3D Animated Movies, Touch Screen Applications and Visual Motor Development of Five-Year-Old Children

Seçil Yücelyiğit, Animeto, Ankara, Turkey
Neriman Aral, Ankara University, Ankara, Turkey

ABSTRACT
This study is implemented to investigate the effects of 3D animated movies and interactive applications on visual motor development of five year old children. The research has been performed in pretest-posttest-permanence test, experimental pattern with control group. For four months, every fifteen day experimental groups (24 children) watched eight episodes of 3D animated movies; 12 of them performed the interactive applications with computer while the other 12 performed the same applications with worksheets. 14 children in control group engaged merely their preschool education. Test of Visual Motor Skills-3 was used to collect and evaluate the visual motor skills of children. Since the data of the research was not distributed normally, non-parametric Kruskal Wallis, Friedman and Wilcoxon tests were used to analyze the data. The results of the research show that the visual motor skills of children who engaged the study in both test and control groups, had improved significantly.

KEYWORDS
3D Animated Movies, Interactive Applications, Preschool Children, Visual Motor Development

INTRODUCTION
Children are increasingly using touch screen devices like tablets and smartphones at preschool during their early education and with family members at home. They are surrounded by digital technologies that were not available a decade ago (Kerawalla & Crook 2002; Buckleitner 2009; Chiong & Shuler 2010; Couse & Chen 2010). The number of hours that children spent in front of screens like computers, smartphones, tablets and game consoles is increasing as well. It’s still argued if it is appropriate for young children to spend hours using technology in front of screens. The answer is yes, if technology is used under control of an adult who has this responsibility with a purpose to promote learning (Lisenbee 2009).

Visual motor skills develop by age since the motor development is integrated to the cognitive development, maturation and practice. A communication between the motor and perceptual systems is necessary for the achievement of visual motor skills. By age three, children start to give meaning...
to what they see around and when they are at the age of preschool their image library gets richer. When they are at primary school, they learn to write and read the symbols like numbers, alphabet and others (Tükel 2013). A very significant part of cerebral cortex in the human brain is reserved for visual process. The different parts of the brain are developed to achieve different tasks like seeing and perception of color, depth, ground, movement and alike. Seeing has an advantage of getting the environmental information free from distance which is necessary for touching, smelling and tasting. That’s why vision has a superiority and priority in human’s life (Farrori & Menon, 2008). For this reason, the visual perception which forms the basis of cognitive development playing an important role in a child’s reading and writing skills, needs to be reinforced (Feder & Majnemer, 2007; Akı, Aral, Bütün Ayhan & Mutlu, 2008).

Developments of graphical and visual applications were pushed forward first in two dimension, then in three dimension and in virtual reality as the last step (Eden, 2007). The new generation movies are mostly presented in stereo and even the preschool children are subject to 3D vision. This study aims to investigate the effects of 3D animations (stereoscopic) and interactive applications on visual motor development of preschool children. It is expected that the interactive applications and 3D stereoscopic movies developed to this effect, target the child’s audio-visual senses simultaneously and integrate data processing. Nonetheless, these applications and movies develop child’s cognitive skills like evaluation and decision making by including child’s tact to learning process. It is stated that assisting the five sense to have experiences and transferring the experiences to daily life is critical for long lasting learning (Murphy, 2009).

The recent studies show that the development of visual skills has an integrated and sensitive effect in evaluating child development. Deficits in development of visual perception and visual motor skills causes learning disability, hyperactivity, and inadequacy in reading and writing skills (Solan, 1987; Tseng & Chow, 2000; Aral, 2002; Ahmetoğlu, Aral & Bütün Ayhan, 2008). Some researchers found strong relationship between reading complicity and visual perception defects (Griffin, Birch, Bateman & Land, 1993), and it is emphasized that low level visio-spatial ability causes lingual problems. It is critical to present substantial stimulus to develop the visual skills during the early years -especially the preschool education- when the visual perception and visual motor skills start its development, to avoid or minimize the academic and daily life troubles (Akshoomoof, 2006; Aral, 2010). In their studies Mangır and Çağatay (1987) determined that eye-hand coordination scores of the children who attend a preschool education program are better than children who don’t continue to a preschool education. Kaya (1989) studied the effects of Frostig Visual Perceptual Training Program on visual and cognitive development of children. The study concluded that four-year-old children in experimental group performed better than the control group on subtests eye-and coordination, figure-ground and form constancy while five year old children performed better on all subtests. Kurtulmuş and Temel (2013) examined the effects of Visual Perception Training Program which was applied to pre-school period children on visual perception and drawing skills. The researchers concluded that posttest scores of children in experiment group were significantly higher than their pretest scores on Eye-hand Coordination, Shape-Surface Separation, Perception Constancy, Perception of Position within Space and Perception of Spatial Relationships subtests. In this context, complementary applications that make learning entertaining and interesting is required. Some applications, reflecting the technological progress, make learning become much more entertaining and interesting for children beginning from the preschool years.

Perceptual system helps human kind to adapt to his surroundings. This adaptation is the product of perceptual learning. During perceptual learning most of the senses get involved in the process and make long lasting changes to the system. Using multimedia tools like animation movies provide students with learning via multi-sensory channels so that learning process can be more fruitful and encouraging. Learning with animation is theoretically based on dual-coding theory. Animation functions by addressing all five senses and the interactive applications can contribute to students’ autonomous development (Kayaoğlu, Akbaş & Öztürk, 2011).
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