Digital Media and Young Children’s Learning

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“Children are in the midst of a vast, unplanned experiment.”

- Hirsh-Pasek, Zosh, Golinkoff, Gray, Robb & Kaufman, 2015

Introduced in 2007

How have mobile media devices changed your daily lives?

Introduced in 2010
“Children are in the midst of a vast, unplanned experiment.”

- Hirsh-Pasek, Zosh, Golinkoff, Gray, Robb & Kaufman, 2015

Introduced in 2007

HUGE changes in children’s lives in this short time period...

Introduced in 2010
Children’s time on mobile devices *tripled* from 2013 to 2017.

2020:
- 97% Smartphone
- 98% any mobile device

Rideout, 2017, Rideout & Robb, 2020
Fear of new media

- “Confusing and harmful abundance”
- “The Pied Piper is back...His cunning witchery...”
Fear of new media

• “Confusing and harmful abundance of books” - Conrad Gesner, 1545

• “The Pied Piper is back...His cunning witchery...”
Fear of new media

• “Confusing and harmful abundance of books” - Conrad Gesner, 1545

• “The Pied Piper is back... he comes disguised as a television transmitter. His cunning witchery is piped through air channels estimated to reach 13,000,000 sets by the spring of 1951.” - Robert Lewis Shayon, 1951
Media and children’s learning

• Potential dangers of today’s new media for children’s learning
  • Easier to access across time/place
  • More solo use

• Potential advantages of today’s new media
  • Possibility of more interactive content
  • Extend learning across remote settings
6.6 hours per day in low-income kindergarteners (Dore et al., in press)
• **Part 1:** Is media use associated with language and literacy development?
  - Multiple ways of asking this question
  - Go beyond “screen time”

• **Part 2:** How can we use media in positive ways to promote learning?
  - Experimental study in preschool classrooms
  - Feasibility and preliminary impacts of virtual intervention
Outline

• **Part 1:** Is media use associated with language and literacy development?
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Why might media affect language and literacy?

• “Displacement hypothesis”
  - Replace educational activities or parent-child interaction
Going beyond “screen time”

• Joint media engagement
  - Using media together, asking questions, etc.
  - Extends interaction to new context

(Stevens & Penuel, 2010; Takeuchi & Stevens, 2011)
Links with language and literacy

- 488 children in first grade
- *Woodcock Johnson Test of Achievement III*

**Language:** Picture Vocabulary subtest  
**Literacy:** Letter-Word Identification subtest

- Spring of kindergarten, spring of first grade
- Caregivers reported media use
### Quantity

Think about the most recent school day. From the time your child woke up in the morning until she/he got to school about how long did they spend engaging in each of the following activities?

<table>
<thead>
<tr>
<th>Watching any kind of video including TV, movies, or short clips on any type of device.</th>
<th>None (0)</th>
<th>30 minutes (1)</th>
<th>1 hour (2)</th>
<th>1.5 hours (3)</th>
<th>2 hours (4)</th>
<th>2.5 hours (5)</th>
<th>3 hours (6)</th>
<th>3+ hours (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using apps or games on any type of electronic device.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Weekday before school
- Weekday after school
- Weekend day
- Weighted sum of 6 items for weekly total
Think about the most recent *school day*. From the time your child woke up in the morning until she/he got to school about how long did they spend engaging in each of the following activities?

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Think about the most recent school day. From the time your child woke up in the morning until she/he got to school about how long did they spend engaging in each of the following activities?

- Watching any kind of video including TV, movies, or short clips on any type of device.
- Using apps or games on any type of electronic device.

Weekly media use (hours)

<table>
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<tr>
<th>Hours per Day</th>
<th># of Children</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>(7)</td>
</tr>
<tr>
<td>1 hour</td>
<td>10</td>
</tr>
<tr>
<td>1.5 hours</td>
<td>40</td>
</tr>
<tr>
<td>2 hours</td>
<td>50</td>
</tr>
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<td>40</td>
</tr>
<tr>
<td>3+ hours</td>
<td>10</td>
</tr>
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</table>

Average = 23.5 hours/week or over 3 hours per day

Dore et al., 2020b
Joint media engagement

When my child is using media *outside of school*...

1. It is usually in the same room as me or another adult.
2. I am not sure whether they are watching videos or using apps/games.*
3. I comment on or ask my child questions about what is happening.
4. I do not interrupt him/her to talk about what he/she is doing or watching.*
5. We do not talk much about what he/she is doing or watching.*
6. I bring up what he/she saw or did in other conversations.
7. We talk about it beforehand.

*Reverse scored.*
Language: Quantity

![Graph showing the relationship between WJ Picture Vocabulary and Hours of media use per week. The graph indicates a peak in vocabulary at around 30 hours of media use per week.](image-url)
Literacy: Joint media engagement

![Graph showing the relationship between weekly media use (hours) and Letter-Word W-scores for different JME levels (0, 9, 20, 30).]
Is media use associated with language and literacy?

• Not in a simplistic way

• **Language**: Moderate levels associated with higher gains than low or high use

• Could be displacement at high levels

• Why moderate better than low?
  - Educational value
  - Expose to new vocabulary

Dore et al., 2020b
Is media use associated with language and literacy?

- Not in a simplistic way

- **Literacy**: Media use was negatively related to gains, but not when joint media engagement was high
  - Could be displacement at low-levels of JME
  - At high levels, could be using media to promote literacy
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Media and technology in early childhood classrooms

- Rising availability and use of media in early childhood settings (Northwestern, 2015, 2019)
- Recent data from 317 preschool teachers in Ohio (Dore & Dynia, 2020)
  - 63% used tablet; 47% at least once a week
  - Of those, 68% use for teaching new material and 82% use to review already-learned material
- Lack of high-quality educational media for preschoolers and little evidence on its use in classrooms
Mobile vocabulary game

• Part of a larger project creating an intervention to teach low-income preschoolers new vocabulary through reading and play

Dore et al., 2019
Mobile vocabulary game

- 10 difficult words
- Takes about 10 to 12 minutes

Dore et al., 2019
Mobile vocabulary game
Mobile vocabulary game
Mobile vocabulary game
Receptive vocabulary test

Dore et al., 2019
Lab study

• 4-year-olds from middle-income homes
• 34 children played the game and took the test
• 23 children (control group) just took the test

Dore et al., 2019
Lab study

Proportion Correct

Control group

Game group

Chance

**** $p < .0001$

+/− 1 standard error

Dore et al., 2019
Classroom study

- 3- and 4-year-olds in low-income preschools in two cities
- 33 children played mobile game

4 weeks (Play once a week)

5 no-exposure control words

Dore et al., 2019
Receptive vocabulary

Proportion Correct

Word Type

Control words  Game words

Control (5 per book)  Play-only (5 per book)

Dore et al., 2019
Mobile vocabulary game

• Children can learn vocabulary from a mobile game
  - Even in classroom context
  - Even without outside instruction

• Shouldn’t replace teacher instruction
  - Potential for supplementary instruction or extra support at home

Dore et al., 2019
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Kindergarten readiness programs

• COVID-19 prevented implementation of in-person summer learning programs

• Important for young children from underserved populations entering kindergarten with little to no preschool experience
Summer Success at Home

• Capitalize on virtual options to deliver programming
  - Educational media (Anderson et al., 2001; Mares & Pan, 2013)
  - Video chat lessons (Gaudreau et al., 2020; Troseth et al., 2006)

• Use a combined approach to target both children and caregivers

• Aimed to assess feasibility, social validity, and preliminary impacts
Summer Success at Home

- 91 preschool-age children and their caregivers
- Primarily low-SES (median income: $33k)
- 4-week program
- Targeted skills:
  1) Social-emotional
     - Emotion understanding
  2) Math
     - Cardinality
     - Counting
     - Patterning
  3) Literacy
     - Alphabet knowledge
     - Emergent literacy
Summer Success at Home

• **Materials:** Tablet, four books, home learning activities

• 5 ingredients
  1) Weekly caregiver-teacher video chat or phone calls
  2) Two weekly *Watch Together* activities
  3) Two weekly *Play Together* activities
Summer Success at Home

- **Materials**: Tablet, four books, home learning activities
- **5 ingredients**
  1) Weekly caregiver-teacher video chat or phone calls
  2) Two weekly *Watch Together* activities
  3) Two weekly *Play Together* activities
  4) One or two weekly *Read Together* activities
  5) Weekly child-teacher video chat lessons
Feasibility and Social Validity

Table 1

Caregiver Survey Responses for Program Satisfaction (n = 21)

<table>
<thead>
<tr>
<th>Item: “Please rate…”</th>
<th>M</th>
<th>SD</th>
<th>Range</th>
<th>% High*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your child’s experience in Summer Success</td>
<td>4.71</td>
<td>0.7</td>
<td>3-5</td>
<td>86%</td>
</tr>
<tr>
<td>Your child’s interactions with Summer Success staff</td>
<td>4.71</td>
<td>0.6</td>
<td>3-5</td>
<td>91%</td>
</tr>
<tr>
<td>Your experience in Summer Success</td>
<td>4.90</td>
<td>0.4</td>
<td>3-5</td>
<td>95%</td>
</tr>
<tr>
<td>Your experience with the Summer Success staff</td>
<td>4.86</td>
<td>0.5</td>
<td>3-5</td>
<td>95%</td>
</tr>
<tr>
<td>The overall quality of the Summer Success program</td>
<td>4.90</td>
<td>0.3</td>
<td>4-5</td>
<td>100%</td>
</tr>
</tbody>
</table>

*Percent of responses coded as 4 or 5 with survey anchors as 1 = poor, 3 = average, 5 = excellent
Feasibility and Social Validity

- Easily recruited 100 families and 91% started program
- High caregiver ratings
- Teacher-rated child engagement in video chat lessons
  - Average = 2.4 out of 3
  - 53% engaged for whole lesson
  - 90% engaged for > half of lesson
Preliminary impacts

Mean Score

Social-Emotional Skills  Cardinality  Counting  Patterning  Alphabet Knowledge  Emergent Literacy

Measure  Pretest  Posttest
Summer Success at Home

• Were able to successfully capitalize on virtual options to deliver programming
• Unclear which aspects of programs were effective and should be rigorously tested
• Evidence of promise for positive use of media and technology under pandemic conditions or for other remote contexts
Takeaways

• Media use in early childhood has \textit{changed} drastically in the last decade and has \textit{risen} during COVID-19 closures
• \textit{Fear} of new media is not new
• Potential \textit{disadvantages} and \textit{advantages}
• For language and literacy, relationship is not simple: some media use may be a positive influence and \textit{context} and \textit{content} likely matter
• When used in \textit{purposeful} ways, media and technology can support and promote learning
• \textit{Challenge} is to create and implement high-quality, research-based media products and programs
Questions/comments? Email: dore.13@osu.edu