

BAR-ILAN UNIVERSITY

**The Impact of Digital Documentation on Preschooler's
Scientific Experimentation, Recall, Understanding and
Curiosity**

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Submitted in partial fulfillment of the requirements for the Master's
Degree in the School of Education, Bar-Ilan University

Ramat-Gan, Israel

2019

Abstract

The instruction of science and inquiry-based activities have become a significant element in kindergarten curricula in the past few decades. In recent years, digital documentation has been integrated into preschool classrooms and schools and has become an important part of the learning process. Today, the two primary methods for documenting in preschool are drawing and digital photography. In the past, digital documenting in preschool was either conducted by staff members or overseen by them. More recently, this is done freely by the children (documenting areas in the classroom, documenting natural phenomenon in the yard, documenting activities such as building with LEGO or building a bridge, and more). Previous research indicates that scientific drawing is crucial in early years but sometimes does not reflect reality and therefore does not serve as an adequate support for describing and promoting understanding. This study investigated whether digital documentation combined with scientific drawing could contribute to recall, understanding and curiosity of scientific experiences among preschoolers. The study examined 40 children ages 5-6 in non-religious urban preschools in central Israel, of middle to high socio-economic status. The sample was randomly divided into two groups: an intervention group and a comparison group. Each group encompassed 20 children, with an identical number of boys and girls.

No significant differences were found between the score for the two groups on Raven's Matrices. In other words, the subjects in both groups were similar in their average general intelligence score. During the study, the children observed a scientific experiment demonstrating the fermentation of yeast. For the experiment, two cups were placed alongside one another. In one cup, the researcher added water, yeast and sugar, and in the second cup she added only yeast and water. The sessions with the children were conducted individually and documented on video. The children's prior knowledge was first tested and found to be similar in both groups. Later, the children documented the cups at two points in time – before and after fermentation. The intervention group documented by means of drawing as well as digital documentation (using the camera on a tablet computer). The comparison

group documented only by means of drawing. Thus, at the end of the documentation process, each member of the intervention group had two digital photos and two drawings, whereas the children in the comparison group had only two drawings. After the scientific demonstration, the children were asked to create a final product to summarize the activity. The intervention group created a short digital video clip (using an app on the tablet) out of the photos and drawings, and the comparison group was asked to create an “exhibition” of their two drawings and to describe the scientific experiment, i.e., a verbal description of the experiment according to both drawings. Throughout the process, the children were asked questions pertaining to recall, understanding, transfer their knowledge and curiosity. At the end of the process, after generating the final product, a structured interview comprising ten questions was conducted with each child.

Research tools used to investigate the research questions included: Raven’s Matrices, participated observation, an interview after creating the final product, a brief questionnaire on curiosity, and analysis of the products according to a detailed rubric.

Examining the quality of the products and the children’s responses in the interviews that followed, revealed four significant measures that indicated an advantage in favor of the intervention group over the comparison group in recall and understanding of the scientific experiment. Two findings regarding recall and understanding were revealed from the final project, and two findings of recall and understanding were revealed from the interview that followed its production. Questions relating to transfer of knowledge and most questions relating to curiosity did not reveal significant differences between groups. These findings indicate that integrating mobile technology and multimedia – digital photography and producing a digital video clip – support recall and understanding of a scientific experiment. Combining authentic photos (in addition to drawings) as well as the production of a video, which requires an additional cognitive process, strengthens and contributes to the process of learning among young children, compared to documenting by means of drawings and verbal description alone.

These findings indicate the importance of integrating digital technologies in preschools in learning contexts where these technologies can contribute to recall and understanding of complex processes such as a scientific experiment.