

## **Action-research Teacher Training Course for in-service Chemistry teachers using a Flipped Classroom- IBSE approach.**

Chiara Schettini,<sup>1</sup> Rossana Galassi,<sup>1</sup> Silvia Zamponi,<sup>1</sup> Daniela Amendola,<sup>2</sup> Daniela Bossoletti,<sup>3</sup>  
Tiziana Pirani,<sup>3</sup>

<sup>1</sup>School of Science and Technology, Chemistry Division, University of Camerino, I-62032, Italy,  
[chiara.schettini@unicam.it](mailto:chiara.schettini@unicam.it), [rossana.galassi@unicam.it](mailto:rossana.galassi@unicam.it), [silvia.zamponi@unicam.it](mailto:silvia.zamponi@unicam.it)

<sup>2</sup>e-learning office, University of Camerino I-62032, Italy

<sup>3</sup>Liceo scientifico Galilei Ancona, Via Allende Gossens, I-60131, Italy

Key words: in service teachers, research action , Flipped Classroom, IBSE, chemical concepts

As part of the PLS project (Scientific Degrees National Plan), the UNICAM Chemistry degree course has been holding training courses for the Teaching of Chemistry since 2010. Addressed to High School Science teachers of the Marche Region, the courses are in blended mode, with residential and online training on dedicated Moodle platform.

In the current academic year (2016/17), two Chemistry High School teachers have undertaken an action research experiment on the teaching of some chemical concepts, using the pedagogical model of the Flipped Classroom and the IBSE approach (Inquiry Based Science Education), with emphasis on the 5E Learning Cycle.

At the end of the training period, the teachers have experimented the activities with the students, following the five-phase sequence of Engage, Explore, Explain, Elaborate, Evaluate, making use of original interactive material developed by UNICAM lecturers.

The monitoring and evaluation have been carried out by questionnaires to teachers and by analysing the products created by both teachers and students. The result analysis shows an overall benefit, both in terms of acquisition of the new teaching practice by teachers and skills acquired by pupils.

[1] Bergmann J., Sams Aaron, (2012). *Flip your classroom*. International Society for Technology in education.

[2] Rodger W. Bybee. (2015). *The BSCS 5E Instructional Model: Creating Teachable Moments*. NSTA Press Book.

[3] L. Szalay, Z. Toth. (2016). *An inquiry-based approach of traditional 'step-by-step' experiments*. Chem. Educ. Res. Pract., 2016, 17, 923