researcher in science of education and belonging to the national team supporting the project, is expert in Cooperative Learning and Problem Based Learning. She proposes to organize a short course to train teacher to use these methodologies with their students.

This proposal has been seriously considered and the work group is thinking to resort to the cooperative learning in association with the use of ICT teaching resources.

The above considerations show that it is important to have the opportunity to experiment different approaches and methods under the guidance of experts (both in the discipline and in psychology and pedagogy) in order to avoid numerous mistakes depending on the lack of experience.

3) Importance of training science teacher keeping them updated with the continuous progress of the research

The work group claimed the necessity of keep a strong link between the teaching and the progress of the scientific research. This updating is useful in order to keep in mind the context where the students will apply their knowledge and to give them suitable hints, ideas and connections with their life.

Knowing the evolution of science and technology means to teach in a more critical way, being aware that the rules do not exist in nature, but we lives in successive approximations. They are models that are modified as the instruments of investigation become more sophisticated.

4) Use of simulations: pros and cons

The discussion on ICT resources has highlighted the difficulties that currently schools have in using them.

The first problem is that the number of computers is not sufficient to meet the guidelines of the Ministry of Education that encourages the development of digital skills; in some cases the internet connection is not available in the computer room.

The second problem consists in the lack of teacher training to use digital tools and applications. Teachers feel obliged to use them but they do not know how make them effective for learning.

On the base of the testing made by the teachers supporting the project, ICTs can be effectively included in the teaching-learning process because the student reaction has been positive and their interest seemed to be motivated.



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But, few words of caution: ICTs have to be included in a significant way in a wider learning path, because if they are used as detached objects they can produce negative effects (loss of time, distractions of the class, transmission of misconceptions...). In this way ICTs can be real teaching resources and not simple tools.

For this reason it was decided to produce guidelines for the use of ICTs that have been tested and those that will be tested in the coming months. These documents will contain suggestions for educational paths that can be followed and supported by the above ICT resources, tips and considerations from teachers and experts. They will be uploaded on the project portal.

5) Identification of recommendations, guidelines for teachers

We also discussed about the possibility of building a resource to teach chemistry that meets the criteria set during the first year of the project: scientifically valid, simple to use, interactive, problem solving. Experts gave willingness to cooperate and to contact IT staff; teachers showed interest to identify some basic chemical paths in which introducing the use of ICT resources while indicating suitable times and ways, basing on their tests.

6) Discussion about international papers and publications

Only few papers and publications were discussed at the end of the workshop:

Elena Ghibaudi (expert)

Paper: Teachers' Training in the Fédération Wallonie Bruxelles

She appreciated the paper because it contains an interesting description of the training system adopted in Belgium for the initial training of teachers, as well as for teachers' continuous training. It does not especially refer to science teachers, but it contains considerations that may be useful for any discipline.

Publication: Active and interactive teaching in "chemistry and environmental protection", 7th and 8th grade

As this book is not available on line, a thorough review is not possible. Anyway, the Web page provides a careful and exhaustive description of its contents and organization. Based on this information, the book provides an insight on active learning strategies, not only at the theoretical level but also in more practical terms, in a constructivist perspective.

One of the most interesting aspects of this book lies in the attempt to analyze and differentiate interactive teaching/learning activities as regard to the type of interactions: human-centered activities, that focus on student- student or student-teacher interactions; technology-based activities, that focus on the interactions between humans and technology (i.e. ICT).

Alberto Regis (expert)

Paper: Perspectivas de la Formación del Profesorado de Secundaria de Ciencias en España

He appreciated the paper because it states that an appropriate science teachers training have to be considered as a priority. The author raises an essential question: which have to be the knowledge for a science teacher to guarantee an appropriate professional practice? It is necessary a deep knowledge about scientific subjects but it is not enough; it is also necessary a knowledge about the scientific ideas history and their origin, about the interaction between science, technology and society; and it is essential a pedagogical competence to examine in depth the educational research.



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Silvana Saiello (expert)

Paper: Chemistry education in Polish schools

Silvana told that the paper does not contain relevant suggestions for science teachers, but is a good description of the chemistry education system in Polish

Nadia Zamboni (lower secondary school teacher)

Paper: An overview of teacher training in Portugal

The importance of the document is linked to interesting information on teacher training in Portugal from initial training to continuous training in-service. Relevant point is also the reference to the role of ICT in the teaching process and the construction of basic competences in science at the primary school.

Training becomes a prerequisite for teachers' qualification and to enhance students' outcomes; it should be the result of integration between initial training and training in-service. In this perspective, the article presents an overview of the three different levels of training required by Portuguese law, initial training, specialized training, in-service training, with particular reference to the training of chemistry teachers through a scenario within technologies and processes of contextualization of contents.

Publication: Teacher collaboration and professional development in the workplace: a study of Portuguese teachers

The document is important because it underlines the importance and the meaning of 'collaboration' among teachers in the workplace, in terms of training and professional growth. 'Collaboration work' is not always simple, but teachers are aware of the value of a collaborative approach discovering new pathways of teaching and learning.

The findings on collaboration at school emerge from a research in a school in the North of Portugal which involves one hundred teachers with different roles. The contents of this publication are therefore relevant because it is directly inspired by teachers' work and suitable to many school situations in which teachers want to develop an innovative learning community.

Lia Zunino (primary school teacher)

Publication: Primary Teachers' Understanding of Four Chemical Phenomena: Effect of an In-Service Training Course

The publication is relevant because it debates about teaching of chemistry in the Primary School, a rarely discussed topic.

The Authors wonder: are primary school teachers ready to teach chemical changes?

They try to answer with a study conduct on one hundred and thirty Greek primary school teachers about their knowledge of the concept of substance and its chemical transformations (hydrogen combustion, iron rusting, sugar heating, a burning candle).

Conclusions

The workshop concluded with the commitment of teachers to present the workshop results to their school colleagues.

All participants expressed their intention to build and test during the next school year at least one teaching unit that foresees the use of ICT resources uploaded on the project portal.



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