Chapter 4
MiniOpenLab:
Open Community and Hands-On Approach to Sustainable Development and STEM Education – An Innovative Approach

Tharrenos Bratitsis
https://orcid.org/0000-0003-4257-2755
University of Western Macedonia, Greece

Iro Koliakou
Educational Association Anatolia, Greece

Arcadio Sotto Díaz
Universidad Rey Juan Carlos, Spain

Virginia Arvaniti
Educational Association Anatolia, Greece

Teresa Sarmento
Centro de Engenharia d Desenvolvimento, Portugal

Nuria Olga León Tobajas
Ceipso Maestro Rodrigo, Spain

Ana Barroca
Projeto Schole LDA, Portugal

ABSTRACT

Education for sustainable development and STEM education are two major EU priorities. Both should be addressed from an early age. At school, children must be motivated to learn maths and science and to imagine working in these fields, and to learn about sustainability and develop attitudes and behaviours that are in line with the UN's SD Goals. Over the past years, children have taken interest in SD and in some cases. By contrast, STEM is still regarded as difficult and unattractive by many children. Thus, it may be beneficial to couple both these fields. The project MiniOpenLabs proposes to set-up and test a different methodology with a higher prevalence of experiential learning and relying on the collaboration between science and technology organisations, enterprises, and civil society to ensure relevant and meaningful engagement of all societal actors with science and increase the uptake of science studies, citizen science initiatives and science-based careers, employability, and competitiveness.

DOI: 10.4018/978-1-6684-3861-9.ch004

INTRODUCTION

The Education for Sustainable Development and STEM Education are 2 major priorities for the EU. As climate change, overpopulation, and inequalities begin to take their toll on our planet and on global human development, the Education for Sustainable Development (ESD) emerged as a response in order to change attitudes and behaviours and mobilize people around the objective of Sustainability.

On the Other hand, Science, Technology, Engineering and Mathematics (STEM) Education is key for an increasingly complex knowledge-based society. "Knowledge of and about science are integral to preparing our population to be actively engaged and responsible citizens, creative and innovative, able to work collaboratively and fully aware of and conversant with the complex challenges facing society" (Science Education for Responsible Citizenship, EC, 2015).

Both Sustainable Development (SD) and STEM should be addressed from an early age. At school, children must be motivated to learn maths and science and to imagine working in these fields, and to learn about sustainability and develop attitudes and behaviours that are in line with the UN's SD Goals.

However, the way children perceive and react to these 2 fields is generally different. Over the past few years, children have taken a great and genuine interest in SD and in some cases, they are even in the forefront of the battle for a more sustainable world. By contrast, STEM is still regarded as difficult and unattractive by the majority of children.

Having this in mind, it may be beneficial to couple both these fields. If, in one hand, SD needs to look at science and technology for answers, on the other hand, STEM education can be made more interesting and appealing if applied to a specific field that gathers particular interest, like SD. Thus, the general interest in SD can be used to attract children to STEM. If coupling these areas of education might be beneficial, it is not enough to gather children's interest if the learning methodologies don't step up and respond to the needs of children. The dominant approach to STEM Education and ESD in schools is still teacher-driven. This, in part, is responsible for the students' lack of interest in pursuing STEM studies and careers and for not exploring to a greater length the genuine interest of children in SD topics.

In this context, education of STEM and Sustainable topics must take on new models with a higher prevalence of experiential learning and that can bring together schools and other actors in the local community.

The MiniOpenLabs project, an EU Erasmus+ KA201 project, proposes to set-up and test a different methodology with a higher prevalence of experiential learning and relying on the collaboration between science and technology organisations, enterprises and civil society, to ensure relevant and meaningful engagement of all societal actors with science and increase the uptake of science studies, citizen science initiatives and science-based careers, employability and competitiveness. This chapter reflects upon the MiniOpenLabs concept as it was initially conceptualized by the consortium members and refined by the qualitative research carried out via the focus groups. The methodology followed will be described and insights gathered will be reported.

The remaining of the chapter is structured as follows: initially a brief theoretical background is presented, justifying the significance of the involved disciplinary areas. Then the research methodology is described, followed by a reflective report of the findings. The chapter concludes with a discussion and a brief presentation of the MiniOpenLabs concept.