

The most important single factor influencing learning is what the learner already knows – What do the learner know about clouds, precipitation, wind and greenhouse effect; a short review of research from 1883 to 2009

P. J. K. Hansen

Faculty of Education and International Studies, Oslo University College (palkirkeby.hansen@lui.hio.no)

If I had to reduce all of educational psychology to just one principle, I would say this: The most important single factor influencing learning is what the learner already knows. Ascertain this and teach him accordingly.

This famous quotation from David Ausubel in 1968 points out one of the fundamentals for constructivism as theory of learning and knowledge, and states a still common held teaching approach. The first one found to investigate “what the learner already knows” about weather and climate elements, was the American pioneer psychologist Granville Stanley Hall in 1883, studying children of age 4 to 8.

Since then many articles and books have been written on the same topics under different theories of learning, knowledge and teaching. Most outstanding are two books from Jean Piaget in 1926 and 1927, both including children’s shifting ideas from age 3 to 12 about weather and climate elements and their causes. His books were the start of his lifelong work (till 1980) on what he called theory of Genetic Epistemology, another fundament of constructivism. Common features of Hall, Piaget and many other researches’ discoveries are for instance that the youngest children (< 8) think that clouds are solids made by men or God from smoke, dust, earth or stone. Clouds move because men, God or the clouds themselves want to; or move when we move. Clouds give rain because men, God or the clouds themselves want to; or rain is needed; or the clouds sweat or melt; or rain is sinks or buckets in the clouds running over. Wind is the breath of men or God; or made by machines; or made by the movement of trees, clouds or other objects. The presentation will discuss some ideas of how to “teach him accordingly” at primary and lower secondary education.

The first one found to investigate what the learner already knows about the greenhouse effect and related topics is this author in 1989, studying students at age 15. The most outstanding and productive researchers on this field are the English environmental educators Edward Boyes and Martin Stanisstreet, starting up in 1992 and writing more than a dozen articles and book chapters – often together with researchers from other countries. Common features of Hansen, Boyes and Stanisstreet and many other researchers’ discoveries up to present, are that students on all levels still exchange or confuse the greenhouse effect with the effects of the ozone layer, and many thinks that the greenhouse effect is not necessary for life on the Erath. The greenhouse effect and related topics came into secondary curriculum during the 1990-ies in many countries. The presentation will discuss some ideas of how to teach him accordingly at secondary education.

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