

Learning from the South Bohemian pond landscape: Using eco-cultural heritage for sustainable science education

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The South Bohemian pond landscape represents a unique interaction between human activities, water management, wetlands, and aquatic and terrestrial vegetation. Beyond its ecological and cultural value, this landscape provides an authentic learning environment in which students can directly explore processes essential for understanding current sustainability challenges. This contribution presents results from educational research investigating how inquiry-based outdoor learning can improve students' understanding of the ecological roles of plants and their awareness of the importance of vegetation in aquatic and terrestrial ecosystems. Educational activities were developed around real South Bohemian ponds and wetlands and combined field investigation with a digital interactive textbook, animations, and modern measuring technologies. Students investigated primary production of aquatic plants and their relationships with oxygen concentration, pH, eutrophication, water quality, and ecosystem functioning. The learning activities thus moved photosynthesis beyond its traditional presentation as an isolated biochemical process and placed it within the ecological context of the local landscape. The approach was based on inquiry-based learning, enabling students to formulate hypotheses, conduct measurements in real ecosystems, interpret environmental data, and connect observed processes with broader sustainability issues.

Research conducted in South Bohemian secondary schools demonstrated significant improvements in students' understanding of photosynthesis, the ecological role of aquatic plants, and the relationship between photosynthetic biomass production and eutrophication. The findings also indicate that authentic field experiences, supported by digital technologies and inquiry-based approaches, can contribute to overcoming plant awareness disparity and make the ecological functions of vegetation more visible and meaningful to students. The South Bohemian pond and wetland landscape can therefore be understood not only as valuable eco-cultural heritage to be protected, but also as a living laboratory for sustainability education, connecting local landscape heritage with scientific understanding and future-oriented environmental responsibility.

