1 - Learning Science: Conceptual Understanding | Empirical

SP - (15799) - MODEL OF ACCESS TO CHILDREN'S PREVIOUS IDEAS ABOUT MICROORGANISMS

Graça S. Carvalho (Portugal)[1]; Nelson Lima (Portugal)[3]; Paulo Mafra (Portugal)[1,2]

1 - CIEC – Research Centre on Child Studies, University of Minho, Braga, Portugal; 2 - CIEB - Research Centre on Basic Education, Politechnic Institute of Bragança, Bragança, Portugal; 3 - CEB – Biological Engineering Centre, University of Minho, Braga, Portugal

Short Abstract

The detection of alternative conceptions that children bring to the classroom is crucial when promoting conceptual change. There are several strategies to detect these previous ideas different from scientific knowledge, which can be obstacles to learning. The drawing technic is a strategy shown to be very effective since it allows children to externalise their mental models more easily than written expression. Several authors have identified scientific uncorrected ideas about microorganisms, not only in initial grade children but also in more advanced grades. Thus, microorganisms are often imagined as animal mini-versions of beetles or earthworms and, in many cases, with anthropomorphised characteristics, with heads, facial expressions and limbs. In general, they consider microorganisms as tiny living beings and tend to relate them to animal species familiar to them and express negative emotional connotation. If these previous ideas are not tackled in the first years of schooling, they may become resistant to change and later make it difficult to learn thematic issues related to microorganisms' benefits and understand their beneficial importance in ecosystems and biotechnology. This study presents a proposal of a model for detecting children's alternative conceptions about microorganisms by using children's drawings. Drawings of 187 children who completed the four-years primary school were analysed and subject to a subsequent categorisation. Several categories emerged concerning the "shape" (real, anthropomorphic, animal, others) and "emotional connotation" (positive, negative, and with no emotional connotation). Thus, a model of analysis was obtained which can be a tool of great importance, contributing to the teacher's knowledge about the students' previous ideas before starting the teaching of these contents and then s/he can move forward with strategies that promote conceptual change effectively.

Keywords: Conceptual Models, Science Education, Primary School