

15 - 17 May 2026

Rome , Italy

Embodied Approaches to Teaching Biology in Elementary Classrooms

Prof Dr. Kyungbin Kwon , Hamid Nadir , Huaishu Peng

Indiana University, the United States

Abstract

Elementary science instruction often struggles to make complex biological systems accessible to young learners, particularly when concepts are presented abstractly or disconnected from students' lived experiences. This project addresses this challenge by centering embodied learning—an approach grounded in the idea that cognition is shaped through bodily action—to support students' understanding of the human circulatory system. Rather than relying on technology-based tools or robotics, the learning sequence is designed entirely around unplugged, movement-oriented activities that help students physically experience and model biological processes. Students begin by acting out the circulatory system using a large floor map that represents the heart, lungs, veins, and arteries. Through guided movement, they take on the roles of blood cells transporting oxygen and carbon dioxide, using color-coded cards and positional cues to represent changes in blood flow and function. This kinesthetic engagement enables students to internalize core concepts such as oxygen exchange, the directional flow of blood, and the interdependence of system components. The activity also naturally supports computational thinking practices—including sequencing, pattern recognition, and decomposition—as students determine the correct pathways and transitions within the system. By emphasizing embodied action, this approach offers an accessible, inclusive method for integrating computational thinking into elementary biology instruction. It demonstrates how unplugged activities can provide powerful cognitive scaffolds, helping students build accurate mental models of complex scientific systems. Ultimately, the project shows that embodied learning can deepen conceptual understanding, spark curiosity, and create meaningful entry points into STEM learning for diverse elementary students.

Keywords: Embodied Learning; Elementary Education; Biology; Computational Thinking; Stem Learning