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INFORMAL PHYSICS TEACHING FOR A BETTER SOCIETY: A MOOC-BASED AND CONTEXT-DRIVEN EXPERIENCE ON LEARNING RADIOACTIVITY

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Scientific literacy is a main target and recommendation of many National Standards of Education around the world, strongly convinced that a scientific culture can foster the development of better and safely lives. Teaching physics has the general objective of providing the learners with an adequate wealth of knowledge, in terms of both interdisciplinary scientific concepts and practical skills, in order to make them able to address the scientific problems they might face in the context of everyday life. In this work, we report the experimental evidence, collected during a first year physics class in an upper secondary technical school, for the urgent necessity to adopt an informal and inquiry-based strategy to teach physics effectively, in particular to all those students living in degraded socio-economic environments. Within the pedagogical framework of “Learning by Doing” and the paradigm “Learning by Teaching”, we have explored the benefits of the students’ participation to an informal ICT-based learning experience and, subsequently, as scientific speakers to a national science exhibition where the majority of the secondary schools in the region presents their scientific exhibits. A sample of 33 students from an upper secondary school has been involved in this experimentation. First, they attended a two-week long MOOC-based laboratory focused on the topic of radioactivity, where they had the opportunity to learn the basic concepts of a radioactive decay and carry out real measurements into a remote lab, challenging themselves through an inquiry-based learning path suitably developed in the context of the European Erasmus+KA2 project “Open Discovery of STEM Laboratories”. Before participating to the exhibition, the students also built a model of atomic nucleus, alpha and beta particles, and practiced the use of a Geiger-Muller counter device for measuring natural radioactivity. After the lab, they trained themselves for a week to present the exhibit to the audience, firstly introducing the basic concepts of ionizing radiation and then the main medical applications, imaging/diagnosing, of radioactive isotopes. About three months after the participation to the scientific exhibition, the students answered to a questionnaire about these issues. Their answers have been analyzed in comparison with those provided by the students who attended a traditional lecture-based instruction. A significant improvement in the memorization of the main aspects concerning a radioactive decay, such as the definition of isotope, particle and electromagnetic radiation, the understanding of the radioactivity process at microscopic level, as well as a stronger view of the useful aspect of radioactivity in the everyday life have been definitely achieved by the students involved in this study. A final discussion about the overall benefits of the “Learning by Doing-and-Teaching” educational strategy within an informal inquiry-based laboratory is also reported.

Apply to be considered for a student award (Yes / No)?

No

Level for award (Hons, MSc, PhD, N/A)?

N/A

Primary author: Dr PIZZOLATO, Nicola (Istituto di Istruzione Superiore “Pio La Torre”)

Co-author: Prof. PERSANO ADORNO, Dominique (University of Palermo, Italy)

Presenter: Dr PIZZOLATO, Nicola (Istituto di Istruzione Superiore "Pio La Torre")

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