History and Philosophy of Science and how they relate to Science Education: Teaching for Conceptual Change in Evolutionary Theory

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Abstract

In the science education literature, conceptual change in science has often been described as similar to a Kuhnian paradigm shift. Students are supposed to undergo conceptual change when they are appropriately taught about evolutionary theory and to shift quickly from their (mostly Lamarckian) preconceptions to Darwinian concepts. However, particularly in the case of evolutionary theory, conceptual change neither took place at once as soon as Darwin's theory was published, nor did it involve a simple shift from a pre-Darwinian to a Darwinian worldview. Darwin's influence was enormous and much more complicated than a simple paradigm shift. Furthermore, research has shown that students do not hold Lamarckian preconceptions but ones that often stem from deep intuitions, which make evolutionary theory seem counter-intuitive and conceptual change difficult to achieve. Students of all ages and adults tend to intuitively provide teleological explanations for the features and properties of organisms. In this paper I will argue that a careful study of history and philosophy of science, in particular of Darwin's own conceptual change and of the structure and content of teleological explanations, can provide valuable tools for designing science instruction aiming at conceptual change in evolutionary theory.

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