1609 A Cross-Age Study of Students' Understanding of the Concept of Respiration

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This study was investigated into the process and mechanism through which the concept of respiration as understood by students changes as they advance in school.

'Respiration' is a word that students come across often in everyday life; as such it was found that they were more likely to associate respiration with its more common concept of breathing or gas exchange as opposed to its more scientific definition as the process in which nutrients are oxidized to provide energy and that this trend did not improve appreciably as they advanced in school. This is an indication that the knowledge system of the student is split into a generic knowledge system that is oriented around their everyday life and a scientific knowledge system based on school-taught knowledge.

There were several trends in which the concept of respiration as understood by the students altered as they advanced in school. They overcome their tendency to base their understanding of respiration on their understanding of human phenomena and learn to integrate their understanding of biological phenomena through a one-organ one-role type of logic. They also overcome their tendency to intuitively explain everything based on their own experience.

Although these results do not dispute the cognitive development stages as proposed by Piaget, within the boundaries of concept development in biology there is a specific concept development stage that can be distinguished from the standard cognitive development stages.

Based on these results, I would like to propose the following. Many terms used in biology is used in everyday life, teachers must understand that students have a life-world knowledge system and must be able to teach the students to distinguish their life-world knowledge system from scientific knowledge system thus allowing them to recognize biological terms from social terms. Furthermore, emphasis must be place on finding a way to allow the students effectively maneuver between these two knowledge systems.

1610 High School Biology Teachers' and Students' Philosophical Views about Explanations of Biological Phenomena

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This study was designed to analyze high school biology teachers' and students' views about biological phenomena, according to causal explanation and teleological explanation.

Given various biological phenomena, the 50% of teachers considered that teleological explanations are more scinetific than causal explanations, whereas the 35.5% of them considered that causal explanations are more scientific than teleological explanations. Rest of them considered both explanations to be scientific. My Analyzying according to the fields of biology, teachers regarded it more scientific what is related to animal morphology(78.3%) and to function of plant reproductive organs(66.9%). In the fields of plant physiology(67.4%) and animal physiology(58.7%), on the contrary, that deal with such as hormone and molecular mechanism, teachers considered that causal explanations are more scientific than teleological explanations.

Practically, the proportion(51.6%) of teachers who explained biological phenomena teleologically during the biology lesson were almost the same as that (48.4%) of who explained causally. This result is contrasted with what two thirds of middle school science(biology) teachers explained biological phenomena teleologically rather than causally (Hyun-Soon Choi, 1993).

Students(50.7%), when front explanaions about biological phenomena, considered that teleological explanations are more scientific than causal explanations. Especially, girls(53.7%) rather than boys(47.6%) were inclined to consider teleological explanations to be more scientific than causal explanations(χ^2=34.6, p<0.01).

Students(62.8%) prefer teleological explantions than causal explanations(37.2%), and those(65.4%) who are in the track of natural science are prefer teleological explanations to those(59.9%) in the track of social science(χ^2=12.3, p<0.01).