*Apps and Brains*: **Young Children Learning With Technology**

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**Abstract**

This presentation will describe ongoing research projects on how technology improves teacher effectiveness as well as how it can assist young children's learning. This presentation has three topics focusing on the use of technology in early childhood education from different perspectives including; the use of technology by diverse young learners, technology in Chinese early childhood education, and the relationship between technology and its effect on cognitive development. The first topic will explore how to integrate technology in the daily learning activities in the early childhood classroom in China. The last two topics will give insight about how technology can support American young children's learning and development by examining iPad instruction for science and educational video games.

**Introduction**

Since technology has become a part of daily life, young children have more opportunity to interact with 1 to 1 digital media devices such as smartphones, Chromebooks, and iPads. Although experience with technology can help children for unprecedented learning opportunity, technology itself cannot fully reach its fully potential for helping children's learning without a full understanding of research-based pedagogical techniques (McManis & Gunnewig, 2012; Wenglinsky, 2005; Pegrum, Howitt, & Striepe, 2013, Manuguerra, & Petocz, 2011). Technology has been integrated into the computer-based 21st Century classroom where both educators and students start to interact with computer or mobile devices. Several studies (e.g., Asher-Schapuro, 2013; Chimilar, 2014; Couse and Chen, 2010; Danishman, 2015) have discussed the benefits of using digital media for young children. In these studies, digital media improved teaching effectiveness and assisted in children's learning by increasing motivation, self-efficacy, and concept knowledge.

Grounded the research findings previously indicated, this presentation will introduce presenters' ongoing research projects on how technology improves teacher effectiveness as well as how it can assist young children's learning from different perspectives. The first topic will explore how to integrate technology in the daily learning activities in the early childhood classroom in contemporary China. The last two topics will give insight about how technology can support American young children's learning and development by examining iPad instruction for science and educational video games.

**Using IPad as Instructional Tool in Early Childhood Education: Voice from Contemporary**

**China**

Since individuals are living in a time that education is considered as a key component for the well being of a society, technology has gradually become the most significant part of individuals' daily life, a large number of educators devote to study that using technology to enhance education. As the new generation, today's young kids have more opportunities to access to mobile devices such as mobile phones, tablets, and e-readers. Of cause the situation makes no exception in China. As a popular type of tablet, iPad has been paid attention to and utilized as a potential teaching instrument involving in early childhood education (Khoo, Merry & Nguyen, 2015). Using iPad to instruct has become a current topic and arouse lots of discussions among educators.

A large body of studies shows that teaching by using iPad has positive influences on young children. Several benefits that using iPad to teach in early childhood education were raised. As a teaching instrument, it provides numerous well-designed apps to accommodate the sense of children, like apps with a child-friendly intuitive design (Kucirkova, 2014). Educational-based apps are able to support and develop literacy, communicative and participatory abilities of young children (Khoo, Merry & Nguyen, 2015). One of the relevant studies written by Flewitt and his peers shows that iPad-based literacy activities could bring a number of positive attitudes and behaviors in children's learning process (Flewitt, Messer& Kucirkova, 2014). Some also states that as a mobile device which is initially to be designed for entertainment, iPad could more or less elicit learning interest from young children (Chiong & Shuler, 2010; Khoo, Merry & Nguyen, 2015).

We've interviewed several educators from different early childhood learning centers in China on using IPad in class as well as their standpoints towards these electronic instruments.

Some of them think that IPad could provide with more immersive plot for young kids to experience, especially for situations like picture book story or a processing of some simple scientific principles when words and static picture couldn't do this job well. Others also reckon these electronic instruments as a byproduct of our high tech information era; things like IPad are not only some particular electronic instruments, but also one of the elements which help to build every young kid's (or at least urban kid) Weltanschauung. Nowadays it already becomes very rare for the educators not to encounter with any mobile device when we are culturing our next generation. In this situation, if we wipe it off from any of our instructions intentionally, we would risk a danger that erodes the contingency during the process of understanding the actual world for those young kids.

According to these previous studies, it seems that using iPad as teaching instrument does make a positive difference on young children. However, some of the educators claimed that the quality interaction between teachers and children is a more important thing when iPad scaffolds the learning of children at the same time(Couse& Chen, 2010; Khoo, Merry & Nguyen, 2015). They also maintained that although children could learn and absorb knowledge through iPad, their teachers and companions play the most valuable and significant role in learning by using iPad (Khoo, Merry & Nguyen, 2015). Similarly, without a full understanding of pedagogy, technology itself could not fully fulfill the goal of helping children explore knowledge (McManis & Gunnewig, 2012).

Based on these discussions, increasing number of educators give more prudent attention to evaluate iPad-based learning in the US. However, there are only a few researches about using iPad as an instructional tool among young children in China. But we do have some extreme opponent against including mobile devices in their learning environments from our interview.

Their first reason may be very Chinese characteristic: any mobile device is harm to your eyes, the less, the better. The second major reason would be that mobile device will take up kids' time and attention which should have been used on outdoor activities or interacting with other people. They believe that the flat screen will isolate kids from the real world whereas establish a health relationship with this world is especially crutial in the first few years. Others also argued that traditional intrustion plans had more postive effects on a sound development including fine motor, creativity and critical thinking whereas mobile devices are quite the opposite.

**Enhancing Diverse Young Learners' Science Learning With Digital Media**

This study examined whether digital media—namely iPad— can help diverse learners (including ELL, children with special needs, and children with neither ELL status nor special needs) in science learning through a three months period. 136 preschoolers aged 3 to 5 years old participated in this research. Analysis of variance (ANOVA) was used to examine the improvement and difference in improvement among ELL children, children with special needs and typical children without special needs or ELL status before and after intervention.

**Child ERP Responses to Two Types of Stimuli in Video game Simulations**

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The hypothesis that video games requiring different types of responses differentially activate child brainwave responses was investigated in two studies of Event Related Potentials (ERPs) exhibited by elementary age children when they process stimuli requiring correct/incorrect responses or choices between two imaginative alternative responses. The first study results found that mean amplitude of P300 and N200 locations showed significant differences in the two conditions. In this study data were collected from children of families in the university community; the second study replicated the research conditions with children of similar age from lower income non-university families, who also were interviewed regarding their child video play habits. Comparison of ERP results from the two studies and interview data are presented.

*Keywords: Videogames, ERP, Middle Childhood, Development*