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Paint On The Finger Or Paint On The Screen: A Comparative Study

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Abstract

The aim of the study was to explore young children's touch-based interaction with Tablets. In particular it aimed to examine how finger painting might change in this digital context versus the physical context, and whether it engenders different kinds of touch movements or changes the nature of the painting process. Children aged between 27 and 37 months from a London nursery school took part. Each child freely explored 3 'painting' applications on a Tablet computer, and made two pictures by finger painting on paper. Data collection involved the use of video recordings from 3 different perspectives (video of the tablet screen, micro cameras embedded in the tablet frame of the children's faces, and camera on a tripod of the whole interaction). A multimodal approach to data analysis was taken, focusing on the combined analysis of body position and movement, gaze, and the detailed movement of the hands and fingers as kinds of touch (stroke, tap, scratch etc.). Results show differences in the movement of the fingers, types of touch and sequence of actions that children spontaneously make when drawing on paper as oppose to on the Tablet. Traditional finger painting requires a constant replenishment of paint on the finger resulting in a shift in focus of attention shifts the sheet of paper to the colour palette, while with the tablet touch itself is sufficient to generate a painted mark. Although individual differences were found, the time spent on drawing (i.e. touching) on the screen was greater than that of drawing on paper.

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Keywords: children, finger painting, Tablet, multimodal approach;

1. Introduction

Preschool-aged children show enthusiasm and motivation when interacting touchscreens on the mobile devices that surround them. Although research suggests such devices can act as tools that support learning through

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promoting students' creativity and increasing their motivation (Clarke and Luckin, 2013),,the specific advantages of using a certain technology in relation to educational activities or goals is not clearly supported by this data, making choices about technology for both educators and schools problematic. This results in ICTs being present in the classroom without fully exploiting them or integrating them effectively into an educational model based on the development of skills. A recent study conducted by the University of Wisconsin confirms that interactive screens are potentially an extremely effective resource for playing and learning during the first years of life (Kirkorian, 2013), indicating that the use of ICTs in nursery schools demands a radical change, surpassing the simple exposure of children to audiovisual content (TV programs or animated films on DVD, for example), to engaging them in the potentialities of interactive content.

The goal of this study was to explore young children's touch-based interaction with Tablets; particularly examining how a familiar activity likes finger painting might change in a digital context (using an iPad Tablet) versus a traditional physical context using paper and physical paint. Touch is a central part of our multimodal sensory system (Smith and Gasser, 2005). It is a fundamental way for children to interact and through which they begin to explore his or her environment during the first few months of life. This study contributes to the discourse on how environments - digital or physical - can support or limit the evolution of certain activities (like drawing), and importantly takes a multidisciplinary perspective drawing on pedagogy, developmental psychology and, in certain aspects, child-computer interaction.

2. The methodology issue

The methodological approach was qualitative, drawing centrally on multimodality, but with certain methodological differences in relation to multimodal data transcription techniques from the literature (Kress, 2009; Howes, 2013). One key difference was that, contrary to the typical multimodal methodological framework, no material selection was done prior to the transcription of data, but instead all the material in its entirety (N hours of video) was coded. The transcription, open but systematic, also allowed us to develop a database containing quantitative data to conduct a descriptive statistical analysis of the 5 activities proposed for each child. Three researchers participated in the transcription process, and collectively developed and agreed a touch observation system, providing inter-observer reliability.

The sample group was composed of 7 preschool children between the ages of 27 and 37 months (5 girls and 2 boys) from a London nursery school. Each child freely (with no time limit) explored three 'finger painting' applications on a Tablet device (making a drawing on a white screen, colouring in a black and white picture of an animal and making a drawing on a black page by spreading out paint in feathered patterns) and made two finger paintings on paper (a drawing on white A4-size paper and another colouring in the same animal picture also printed out on A4-size paper). The sequence of 5 activities was varied for each child; 4 children started with the 3 iPad activities and the other 3 with the sequence of activities on paper.

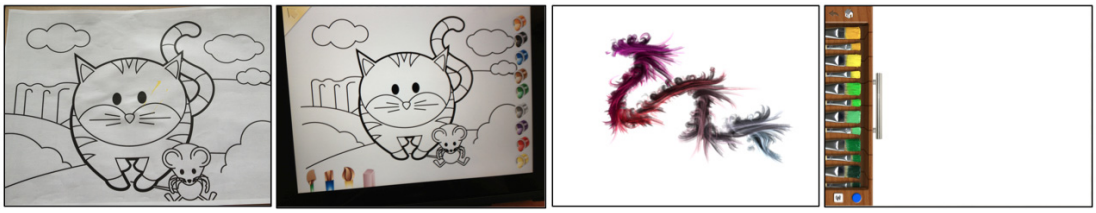

Fig. 1. (a & b) On the left, screenshot corresponding to the same figure of the cat to be colored in on paper and digitally on the iPad ("Color zoo"); (c & d) on the right, screenshots corresponding to the "Fingerpaint" App and the "Sketch Pad" App for free design.

Through a questionnaire delivered to their parents, we confirmed that the children in the sample group did not have great familiarity with mobile devices. On the other hand, the school's teachers and management confirmed their familiarity with finger painting on paper. This difference in familiarity was kept in mind when interpreting the results; although the study's goal was not to determine the best environment, but to identify the play and learning