INTERNATIONAL WEEK

Training Teachers in Digital Literacy

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Training Teachers in Digital Literacy

◆ Presentation Outline

    ◆ Before and After the Introduction of the iPad Leading to the Study

    ◆ Children

        ◆ A Study Looking at Visual Spatial Functioning and Digital Device Usage

    ◆ Teacher Preparation for integrating Digital Learning

    ◆ Assessing the Quality of Digital Learning

        ◆ Discussion

Digital Learning & Devices

-First iPad released in 2010

-Many school have have integrated the use of tablets into their curriculum (Apple, 2013a), despite the absence of research to support this change.

Understanding Visual Spatial Functioning

- Sensorimotor skills are key for early cognitive development in children (Piaget, 1952).

- Thinking spatially allows us to focus on object location, shape, the relation to other objects, and what happens when the items move (Newcombe, 2010).

- Science, technology, engineering and math fields (STEM) build upon those early years of motor development (Uttal, Meadow, Tipton, et. al., 2013).

Integrated Technology & Spatial Development

- The children of today have never known a life without mobile devices, computers and television.

- Top grossing apps for young children sold on the iTunes website are advertised as "Education" (http://itunes.apple.com/).

- Studies have not yet been conducted on the validity of the educational potential.

Use of Digital Devices

- Children using a mobile device for media activity from 39% in 2011 to 80% in 2013 (Rideout, 2014).

- Children who are poorer or of minority status have higher usage rates daily (Rideout, 2013).

- 58% of parents in 2013 reported downloading apps for their children

- 80,000 apps are classified as education- and learning- based (Apple, 2015)

- At-risk children already show less optimal sleep health, and related adaptive and cognitive functioning issues (Keefe-Cooperman & Brady-Amoon, 2014).

Spatial Development and Integrated Technology

- Touch screen usage involves a physically different manipulation of objects.

- Fingers are used to move items across the screen in a two dimensional manner.

- The American Academy of Pediatrics (2015) suggests limits for screen time, but provides only minimal guidance on how to successfully help parents enforce healthy usage boundaries.

Purpose of Study

- Several hypotheses were tested
    - Time spent on digital devices is significantly negatively associated with visual spatial abilities.

    - Television viewing time has not decreased since 2010, and children have more total screen time due to the increase of digital device usage in society.

    - There is a significant relation between overall screen time/digital device usage based and racial identification, SES, and maternal education.

Preschooler Population

- Participant Group 2013 - 2014
  - 502 children (median age of 3.1 years); 326 male;173 female
  - Reported race/ethnicity:
    - European-American or White (n = 371, 74.1%)
    - Latino or Hispanic (n =45, 9%).
    - Black or African American (n = 51, 10.2%).
    - Asian or Asian American (n = 25, 5%)
  - Income:
    - 11.8% of the children (n =59) lived in at risk/lower income areas
    - 16.8% (n = 84) lived in lower middle class areas
    - 44.3% (n = 221) lived in middle class areas
    - 25.9% (n = 129) lived in upper middle class areas
  - Maternal Education
    - At least a college degree (77.7%).
    - Some college (14.1%).
    - HS degree or its equivalent (4.6%). Did not finish HS(3.6%).

➤ Participant Group 2005 - 2010

◆ (n = 612)

➡ The two groups were similar to each other in all areas, including age, parental information and level of functioning.

Tests Used

- Wechsler Preschool and Primary Scale of Intelligence-Fourth Edition (WPPSI-IV)

  - -Visual Spatial Composite Score (Block Design & Object Assembly)

  - Full Scale IQ

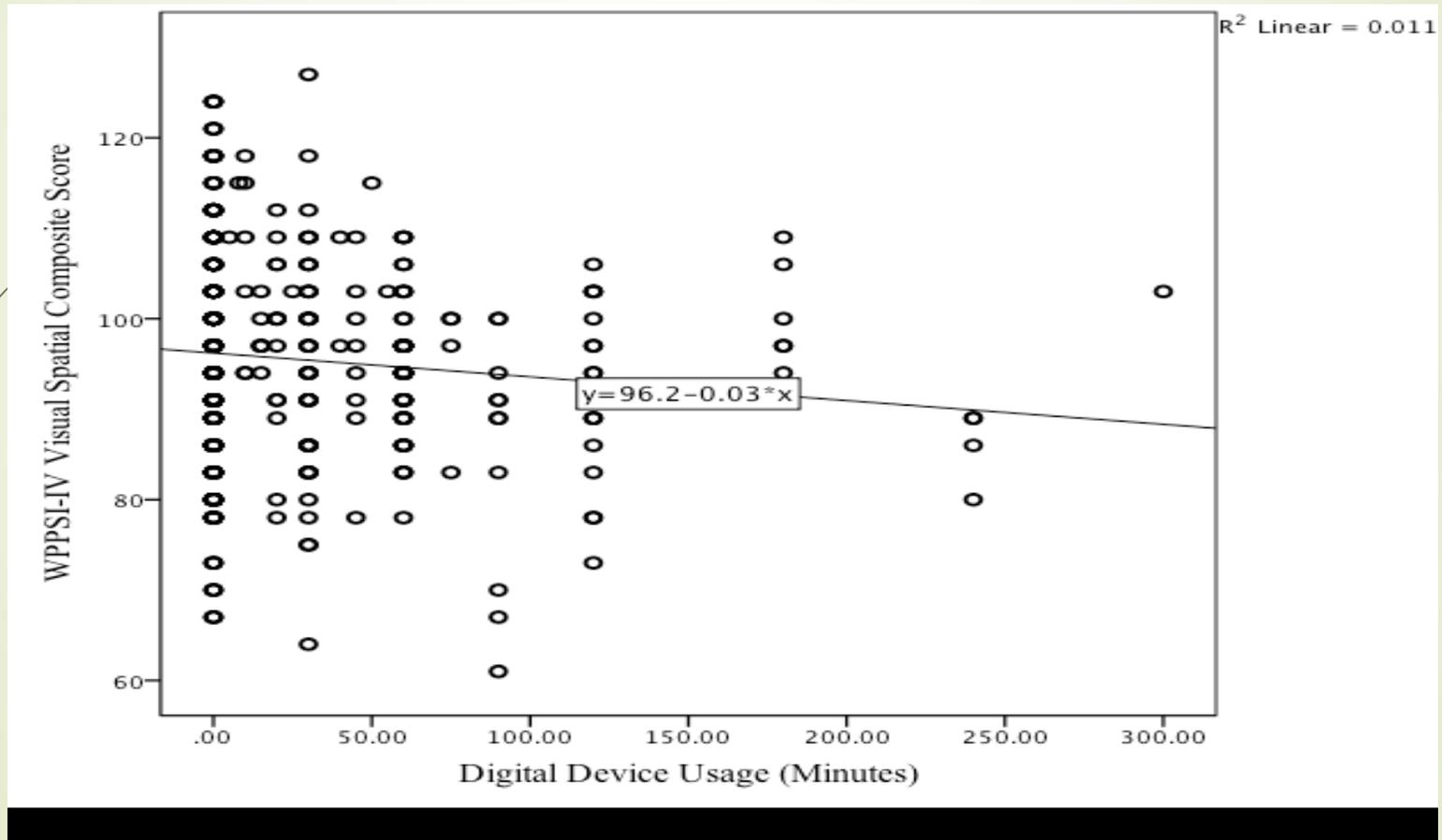- Peabody Developmental Motor Scales – Second Edition (PDMS-2).
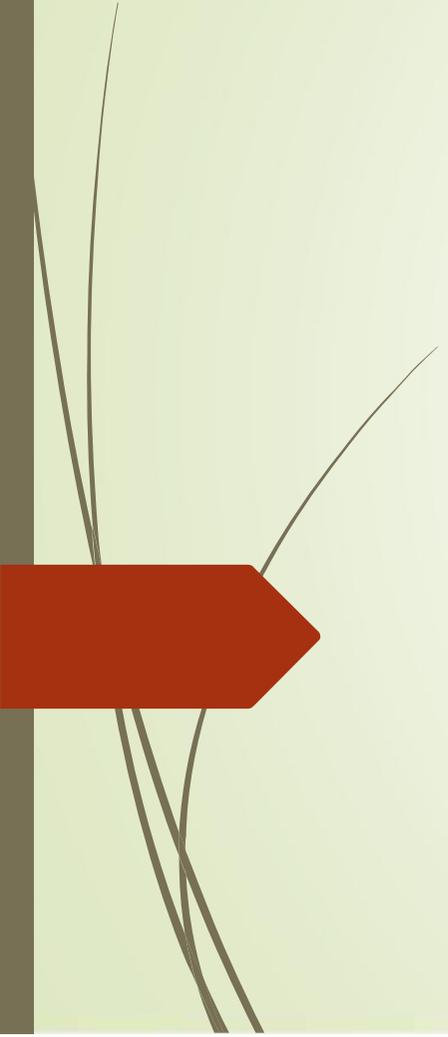
Results

Table 1

Bivariate Correlations Among WPPSI-IV Visual Spatial Composite Index, Smart Device Usage Time, and PDMS-2 Fine Motor Quotient

	1	2	3	4
1. WPPSI-IV Visual Spatial	--	-.10*	.27	--
2. Smart Device Usage		--	-.06	-.20**
3. PDMS-2 FMQ			--	--
4. WPPSI-IV Full Scale IQ				--

$* p < .05$

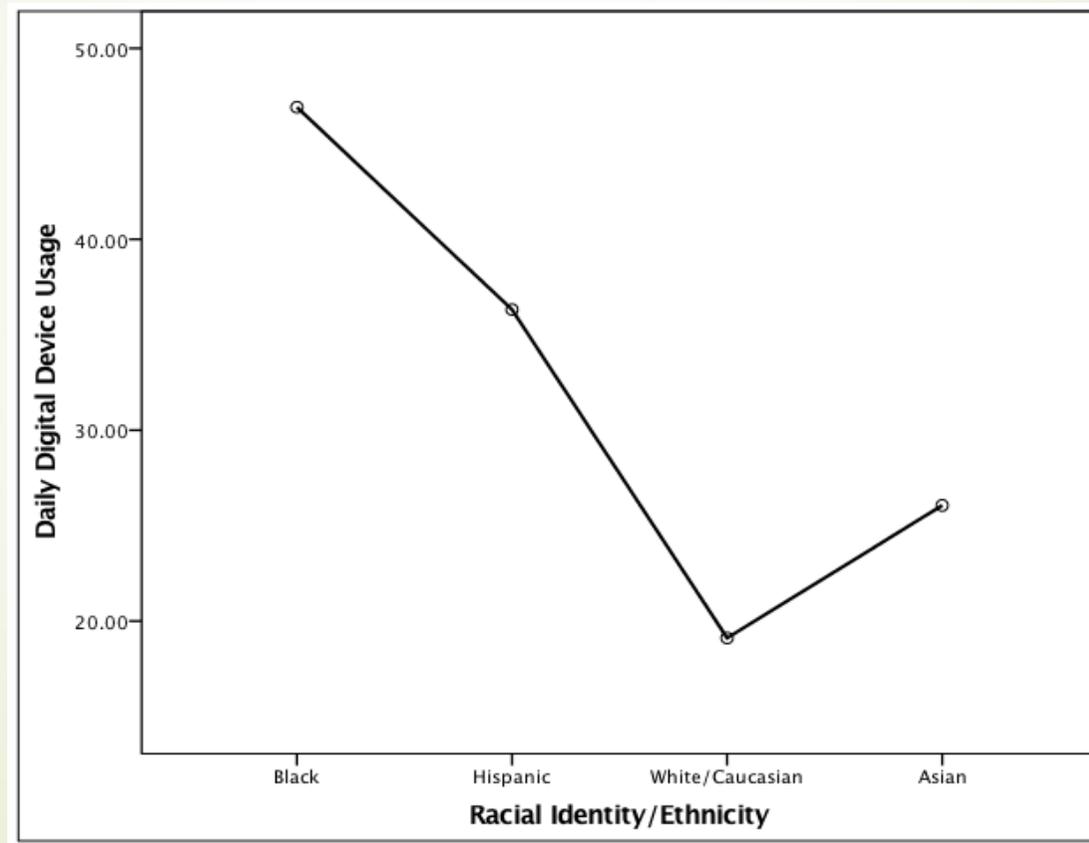# Smart Device Hours and WPPSI-IV Visual Spatial Scores

Television Viewing Times, Smart Device Usage, and Total Screen Time in Racial/Ethnic Identity from the 2010 and 2014 Preschooler Groups

Racial Identity/ Ethnicity	*n*	Television[a] Time	Digital Device[b] Time	Total Screen[a] Time	WPPSI-IV VS
European American					
2010	708	1 – 2 hrs		1 – 2 hrs	
2014	340	1 – 2 hrs	15 – 30 min	1 – 2 hrs	97.73 (11.31)
African American/Black					
2010	53	2 – 3 hrs		2 – 3 hrs	
2014	49	2 – 3 hrs	45 – 60 min	> 3 hrs	88.2 (12.39)
Latino(a)					
2010	47	2 – 3 hrs		2 – 3 hrs	
2014	38	2 – 3 hrs	30 – 45 min	2 – 3 hrs	88.67 (10.44)
Asian					
2010	39	1 – 2 hrs		1 – 2 hrs	
2014	24	1 – 2 hrs	30 – 45 min	2 – 3 hrs	96.92 (10.71)
Total					
2010	847	1 – 2 hrs		1 – 2 hrs	
2014	451	1 – 2 hrs	15 – 30 min	2 – 3 hrs	92.88 (11.21)

Note. WPPSI-IV Visual Spatial (VS) Composite Score is derived from the Block Design and Object Assembly Subtest Scores; M = 100, SD = 15. [a]Television and total screen usage time have been collapsed into time categories: < 1 hour; 1 – 2 hours; 2 – 3 hours; > 3 hours. [b]Digital device usage time has been collapsed into categories: 15 – 30 minutes; 30 – 45 minutes; 45 – 60 minutes.

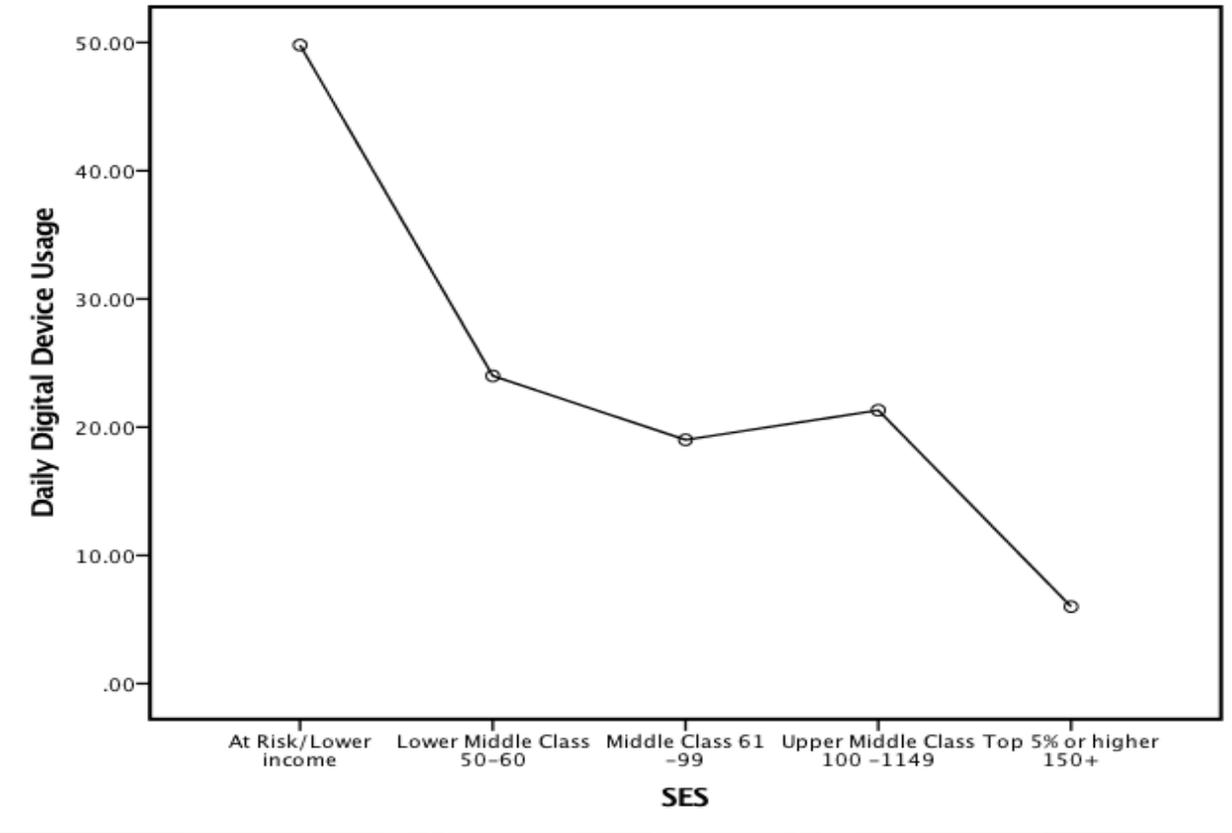# Digital Device Time Usage and Racial Identity/Ethnicity

Television Viewing Times, Smart Device Usage, and Total Screen Time in Minutes for Socioeconomic Groups from the 2010 and 2014 Preschooler Groups

SES Group	*n*	Television Time	Digital Device Time	Total Screen Time	WPPSI-IV VS M (SD)
At Risk/Lowest Income					
2010	59	2 – 3 hrs		2 – 3 hrs	
2014	53	2 – 3 hrs	45 – 60 min	> 3 hrs	90.11 (10.36)
Lower Middle class					
2010 (Combined with Middle Class)					
2014	74	1 – 2 hrs	15 – 30 min	2 – 3 hrs	95.12 (10.60)
Middle Class					
2010	625	1 – 2 hrs		2 – 3 hrs	
2014	204	1 – 2 hrs	15 – 30 min	2 – 3 hrs	95.94 (11.32)
Upper Middle Class					
2010	141	1 – 2 hrs		1 – 2 hrs	
2014	121	1 – 2 hrs	15 – 30 min	1 – 2 hrs	98.23 (11.10)
Total					
2010	847	1 – 2 hrs		1 – 2 hrs	
2014	452	1 – 2 hrs	15 – 30 min	2 – 3 hrs	95.66 (11.22)

Note. WPPSI-IV Visual Spatial (VS) Composite Score is derived from the Block Design and Object Assembly Subtest Scores; M = 100, SD = 15. [a]Television and total screen usage time have been collapsed into time categories: 1 – 2 hours; 2 – 3 hours; > 3 hours. [b]Digital device usage time has been collapsed into categories: 15 – 30 minutes; 30 – 45 minutes; 45 – 60 minutes.

# Digital Device Time Usage and Socioeconomic Status

Television Viewing Times, Smart Device Usage, and Total Screen Time in Minutes for Maternal Education Groups from the 2010 and 2014 Preschooler Groups

Maternal Education	*n*	Television Time	Digital Device Time	Total Screen Time	WPPSI-IV VS M (SD)
Did Graduate High School					
2010	10	1 – 2 hrs		1 – 2 hrs	
2014	9	1 – 2 hrs	30 – 45 min	2 – 3 hrs	92.13 (9.32)
High School Graduate					
2010	51	1 – 2 hrs		1 – 2 hrs	
2014	22	2 – 3 hrs	15 – 30 min	2 – 3 hrs	86.4 (13.43)
Some College					
2010	103	2 – 3 hrs		2 – 3 hrs	
2014	63	2 – 3 hrs	30 – 45 min	2 – 3 hrs	91.39 (9.63)
College Degree or Higher					
2010	477	1 – 2 hrs		1 – 2 hrs	
2014	352	1 – 2 hrs	15 – 30 min	1 – 2 hrs	97.11 (11.12)
Total					
2010	641	1 – 2 hrs		1 – 2 hrs	
2014	446	1 – 2 hrs	15 – 30 min	2 – 3 hrs	95.64 (11.33)

Note. WPPSI-IV Visual Spatial (VS) Composite Score is derived from the Block Design and Object Assembly Subtest Scores; M = 100, SD = 15. [a]Television and total screen usage time have been collapsed into time categories: < 1 hour; 1 – 2 hours; 2 – 3 hours; > 3 hours. [b]Digital device usage time has been collapsed into categories: 15 – 30 minutes; 30 – 45 minutes; 45 – 60 minutes.

Digital Device Time Usage and Maternal Education
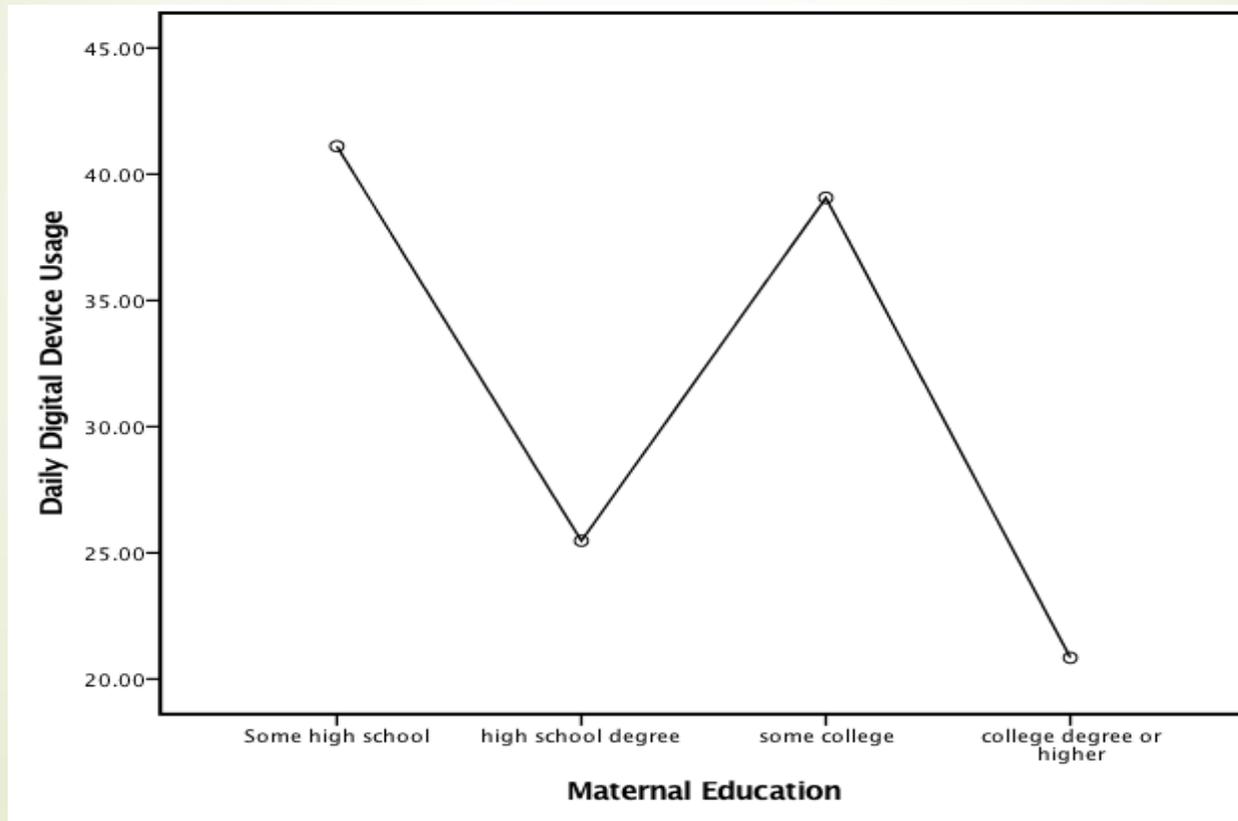
Digital Device Usage, Television Viewing & Visual Spatial Performance

- This study provides novel information about how the increase in digital usage relates to preschooler visual spatial functioning

- There is more screen time due to the combination of television and touch screen devices

- There are digital device usage differences based on racial identity, SES and maternal education.

- The results extend previous research showing how ethnic/racial status, SES, and maternal education are related to greater risk for educational difficulties.

- At risk preschoolers are missing opportunities for naturally occurring visual spatial exploration within the environment because of increased integrated technology usage.

Implications for the Classroom

- Realize in the early elementary school years that children may not have had the traditional upbringing as seen in former times.
- Proactively compensate with the use of structured spatial lessons (hands on activities)

Teacher Training

- Differentiate between attitudes toward (Information and Communication Technology) ICT generally and ICT as an educational tool.

- Integrating ICT involves teacher's:

  - cognitive attributes (i.e. competence and self-efficacy in ICT use, attitudes, beleifs)

  - Professional characteristics

  - Personal characteristics

- Teacher training programs should enhance student perceptions that ICT has a positive impact on learning

Teaching Teachers to Assess the Quality of Educational Apps/Materials Using the Science of Learning

Active learning

- Children play an active role in their own learning
- Children are active knowledge builders
- They do not simply observe what is going on around them and copy it
- Active Learning in Practice
  - Symbolic material to support active cognition at various levels of expertise are evidenced.

Engagement in the learning process

- Three kinds of engagement:
  - **Behavioral engagement** (i.e., rule-following, effort, persistence, participation in programs)
  - **Emotional engagement** (i.e., affective reactions)
  - **Cognitive engagement** (i.e., investment in learning, flexibility in problem solving)
- Engagement in Practice
  - Praising the effort of trying
  - Achieving a goal within the app

Meaningful Learning

- Sustainable and useful learning comes from experiences that connect to our existing knowledge.

- Meaningful Learning in Practice
    - The number and quality of relationships between the app experience and the larger realm of a child's life.

Putting it All Together

- Digital learning tools can be helpful if integrated appropriately into a child's life

- Teachers can help to make that happen

- We need to make sure teachers are comfortable with technology and their ability to bring it to the classroom effectively

- We need to help teachers be able to critically assess technological and digital tools to make sure standards for learning are met

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Thank you!!!

Questions?

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