LOESS

LITERACY BOOST THROUGH AN OPERATIONAL EDUCATIONAL ECOSYSTEM OF SOCIETAL ACTORS ON SOIL HEALTH

LOESS CO-DESIGN WORKSHOP 3: A BLUEPRINT ON SOIL EDUCATION

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(16:00-18:30 CEST)

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1. INTRODUCTION

The International co-design workshop "**A Blueprint on soil education**" invites participants – e.g., teachers, teachers' trainers, professionals, researchers, experts on soil, etc. – to discuss on a blueprint for sustainable exemplary practices on soil education i.e., a handbook on how to teach about soil and its ecosystem services in school.

The workshop offers the opportunity to share ideas, experiences, and reflections in an informal, facilitated conversation. The aim of this discussion is to identify and assess exemplary practices for soil education and find ways to incorporate them into schools' activities.

The workshop is divided into two sessions. **Session 1** will discuss the BSCS 5E[1] instructional model (Bybee, et al. 2006) and evaluate its pertinence to teaching soil health in primary and secondary school. **Session 2** will help identify the overarching learning goals on which to base soil education for schools and acknowledge possible barriers in soil teaching. Join us in this vital conversation as we explore ways to foster a deeper connection to nature among educators and youngsters.

The workshop is organized by **LOESS**[2], a Horizon Europe project under one of the EU Mission areas – **A Soil Deal for Europe**[3]. The goal of LOESS is to raise awareness on the importance of soil and its functions and to increase soil literacy across Europe. All in all, LOESS will boost soil literacy by building an educational ecosystem that enhances capacity building, knowledge exchange and peer-to-peer learning.

2. A BLUEPRINT ON SOIL EDUCATION

Soil knowledge and health hold a crucial role within the **European Green Deal**[4], and they are also important for reaching the **long-term vision for the EU's rural areas**[5] as well as the objectives of the **EU Soil Strategy 2030**[6]. In the realm of education, the integration of soil into curricula is crucial, offering students immersive experiences that inspire curiosity about soil and foster a sense of environmental awareness.

While soil education varies across European countries due to differences in educational systems and priorities, there is a general trend towards integrating soil-related topics into school curricula. There is also a "need for educational programmes that create awareness

[1] BSCS 5E – Instructional model based on 5Es (Engage, Explore, Explain, Elaborate, Evaluate). Developed by BSCS Science Learning, an educational center in Colorado, US, formerly known as Biological Sciences Curriculum Study: https://bscs.org/reports/the-bscs-5e-instructional-model-origins-and-effectiveness/
[2] LOESS – Literacy boost through an Operational Educational Ecosystem of Societal actors on Soil health: https://loess-project.eu/
[3] European Commission – A Soil Deal for Europe: https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/eu-missions-horizon-europe/soil-deal-europe_en
[4]European Commission – A European Green Deal: https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en.
[5] European Commission – Long-term vision for the EU's rural areas up to 2040: https://rural-vision.europa.eu/index_en
[6] European Commission – Soil Strategy for 2023: https://environment.ec.europa.eu/topics/soil-and-land/soil-strategy_en

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of the role of soil in the life of individuals, communities and European society as a whole" (van der Putten, et al., 2018: 28). Despite progress in certain countries, achieving comprehensive soil education across Europe faces challenges. One significant issue is the lack of consistent approaches to teaching soil science across different regions and educational systems. Moreover, the level of emphasis placed on soil education varies, with some regions prioritizing it more than others. This inconsistency highlights the need for increased collaboration and coordination at the European level to promote soil literacy and awareness among students and educators.

LOESS aims at overcoming these obstacles by proposing a blueprint for sustainable exemplary practices on soil education in educational settings co-designed with the support of different stakeholders across Europe. Hence, in this international co-design workshop, we will exchange ideas, aiming at identifying and assessing core pedagogical solutions suitable to teaching soil health in schools across countries. The discussions taking place will be analysed and summarised into a document – deliverable D3.6 under Work Package 3 of LOESS - which will lay the ground for the creation of a blueprint for exemplary sustainable practices for soil education in school.

Figure 1 BSCS 5E phases

The starting point for discussions will be the BSCS 5E[7] instructional model as in Figure 1 (Bybee, et al. 2006). The model consists of five phases – Engage, Explore, Explain, Elaborate and Evaluate – each of which has a specific function. The model is based on the idea of constructivist learning and aims to give learners the opportunity to understand the subject matter from their own experience, so that they can subsequently develop new ideas. Planning in advance plays an important role in the implementation of the individual phases. Starting with Engage followed by Explore, Explain and Elaborate. Evaluation, in particular formative assessment, is required during all phases to monitor student learning and to act accordingly if needed.

3. AGENDA

Time (CEST)	Session
16:00 - 16:10	Welcome, tour de table and brief presentation on LOESS
16:10 - 17:10	**Session 1: A teaching model for soil education in school** Introduction (5-10min) Discussion by all participants
17:10 - 17:20	Break
17:20 - 18:20	**Session 2: Learning goals and barriers in soil education** Introduction (5-10 min) Discussion by all participants

[7] BSCS 5E – Instructional model based on 5Es (Engage, Explore, Explain, Elaborate, Evaluate). Developed by BSCS Science Learning, an educational center in Colorado, US, formerly known as Biological Sciences Curriculum Study: https://bscs.org/reports/the-bscs-5e-instructional-model-origins-and-effectiveness/

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18:20 - 18:30	Summary by EUN

4. QUESTIONS

Session 1: A teaching model for soil education in school

1. Discuss and assess the suitability of the BSCS 5E[8] instructional model (Bybee, et al. 2006) for soil education in school.
2. What are the key elements that a cross-national teaching model for soil education should include?
3. What are the foundational concepts about soil that students should learn at the primary and secondary levels, and how can we introduce these concepts in an age-appropriate manner?
4. What hands-on activities, experiential learning opportunities and exemplary practices can we imagine to engage students in exploring soil properties, composition, and functions?
5. How can we assess students' learning outcomes and evaluate the effectiveness of soil education initiatives in primary and secondary education?

Session 2: Learning goals and barriers in soil education

1. What are the primary learning goals we should aim to achieve when teaching about soil health, and how do these align with broader educational objectives?
2. What are the main barriers or challenges we face in effectively teaching soil-related concepts and skills in educational settings?
3. How can we make explicit and meaningful systems connection between soil education and the Sustainable Development Goals (SDGs)[9] as part of the 2030 Agenda for Sustainable Development[10]?
4. How can we address misconceptions or gaps in students' understanding of soil, and what strategies can we employ to enhance their engagement and comprehension?
5. How can we ensure that students not only acquire knowledge about soil but also develop a deeper understanding of its significance in supporting life on Earth and sustaining ecosystems?

6. REFERENCES

Bybee, R. W., Taylor, J. A., Gardner, A., Van Scotter, P., Powell, J. C., Westbrook, A., & Landes, N. (2006). The BSCS 5E instructional model: Origins and effectiveness. Colorado Springs, Co: BSCS, 5 (88-98).

van der Putten, et al., (2018). Opportunities for soil sustainability in Europe. (EASAC policy report; No. 36).

[8] BSCS 5E – Instructional model based on 5Es (Engage, Explore, Explain, Elaborate, Evaluate). Developed by BSCS Science Learning, an educational center in Colorado, US, formerly known as Biological Sciences Curriculum Study: https://bscs.org/reports/the-bscs-5e-instructional-model-origins-and-effectiveness/

[9] The 17 SDGs: https://sdgs.un.org/goals

[10] 2030 Agenda for Sustainable Development: https://sdgs.un.org/2030agenda

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