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E-LEARNING GRANULARITY FOR A CHEMICAL REACTIVITY LEARNING OBJECTS

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The present trends in education encourage teachers to design and implement Learning Objects (LOs) to be offered as services for their courses on Open Molecular Science Cloud (OMSC) (see http://services.chm.unipg.it/ojs/index.php/virtlcomm/article/view/191). In our approach we adopt, first, an easy to use technology to design, produce and modify in full autonomy LOs at a proper level of granularity in a not-specifically equipped environment and then prepare their version for sharing with other teachers of the field within the European Chemistry Thematic Network (ECTN) (http://ectn.eu/) and the Theoretical Chemistry and Computational Modelling (TCCM) Master (https://tccm.qui.uam.es/) through collaborative development. Only after a certain period of collaborative development, the revised version of the LOs is proposed for approval by the appropriate expert board in order to make them available for general use.

This type of approach has been already adopted in the past for a Chemistry alignment course of the Veterinary Degree [1] with the aim of equipping freshmen with basic Chemistry concepts thanks to the "objective and universal" nature of related concepts identifying the common ground of all Chemists everywhere in the World (like "chemical equilibrium", "thermodynamics", "perfect gas laws", "stoichiometry", "redox", etc.) and to the objectivity of their contents. In that case LOs can be tailored to be modular, self-consistent, interoperable, available and reusable. Furthermore, they can adopt the highest granularity possible.

When tackling the problem of advanced Master courses (as is the Erasmus Mundus TCCM Master considered here) the adoption of the strategy of the *scope of the objective* allows to maximize the proper evolution of the content and the enhancement of the virtuosity of LOs sharing. This allows, in fact, a continuous updating of the contents by the whole community of teachers belonging to the same scientific area (this is often named "holistic granularity" [2]). The LOs considered deal with the "From the phenomenology of chemical reactions to the classical mechanics modelling of two body collisions" section of ref. [3] (the first four chapters) which will be taken as candidate case studies within MOSEX (the OMSC component of the European Open Science Cloud (EOSC) Pillar project (https://ec.europa.eu/research/openscience/index.cfm?pg=open-science-cloud#)).

REFERENCES.

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2] [Johannes Strobel, Gretchen Lowerison, Roger Côté, Philip C. Abrami and Edward C. Bethel - "Handbook of Research on Learning Design and Learning Objects: Issues, Applications, and Technologies - 2009 - DOI: 10.4018/978-1-59904-861-1.ch017]

3] A. Laganà, G.A. Parker, Chemical Reactions Basic Theory and Computing, Springer International Publishing 2018; ISBN 978-3-319-62355-9.

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