Scouting for Learning: Surfacing Opportunities and Challenges Through a Mobile Diary Study

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Abstract: Survey research shows that "screen time" for young children tripled from 2015-2017 and the most recent studies with nationally representative data suggests children spend an average of 46 minutes a day engaging with digital content on mobile devices. This increase has stirred debate about the benefits and drawbacks of digital resources for development and differential benefits for those with greater and fewer financial resources. We report our methodological approach that uses a remote diary tool to provide snapshots of how digital resources are being used at home by an economically and geographically diverse sample of families with 5-10-year-old children.

Introduction

Children are enthusiastic adopters of digital technologies—using them to play, complete schoolwork, develop expertise as young makers and creators, and explore their interests (Barron & Levinson, 2017). Interest-driven learning can nurture "islands of expertise" around specific topics, deepening background knowledge, motivating learning conversations, and building positive affect connected to academic domains (Azevedo, 2006; Hidi & Renninger, 2006). Longer-term projects offer additional benefits, fostering self-regulation, collaborative activity, and encouraging choices to learn more across settings (Barron, 2006; Neitzel, Alexander, & Johnson, 2016). For young children, digital media resources can be a particularly powerful learning tool when adults and children use them as a catalyst for discussions that include question generation, problem-solving, explanations, and sharing perspectives that build connections to real world experiences (Barron & Levinson, 2017). These potential learning benefits raise questions about who is getting access to them and the social and material conditions that make them possible (Schneider, Hastings, & LaBriola, 2018). Particularly urgent are long standing concerns about equity. Although the digital divide was initially defined in terms of access to devices and connectivity, more recent theorizing frames these equity issues as multidimensional, with a focus the quality of content and ways that caregivers understand and support participation (Warschauer & Matuchniak, 2010). The study of parents' subjective experience of their children's engagement with technology is at an early stage and the field needs new methods that can obtain rich reports grounded in daily life experience. To contribute to this agenda we used a mobile diary method to learn about how parents' frame benefits and address concerns about privacy and safety.

Aims and significance

To date, research on children's learning with technology has included surveys, naturalistic observational studies, ethnographic studies, content analysis of apps and websites, and randomized experiments. Given the highly unique media-infused learning ecologies that children and their families develop, the next generation of research will need to expand in methodological and conceptual scope. In particular, we need approaches that can characterize the diversity and quality of digitally supported learning activities that emerge within the course of a typical week and how they originate. From an equity perspective, this work need to be able to reach families that differ in terms of their funds of knowledge, social networks, connections to public and private institutions, geographical location, financial resources, and educational backgrounds. And, we need studies that give voice to parents' hopes, concerns, and daily observations of their children's learning and well-being. To this end, we report a novel method for obtaining these accounts from a diverse and geographically dispersed sample, along with emergent findings regarding: (1) What challenges and learning opportunities do parents observe from their children's digital activity? (2) How do learning opportunities vary in terms of diversity and quality within and between families?

Methods/empirical approach

We collected daily learning diary entries from parents with children aged 5-10 using dscout, a smartphone-based remote qualitative research platform. Diary studies ask people to systematically record and reflect on moments from

their life (e.g., Csikszentmihalyi & Larson, 1984). dscout maintains a panel of over 100,000 participants from around the US, who are roughly representative of the smartphone owning population. Participants download the free app to participate in "Missions" designed and managed by researchers. Missions are time-limited and can have multiple "Parts" which may include multiple choice and short answer questions, as well as video and image entries. Incentives are often provided for successful completion. Remote ethnographic methods like dscout leverage recent advances in technology to recruit participants from areas that are more difficult to access, such as rural regions.

Of the 726 people who expressed interest in our Mission, 311 had kids at home between 5 and 10 years old. Additional screener questions allowed us to refine our participant pool based on demographic metrics and individual characteristics, such as the level of detail they provided in video responses. Given our focus on equity and opportunity, we invited lower income households (56 potential cases) and oversampled rural applicants. The final 33 participants lived in 21 states. About half (52%) considered their area suburban, 30% rural, and 18% urban. Eighty-five percent reported a household income of less than 50K/year. About half (48%) identified as white, 33% as black/African American, and 21% as Hispanic/Latinx. Participants ranged from 21 to 54 years old and the majority (79%) were female. A third were single parents. The focal children were 64% female and most (68%) went to public schools. The final sample was kept small in order to explore the potential of the method. We chose a diverse sample to understand the types of data and questions we might be able to answer in future mobile ethnography work.

Over the course of 20 days, parent participants completed a three-part Mission. Our study was designed to understand how parents perceive their child's learning activities with technology, as they are often the primary brokers of resources. As such, the Mission questions were directed to parents. The first part was a diary study, asking scouts to submit five entries over seven days "telling us about how [their] child learned with the help of technology that day." Each entry included a photo of what their child worked on, a video describing the activity, and six additional multiple choice or ranking questions that asked parents to help us categorize these moments. A total of 169 unique diary entries of learning moments were submitted. The second part consisted of 10 questions focused on parent perspectives and practices regarding privacy and safety online. The final part asked 13 questions including reflections about their child's learning with technology and additional family demographics. The primary researcher corresponded daily with the scouts using the in-system messaging feature. Participants were paid $75 for their time.

After all participants completed the Mission, we downloaded the data from the dscout platform for analysis. Survey responses were downloaded as a .csv file and descriptive analyses were conducted in SPSS. Video and image submissions were downloaded as .mp4 and .jpg files respectively. Automated transcripts of the videos were included in the .cvs file download. We pulled transcripts into individual case files for each participant and a 6-person research team corrected transcripts and annotated open-ended notes for each case. Analysis is ongoing and the research team is currently discussing cases and emergent themes for systematic coding of the dataset.

Results

Using a remote diary study method allowed us to capture contextualized qualitative and quantitative data on the learning moments that parents identified during their family's daily life. Below we offer preliminary findings that illustrate the types of data and results we are able to produce using this method.

Opportunities and excitement

Parents are enthusiastic about the opportunities that technology provides to help their child learn. And this is true for both interest-driven pursuits and more formal academic learning. When asked to indicate how their child learns with technology in general (Figure 1a), every parent in our sample believed their child finds new interests or learns more topics they are already interested in. Nearly all think technology supports their child in establishing core literacies of reading and mathematics, and approximately 75% indicate learning related to enrichment topics and supporting their child to complete school assignments. These same categories were frequently identified across the 169 learning moments captured. Math or reading accounted for 56%, while interest-driven learning was tagged for 48%. Over a quarter (27%) were related to homework assignments, and 18% were categorized as learning art, music, or language.

Challenges and concerns

Many parents also face challenges in making these generative learning opportunities a reality for their children. This was the case for over three quarters (79%) of our sample. Finding good content is an issue for 60% of parents, over half struggle with the cost of subscriptions, and a quarter have trouble with stable Internet (Figure 1b). All parents in

the sample had concerns about their child's use of technology. The most frequent were worries about too much screen time (76%), seeing inappropriate content online (70%), and encountering online predators (61%).
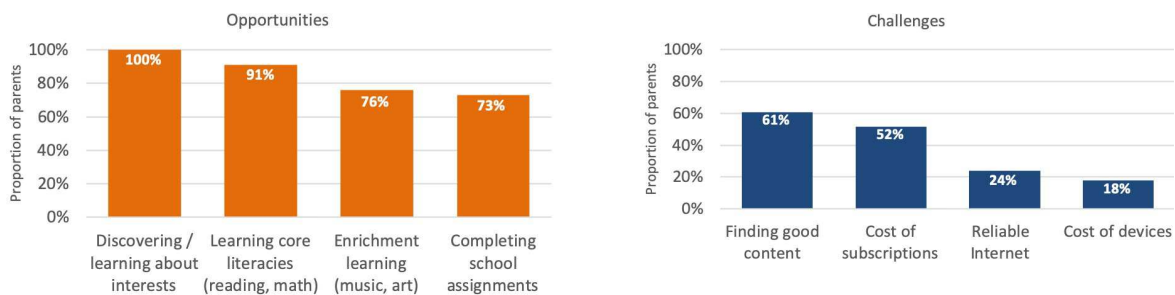

Figure 1. (a) Learning opportunities with technology & (b) Challenges faced in providing quality opportunities.

What this looks like at home

Learning moments at home were rich and varied. Figure 2 includes pictures shared during the study: a six year old engaged in a counting activity on a free educational games website, a YouTube video about the solar system, a collaborative simulation game called Hay Day, a digital library of Spanish and English books, and an Amazon echo used to query information about music the family is listening to. Two case portraits are offered below.
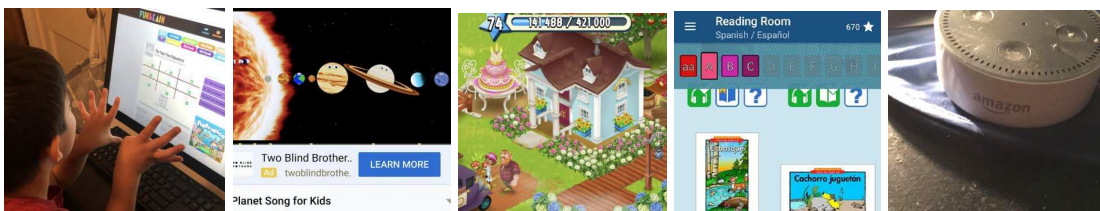

Figure 2. Examples of images of child learning moments with technology submitted during the diary study.

Ashley

Ashley, a white 33-year-old mother of three living in suburban Tennessee, shared diary entries focused on her fourth-grade daughter, Madison, who has struggled with math at school. Ashley reports her family income as less than 25K, placing her below the national poverty line. She is a homemaker with an online craft business. Ashley estimated that Madison used technology for 11 hours during the study week. All five diary entries focused on Madison playing online math games, Prodigy and Splash Math, introduced at school and accessed at home and while waiting for appointments. Both games facilitate procedural practice aligned with grade-level standards within a personalized/customizable fantasy world and include assessment dashboards. The games are also social spaces and Madison sometimes interacts with her younger siblings' characters around both math and non-math related content. She likes to show people her progress, evidenced by the dashboards and improved grades on math tests. Ashley mentions that Madison used to play other games when she came home from school but as she saw her grades improving, she was incentivized to hop on her math games first. During the study, Ashley had trouble logging into one of the math games and had to proceed as a guest with limited functionality. In addition to issues of access, Ashley found it challenging to find good content and pay for subscriptions and devices. She has concerns about people who are not who they pretend to be infiltrating her children's online games and uses device controls that mediate when her children can chat in online systems. Ashley wants to ensure that her children are not "glued to a screen 24/7." She believes that growing up an "AOL kid" helps her navigate how her children use technology, and her social networks, including Facebook, friends, family, and teachers, familiarize her with current issues.

Imani

Imani is an African American 42-year-old single mother of three children. Her diary entries focus on her fifth-grade middle child, Monica. The family lives in urban southern California. Imani, a college graduate, is employed full time in the education sector. She is enthusiastic about technology for learning, and estimated that Monica spent 35 hours using technology during the diary study week. Every entry focused on a unique activity, showing the range of learning

Imani observed. Like Madison, Monica used a school-based personalized learning platform to do assigned math homework. Monica had used the site, IXL, since she started elementary school. During the study she accessed it on her mom's phone in the doctor's office waiting room. In another entry, Imani found a how-to website that guided her to safely carve a pumpkin at the kitchen table. Imani appreciated that her daughter could use how-to guides to engage in complex creative activities while Imani was busy with her other children or cooking dinner. When school was cancelled later in the week due to local wildfires, Monica used the local FOX News website to learn about the fires and evacuations. She wrote about the topic for her current events homework and was eager to share what she learned with her mom, friends, and teachers. In a final entry Imani described Monica using an app to make a short Halloween-focused video with her friends. The girls wrote scripts, designed costumes, and used the app to film, edit, and share the resulting video with friends. Imani saw the process teaching her daughter about important collaborative skills such as, "how to get along with people, how to hear, how to include others." Reliable Internet is Imani's primary challenge and she worries about predators or strangers online. She describes "always paying attention" by keeping close tabs on what her daughter is looking at, having control of all passwords, and blocking inappropriate content.

Implications and future work

Our early findings from a diary study underscore significant opportunities to leverage technology for powerful learning at home but also make clear the need for parent support. The diverse group of parents in this sample were enthusiastic about the learning they observed. At the same time, parent entries indicate that children are having vastly different experiences that varied in the extent to which they connect digital experiences to the real world, nurture imaginative capacity, inquiry skills, and core academic skills. Flexible repertoires of practice are needed as parents learn with and from their children's playful learning activity (Gutiérrez & Rogoff, 2003) and many parents want help navigating this ever-changing landscape (Rideout, 2014). Developing a robust cross-disciplinary research and design agenda that can help capitalize on the opportunities offered by rapidly changing digital resources is a high priority for the Learning Sciences. We need basic science to conceptualize variability in experience and outcomes coupled with design-based approaches that offer new forms of curation, insight sharing between parents, and ways to help educators understand and nurture home-based ecologies linked to school. There is ample room for innovation building on mobile diary studies in combination with longitudinal design-based interventions and assessments designed for use by parents, children, and the designers who are benefitting from their engagement.

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