



Open-Ended Virtual Experiments towards Early Environmental Skill Development

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Abstract

Achieving long-term sustainable development requires international initiatives for the preservation of the environment as well as an environmentally-aware next generation. The development of active future citizens taking a responsible stance on natural resources management at the personal as well as civic level calls for environmental skill building starting early, at the primary school level. Recognizing the importance of environmental education, most European national level curricula include high level objectives on the development of related skills. However, teachers in the field point to lack of supporting educational material and guidelines for classroom deployment, including fully developed learning activities as well as tools, especially in digital form. As a result, environmental education in primary schools currently mostly involves off-line activities such as recycling at the school grounds, site visits, and story-telling projects presented to classmates. The EnvKids project develops open-ended, explorative and collaborative learning methodologies that take advantage of virtual experimentation aiming at enhancing primary environmental education. End-to-end learning activities and teaching guidelines are developed on proof-of-concept virtual learning tools that cover a wide range of environmental subjects ranging from responsible residential behavior to the advantages of renewable energy resources at the civic level and responsible natural resources management, including forests, biodiversity, and water. Children are called to introduce innovative solutions in a game-based, sandbox environment where not only single solution exists, fostering creativity and an entrepreneurial spirit. Graphical interfaces and real-time feedback introduce a focus on concepts and impact of actions hiding computational details. The outcomes are being validated in Greece, the Czech Republic, France, and Sweden in real-life learning experiments taking place in primary schools with very positive reaction from learners and teachers on motivation, long-term engagement with the learning process, usability, and content design. This work is partly funded by the Life Long Learning Programme of the European Commission.