The role of narrative in teaching evolution, and what makes biology unique

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Our presentation will explore some of the particular characteristics of biological science, and then go beyond science history and look at what narrative can do for understanding biology in the classroom, particularly the topic of selection theory (Darwin 1872). We will present data from a group discussion with primary school kids (grade 4, age 9-10 ys.), as well as text and interview data from secondary school (grade 7, age 12-13 ys.). We apply the perspective of narrative and cultural psychology (Bruner 1990, 1996; Echterhoff & Straub 2003) to student reasoning on adaptation phenomena (see Zabel 2015 on this website). From a constructivist perspective, narratives represent far more than just a 'format' or an outer shell for scientific content. Bruner (1990) stresses the importance of story for meaningful understanding and the special characteristics of paradigmatic and narrative thinking, and advocates including narrative realities into science education.

In contrast to most domains in physics, biology is a historical science. Even after Darwin had published his Theory of Evolution, biology kept its doubtful scientific status for many decades: 'Evolution is a good topic for the Sunday supplements of newspapers, but isn't science: You can't experiment with two million years!' (Stebbins in Mayr 2004, 16). Darwin's Theory of Evolution defies reduction to physics and chemistry because of its meta-physical components, at the same time that it introduces a cause-mechanic agent for evolutionary change. Only after the variables of natural selection, genetic drift, and mutation had been identified as variables in evolution in early 20th century, they could be measured and made to work in natural populations. 'The quantification of evolution - the attachment of numbers to 'nature' - and the growing measurability and testability of natural selection were part of a process that would eventually lead to general support for natural selection as the primary mechanism of evolution' (Mayr 2004, 16). This process, known as the 'synthesis', created modern biology as an autonomous science, unifying experimental and non-experimental sub-disciplines under one theoretical framework.

Its ambiguous character between testability and theory-based speculation makes biology complex in terms of epistemology, and particularly interesting in the context of narrative. Narrative is certainly inherent to scientific biology in a broader sense: According to Norris et al. (2005, p. 16), the type of *narrative explanation* 'explains an event by narrating the events leading up to its occurrence' and 'cites unique events as explanatory of other unique events'. Narrative explanation is certainly frequent in natural history. In this sense, it is inherent to many biology lessons. Evolution has an aspect of contingency, but Darwin's Theory of selection also features law-like logical conclusions that are to some extent 'timeless'.

With reference to Hans Fuchs' categories of the role of narrative in science (on this website), we will present an example for the use of narrative to create context in primary school (narrative *about* science). The story was modified for this purpose according to Kieran Egan's (1997) stages of evolution of the human mind. However, it also explains some of Darwin's ideas, observations and conclusions, making it a narrative *for* science to some extent. We will use student data to illustrate narrative meaning making processes in the classroom and make a case for the use of student narratives as a stepping-stone to understanding biology.

References

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