

Applications of Multimedia Technology to study the ordinal thinking evolution of scholars from 3 to 7 years old

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Lecture Proposal for the ACDC strand

ABSTRACT

One of the most interesting research field in Mathematics Education is the formation and evolution of numerical and arithmetical thought from comparison of quantities to the concept of natural number and arithmetic operations with natural numbers. Nevertheless, many of the conducted studies have focused on the cardinal aspect of natural numbers and have devoted less attention to their ordinal and inductive side. Additionally this sort of studies shows some methodological limitations produced by the age of infants which creates several difficulties to reach valid, objective and reliable information.

The main purpose of this communication is to present the master lines and first conclusions of a research study on the analysis of ordinal thought evolution in prenumerical and preinductive levels among three to seven years old students. Our methodological scheme has been based on multimedia technology, automatic and objective record of the information and an outstanding of interaction between students and researcher.

Therefore a triple finality is fulfilled:

1. To find out the accuracy, validity and possibilities of multimedia technology as a mean in Mathematics Educations research.
2. To check its usefulness for infants.
3. To seek the features and evolution of ordinal thought in a virtual, ludic and interactive environment which have been adapted to the psycho-affective characteristics of the infants.

Our method is based on a set of multimedia tasks that is organised according to an evolutive model of ordinal competences and generated with the tool “Macromedia

Director". These tasks have been conceived according to our theory on the production of multimedia items. In this theory the epistemic, ontological and onto-epistemic functions have been redefined and some constructive principles about the multimedia learning from Mayer and other authors have been incorporated. Our first conclusions prove the usefulness of this methodology and show the existence of solid evolutive patterns in different stages of the proposed model. At the same time they are completing the previous research results.

Keywords

Mathematics Education, Multimedia Technology, cognitive diagnosis and assessment, numerical thinking, development of mathematical concepts and skills, evaluation, prekindergarten, infants, primary, order, natural numbers.