Cognitive state analyses of children after understanding of chemical processes in extrascholar situations of action

ABSTRACT

Scientific educational processes for children in the preschool and primary school age are also based on extrascholar situations of actions. With partly high financial expenditure universities and industrial supporters have founded the so-called students laboratories and cooperative initiatives to give primary school children an understanding of chemical facts. Until now, there are no cognitively orientated studies in the didactical chemical research which focus the possibilities and prerequisites of children to understand chemical concepts.

In this work nine single case studies which have been conducted with primary school children in connection with extrascholar situations oft action are represented. The acid-base concept has been determined as an objective for this study. This concept can be classified to be suitable for children in an operational-phenomenon-orientated way of access. Four methodical single procedures (concept-maps, drawings, interview situations, experimental tasks) which are under obligation of a qualitative research paradigm have been applied to analyze the final cognitive states of the probands under the learning-psychological construct of understanding. The probands have been questioned in defined time intervals. After preparation the data material obtained in this way was evaluated with regard to its content. In the scientific-didactical research contexts this investigational procedure is known as a reconstructive analysis of individual-cognitive final states as well.

The methodically-triangulated results show that despite positive-motivational initial conditions the objective meanings of terms are not understood by the probands and this possibly is an excessive demand for children even in case of a single chemical concept. Should the support be effective the support programmes have to take note of this dilemma. At the same time for the chemistry-related science teaching at primary schools curricular consequences which are required often too fast should be taken on a broad basis of evaluation.