Using CD-ROM to Explore second-grade students' conceptions about nanotechnology in Taiwan

Hsueh-Mei Chiu[1], Chow-chin Lu[2], Chia-Chi Sung[3],
[1,2,] National Taipei University of Education, Taiwan

[3]National Taiwan University, Taiwan

Abstract：This paper described the conceptual understanding of second-grade students about nanotechnology utilizing CD-ROM teaching in the northern area of Taiwan. Because the nano-phenomena of natural world were invisible in eyes, children learn related conceptions utilizing educational technology. The CD-ROM intervention was immerged the nanotechnology instructions on the lotus effect, the effect of colorful butterfly, and nano-magnetic particles, therefore, the researcher could transfer abstract descriptions into concrete images suitable for children's cognition. The study adopted a qualitative, interpretive method and twelve students were interviewed by the researcher. Using a questionnaire composed of contexts and open-ended questions measured the outcomes of students' concept learning of nanotechnology, and provided descriptive data regarded as the basis of further interviews.

Data sources included drawings, interviews, and discussions. Tapes of participants' interviews were used along with drawings and responses during data analysis. The various data were analyzed via a constant comparative method in order to produce profiles of each participants' pre- and postinstruction conceptual understandings of nanotechnology. The students' understanding of nanotechnology concepts was described in three categories: the meaning of nanometer, the observation of nano-phenomenon in natural world, and the application of nanotechnology. Results indicated that children individually understood the natural phenomenon without the linkage of nanotechnology. They knew the birds migration, the colorful wings of butterflies, and the round water of the lotus leaves, but they linked relationships to the nano functions. For the reason of the Chinese word meaning of "nano", children easily thought "nano" as another rice. The results of this study demonstrate that children' intuition in macro-world guides their learning in micro-world. Hence, a well-designed CD-ROM software can be very effective in promoting scientific understandings.