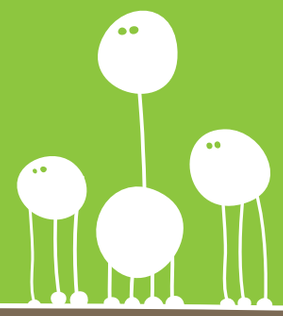
the new coviewing:

designing for learning through joint media engagement



By Lori Takeuchi and Reed Stevens

with Brigid Barron, Erica Branch-Ridley, Mindy Brooks, Hillel Cooperman, Ashley Fenwick-Naditch, Shalom Fisch, Rebecca Herr-Stephenson, Carlin Llorente, Siri Mehus, Shelley Pasnik, William Penuel, Glenda Revelle

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Sesame Workshop and LIFE Center

table of contents

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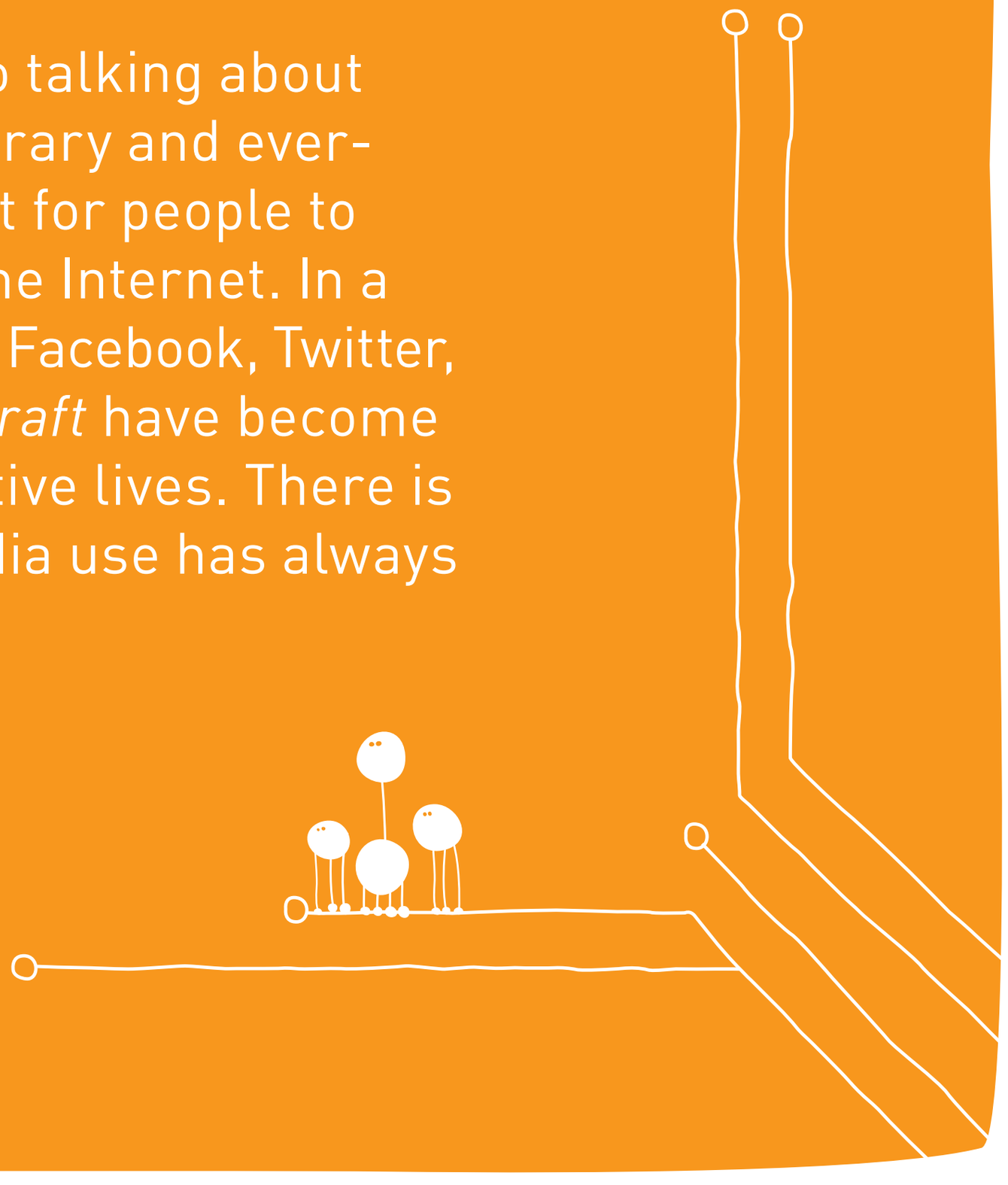
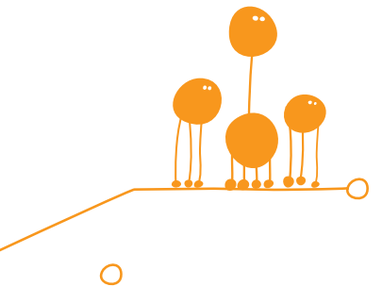
introduction

We have grown accustomed to talking about *social media*—those contemporary and ever-expanding platforms that exist for people to create and share content on the Internet. In a mere decade, social media like Facebook, Twitter, *Second Life*, and *World of Warcraft* have become ubiquitous parts of our collective lives. There is a sense, however, that all media use has always been, at least in part, social.



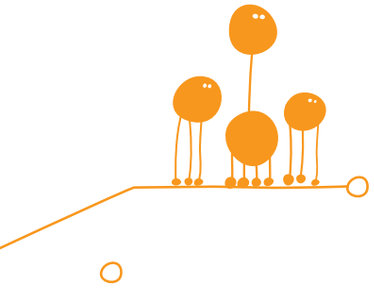


Social is a word that can mean many things; one of the things it clearly means—to borrow phrasing from sociologist Howard Becker—is "doing things together" (1986). When people comment on Facebook posts, mount a collective quest in *Azeroth,* or report a tweet, they are clearly doing things together. What of other, more traditional media like television, radio, console video games, and personal computers, not to mention books and other print media? Contemporary field research about experience with both new and older media show that there are aspects of *all* media experiences that are social. In what ways are they social? Are there ways we can design differently to take advantage of neglected opportunities for social interaction and engagement, beyond and in addition to those innovations that have been built into the platforms we are currently calling social media? How can we design *outside* the interface?

One of the most basic senses in which all media are social is that when people are engaged with them—perhaps as individuals—other co-present people are often drawn to get involved. If, for example, the medium is television, conversations may happen during the program or during commercial breaks. These interactions also may happen "around the water cooler" after programs have aired and people convene again together to discuss. This is a particularly common experience, we assume, with serialized content (e.g., sci-fi mystery series *Lost*) or sports. To take another example: If you have ever watched a young person try to play a video game alone when other young people are in the room, it quickly becomes clear that others gravitate toward being involved. Other young people sometimes want to play, but just as often they want to comment or offer advice about how to play. These are forms of social engagement around media that are not visible in the media itself; they happen in the room and are ephemeral. Their ephemerality, however, should not be mistaken for inconsequentiality (Stevens, Satwicz, & McCarthy, 2008). Indeed, these forms of *joint media engagement* are no less social than those fostered by the eponymous versions. In fact, shared attentional focus on media in real time is a powerful interactional resource not found in most contemporary asynchronous social media, and

We need to better understand how people use media together and how individuals interact with and around all forms of media

Learn more



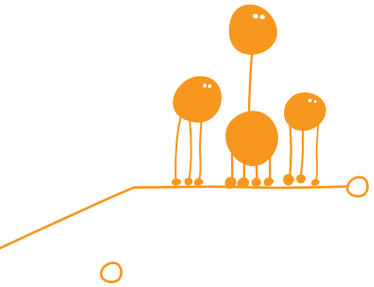
researchers across a range of disciplines highlight the importance of joint attention for learning and meaning-making (e.g., Barron, 2000, 2003; Brooks & Meltzoff, 2008; Bruner, 1983, 1995; Goodwin, 2000; Meltzoff & Brooks, 2007; Stevens & Hall, 1998; Tomasello, 1999, 2003).

The vast landscape of media use—inclusive of so-named social media as well as a dizzying variety of other media—calls for new focus on the ways that people engage with media together. The stereotype of singular engagement in media has influenced how media are designed—as if all users are isolated individuals. It is time for that to change. We need to better understand how people use media together and how individuals interact with and around all forms of media, especially those that dominate young people's time and experience. As we come to better understand joint media engagement, our methods of designing will undoubtedly change so that we may better take advantage of the unique capacity of human beings to work, learn, think, and make things together. That is the hope of this report and the developing multi-organizational partnership it represents.

about the initiative

On November 10, 1969, the first episode of *Sesame Street* aired on public broadcasting stations across the country. As the first educational television program to base its content on laboratory and formative research, *Sesame Street* was often referred to by Joan Ganz Cooney, the show's creator, as an "experiment." Researchers both within and external to the Children's Television Workshop (CTW) studied, among other things, the roles that parents and others in the room can play in enhancing the viewing experiences of preschoolers. They discovered that children learn more if parents *coview* the program alongside them (e.g., Reimer, Tessmer, & Phelps, 1984; Salomon, 1977). Nearly four decades later, in December 2007, Sesame Workshop (formerly CTW) created The Joan Ganz Cooney Center, an independent R&D organization whose mission is to explore the potential of digital media in deepening children's learning. Keeping to its institutional legacy, the Cooney Center is investigating coviewing as it may occur on digital platforms through a series of projects nicknamed "the *new* coviewing."

The LIFE Center has also focused on social forms of learning with media since its inception in 2004, albeit through more basic forms of research than the Workshop's product-driven cycles. An overarching mission of this multi-institution collaboration has been to identify and investigate underlying principles of how people learn socially by strategically sampling learning across settings, domains, and ages, and by using multiple methodologies to create an integrative synthesis. A subset of LIFE researchers—Reed Stevens, Brigid Barron, Roy Pea, and William Penuel—has been particularly interested in how media can provide contexts for people to jointly create

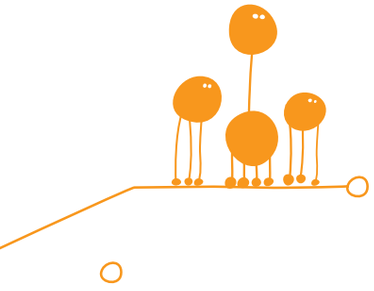


meaningful connections among representations, interests, and experiences. The term *joint media engagement* (JME) was first coined by these researchers to describe the variety of spontaneous and designed experiences of people using media together, including the coviewing experience *Sesame Street's* producers have been interested in from the start.

With the realization that joint media engagement and "the new coviewing" describe essentially the same phenomenon, the Cooney and LIFE Centers joined forces in early 2010 to explore this territory together. The Cooney Center and the LIFE Center applied for a grant from the DML Hub to fund a multidisciplinary seminar on the topic of JME. On November 9, 2010, the two Centers co-hosted the *Workshop on the New Coviewing: Promoting Young Children's Learning with Digital Media* at Northwestern University's School of Education and Social Policy (SESP) with additional funding from the Corporation for Public Broadcasting. The daylong event brought together two dozen learning scientists, developmental psychologists, communication scholars, media producers, and philanthropists to identify key challenges in researching and designing for JME. Participants made use of the School's state-of-the-art Baldwin Studio to engage the group in a bit of JME during the event, projecting videos on the walls for all to watch together and ground conversations in real cases of JME. At the end of the day, participants prioritized issues of concern and research questions to tackle, and agreed to continue these conversations into the future. Thus, the first cross-sectoral community devoted to understanding and designing for JME media was born. (See **Appendix** for the workshop agenda and list of participants.)

The stereotype of singular engagement in media has influenced how media are designed—as if all users are isolated individuals. It is time for that to change.

In the year following the Northwestern workshop, the Cooney and LIFE Centers met on three other occasions to further build this alliance. In March 2011, the Cooney Center led a workshop on *The New Coviewing: Supporting Learning through Joint Media Engagement* at the **DML Conference 2011** in Long Beach, California. The workshop opened the conversation up to a wider group of stakeholders, including academics, leaders in K-12 school settings and non-profit youth groups, as well as media designers working in television, games, and museums.



In April 2011 and then again in December 2011, a subset of participants from the Northwestern gathering (namely Sesame Workshop, the Cooney Center, the LIFE Center, Northwestern University, SRI, and EDC), met to map out a series of research and development activities to enter into together, in a manner reminiscent of the productive collaborations CTW held with academic researchers back when *Sesame Street* was still considered just an experiment.

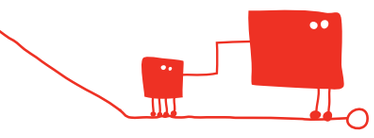
This report captures many of the insights that have emerged from this first year of work together, as well as from the collective decades of experience and wisdom that all involved have brought to these conversations. Here we give Sesame Workshop, Jackson Fish Market, MediaKidz, Nokia Research Center, and others a chance to share their words of wisdom regarding designing and researching for joint media engagement. Future outputs of this initiative will come in the form of new products, systems, and environments that embody principles of effective JME design, as well as new research that uncovers foundational principles about the social underpinnings of learning.

the new coviewing: joint media engagement

Working definitions

"**Coviewing** refers to occasions when adults and children watch television together, sharing the viewing experience, but not engaging in any discussion about the program. Coviewing is considered a form of mediation, because it has been shown to have positive effects on children." (Valkenburg et al., 1999)

Joint media engagement (JME) refers to spontaneous and designed experiences of people using media together. JME can happen anywhere and at any time when there are multiple people interacting together with media. Modes of JME include viewing, playing, searching, reading, contributing, and creating, with either digital or traditional media. JME can support learning by providing resources for making sense and making meaning in a particular situation, as well as for future situations. (Stevens & Penuel, 2010)



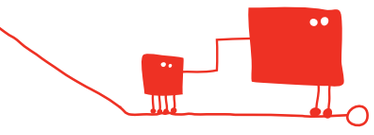
review of the research on joint media engagement

The practice of watching/consuming media (most often, television) with others has long been recommended as a strategy for parents to mitigate the possibility of negative media effects on their children. *Coviewing* also increases the likelihood that children will learn from the media they consume (Buijzen, van der Molen, & Sondij 2007; Nathanson, 1999; Reiser, Tessmer, & Phelps, 1984; Reiser, Williamson, & Suzuki, 1988; Salomon, 1977; Valkenburg, Krcmar, Peeters, & Marsielle,1999; Warren, 2003). Although television remains the dominant media in most homes (Gutnick, Robb, Takeuchi, & Kotler, 2011), the concept of coviewing warrants revision in the contemporary media environment to encompass multiple modes of engagement with diverse digital media.

To this end, the LIFE Center coined the term *joint media engagement* (JME) to extend the notion beyond television and to more broadly describe what happens when people learn together with media (Stevens & Penuel, 2010). Joint media engagement refers to spontaneous and designed experiences of people using media together, and can happen anywhere and at any time when there are multiple people interacting together with digital or traditional media. JME can support learning by providing resources for making sense and making meaning in a particular situation, as well as for future situations.

When it comes to young children, parents are key JME partners. Parents indirectly influence learning by providing particular toys or media and by arranging excursions that provide new experiences and opportunities for conversation. Provision of materials that match a child's interest can encourage sustained exploration of a topic, which in turn can develop content knowledge (Leibham et al., 2005). Parents more directly influence learning when they choose to engage in coactivity with their children, for example, by watching a favorite show, reading books, playing board games, searching for information of interest online, or doing a project together. In these contexts, parents can provide explanations spontaneously or in response to questions, children can learn through observation, perspectives can be shared, and performances can be scaffolded. Joint activities also provide opportunities for parents to communicate the value of specific activities, encourage a sense of efficacy, and model productive dispositions.

This review focuses on JME between children and adults—primarily parents, but also grandparents and teachers. To a lesser extent, we have included literature that examines JME among siblings and peers. Two questions helped narrow the focus of this brief review:



- What is currently known about the social, cognitive, and emotional benefits of joint engagement with digital media? What remains to be discovered?

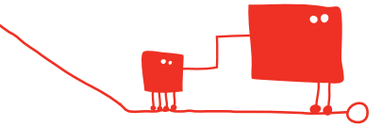
- What research and design methods are being employed or should be employed to answer these questions?

Here we examine the emergent literature on joint engagement involving newer forms of media, highlighting six practices of interest: viewing, playing, searching, reading, creating, and contributing. This group of literature is small but growing, and tends to focus on particular platforms—for example, e-readers or game systems. However, our aim is to look beyond platform-specific features to the types of interactions and relationships fostered by the practices, ultimately unpacking the benefits of different types of participation as they relate to learning.

Television coviewing

Scholars have used the term *parental mediation* to describe the roles that parents play in managing and regulating their children's experiences with television. Valkenburg, Krcmar, Peeters, and Marsielle (1999) identified three styles of parental mediation: restrictive mediation, instructive mediation, and social coviewing. Restrictive mediation refers to rules about the content and frequency of children's television viewing, while social coviewing refers to parents and children watching television together but not necessarily discussing what they watch. Instructive mediation is the middle ground between the two, in which parents and children watch television programming together and talk about it throughout the viewing process. Specifically, instructive mediation focuses on the pedagogical efforts of parents to ask the child questions about what he/she is viewing, to solicit the child's reactions to the content, or to model media literacy skills. Over time, Valkenburg et al.'s scale has proven robust and has been adopted (with some minor changes to terminology and definition) by other researchers interested in coviewing, including Nathanson (1999), Buijzen, van der Molen, and Sondij (2007), and Warren (2003).

One of the earliest studies conducted on parent-child coviewing of television involved Israeli mothers who were asked to watch *Sesame Street* with their 5-year-old children. The study was motivated by concerns that the documented educational benefits of the program (e.g., Ball & Bogatz, 1970) were skewed toward middle class children who self-selected the program; encouraging mothers in low-income families was proposed as a way to improve the learning outcomes for less privileged

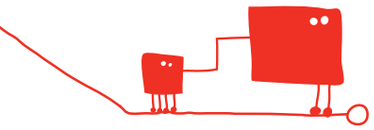


children. The research demonstrated that the "encouragement of mothers had mainly an affective influence for the lower-SES subjects. For them, enjoyment, hence positive affect, may be conducive to deriving benefit from a program such as *'Sesame Street.'* Indeed, it makes them benefit nearly as much as and sometimes more than middle-class children" (Salomon, 1977, p. 1150). Further, several other studies of coviewing and *Sesame Street* also identified comprehension gains when adults and children watch the program together (e.g., Reiser, Tessmer, & Phelps, 1984; Reiser, Williamson, & Suzuki, 1988).

Parental mediation and joint media engagement

New media present a number of challenges to the models of parental mediation first outlined by the research on television (Clark, 2011). Not least of these challenges is the reconfiguration of family entertainment and living spaces. Whereas media use previously may have been restricted to particular rooms within the home due to the placement of a TV set or a desktop computer, mobile devices and wireless Internet remove some of these limitations, allowing media use to be an "anywhere, anytime" phenomenon for families with the financial means to purchase such digital products.

Livingstone and Helsper (2008) note how the size of a computer screen, how users face the screen, and users' reliance on a single keyboard and mouse may complicate parents' application of existing mediation styles to use of the Internet. For example, whereas large television screens and ambient sound may allow parents to casually monitor what children are watching from an adjacent space, small screens on portable computers and mobile devices make this kind of casual observation more difficult. Similarly, children's usage of mobile devices can be more difficult for parents to monitor and mediate, as children can use those devices in spaces that may not have been previously associated with media consumption: the school bus, the car, their bedrooms, friends' homes, and so on. Despite these difficulties, Livingstone and Helsper reinforce the value of parental presence when children use computers—even when parents are not scaffolding computer use as they might do with a television program—noting that when parents are present and available in the context of computer use, "conversation about the online activity, including interpretive or evaluative comments or guidance, is more likely" (p. 589). In a national survey, Livingstone and Helsper found that parents use both "social rules (banning or restricting activities) and technical restrictions (filtering or blocking certain activities)" in managing children's Internet use and that "active co-use," was a regular



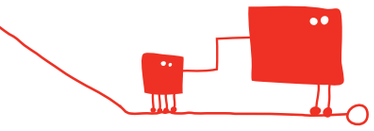
occurrence, with two thirds of parents reporting talking with their children about their Internet use, and almost half coviewing when children used the computer.

Similar strategies can be seen with video games. Nikken, Jansz, and Schouwstra (2007) found that parents, particularly those with negative opinions of games and gaming, used video game ratings and content descriptors to inform restrictive and active mediation of games. Parents who were themselves gamers or who had positive opinions about games tended to play with their children rather than restricting play. These findings echo earlier evidence that coviewing of television is frequently motivated by shared interests and preferences in programming (e.g., Austin, 2001).

Aarsand (2007) describes "asymmetrical relations" (p. 251) between parents and children with respect to assumptions about expertise with computers and video games as both a challenge and opportunity for joint engagement with these media. The so-called "digital divide" through which children are considered to be experts with digital media while adults are positioned as novices becomes a "resource for both children and adults to enter and sustain participation in activities" (p. 251). The resulting tensions can be a challenge to joint media engagement if the digital divide between adults and children is reified with each group engaging in separate activities, or a valuable opportunity if adults step out of typical authoritative or mentor roles and allow children to take the lead in guiding the activity. As such, slight disruption of the balance of power between children and adults can be a powerful motivator for sustained participation.

JME over distances

There are several examples of tools designed to support families in JME when a parent travels or lives separately from the child, as well as tools designed to connect extended family through shared media experiences (in addition to the tools described here, see pages 38 and 52). Yarosh, Cuzzort, Muller, and Abowd (2009) reviewed several systems designed to facilitate communication among

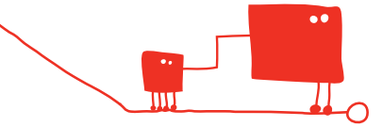


geographically distributed family members. Among them, ASTRA, eKiss, Collage, and Virtual Box use PDAs and mobile phones to enable capture and sharing of images between family members. However, Yarosh et al. are skeptical about the benefits of asynchronous communication between remote family members, noting that currently available modes of remote communication "rarely provide opportunities for the amount and type of contact parents and children require" (p. 97). One alternative designed to address some of the pitfalls of asynchronous remote communication is ShareTable, a system that "augments an audio-visual connection with a shared workspace created by projecting a video of one table surface onto the other" (p. 98). The shared workspace can be occupied simultaneously by both remote parties and facilitates sharing of "normal" activities, such as working on homework or show-and-tell.

As such, slight disruption of the balance of power between children and adults can be a powerful motivator for sustained participation.

In considering opportunities for joint media engagement through contributing and co-creating, design considerations become especially important. While not specifically looking at use by children, Lewis, Pea, and Rosen (2010) discuss the intentional design of Moblitz, a mobile application intended to allow users to go beyond simple sharing of pictures to co-creation of meaning. Moblitz was designed specifically to allow production across distance, share all types of media, support joint attention, and share community context. As the authors note, "today's challenge is to build applications that are global in reach, but local in accessibility" (p. 358).

Beyond the technologies common to kids' everyday media ecologies, other tools, such as augmented reality (AR) systems appear to offer distributed communities unique opportunities to use media together. For example, Pemberton and Winter (2009) examined the pedagogical effectiveness of an AR system called Spinnstube for remote collaboration among adolescent students. The system allowed distant students to communicate via voice link and to work with 3D simulations of artifacts related to curricula about science or cultural heritage. Anecdotal evidence suggests that the simultaneous experience and synchronous communication facilitated by the system create valuable opportunities for joint engagement and learning from media.



Learning together with digital media

There have been very few empirical studies specifically designed to evaluate children's learning through joint engagement with digital media. Penuel et al. (2009) report findings from a large study of preschool children (N=398) whose teachers implemented a media-rich curriculum including video, teacher-led activities, and computer games. Teachers in this study led students in focused viewing and whole-group activities related to the selected video content. Findings indicated that integration of media formats, opportunities for repetition of activities and, of particular salience to this review, use of coviewing and active mediation by the teachers, are associated with students' improved literacy skills. Also significant is the finding that these literacy gains were achieved by students in low-income communities.

E-books in their many incarnations—websites, computer software, electronic consoles (e.g., LeapFrog products), and mobile "apps"—are an increasingly popular platform for parent-child interactions around text. Parish-Morris, Hirsh-Pasek, Golinkoff, and Collins (in review) compared dialogic reading on electronic console (EC) books and traditional print books. Seventy-two dyads comprising 3-year-olds and their parents (N=36) and 5-year-olds and their parents (N=36) were randomly assigned to read either a Fisher-Price Learning System electronic console book or traditional book together. Parish-Morris and colleagues found dyads in the print book condition to engage in more dialogic and content-focused reading than dyads in the EC condition, where more behavior-focused conversation was observed. With the growing popularity of e-books apps on e-readers (e.g., Kindle, Nook), iPads, and other tablet PCs, more research is needed to understand the role that these devices can and should play in supporting joint versus independent reading sessions.

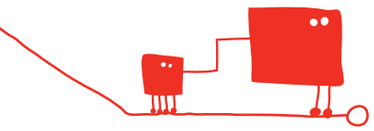
Peer and sibling JME

Stevens, Satwicz, and McCarthy's (2008) naturalistic studies of siblings and friends playing video games together at home examined the spontaneous instances of teaching and learning that players set up among themselves during gaming sessions, as well as how their in-room interactions connect with what's going on inside the game and in their lives outside the home (e.g., school). According to Stevens and colleagues, "collaborative interactions around video game play are good learning environments [in] that 'in-room' interaction provides opportunities for sociality, joint projects,

and empowerment through sharing one's knowledge and seeing it used for concrete success by others" (pp. 52-3).

Research from the Digital Youth Project (DYP) found evidence of youths' learning through joint media engagement with peers in each of three genres of participation—"hanging out," "messing around," and "geeking out"—identified by the project researchers (Ito et al., 2009). JME appears differently within each genre; whereas youth hanging out with friends tended to casually share media by listening to music or watching movies, television, or online videos together in person or online, youth who engaged in JME while geeking out engaged in more intensive activities such as critiquing the media they were viewing, working together to mod video games, or producing digital videos, music, or podcasts. Further, the DYP findings indicate that the genre of participation that appears to present the most possibility for learning is messing around; in terms of JME, it is possible that messing around will be equally important. Here, friends and mentors play important roles in these activities by introducing youth to technological tools, structuring interactions with them, and messing around together to help troubleshoot problems.

This brief review was intended to provide readers with a basic understanding of JME before delving into the deeper issues covered in subsequent sections. Clearly, several questions remain about the educational outcomes and possibilities of JME, but these will be posed toward the end of this report in Future Directions for Research and Development (see page 54).



the basic ingredients of JME: watching tv together

This classic photograph of a family watching TV together depicts the basic ingredients of joint media engagement. At its core, JME involves:

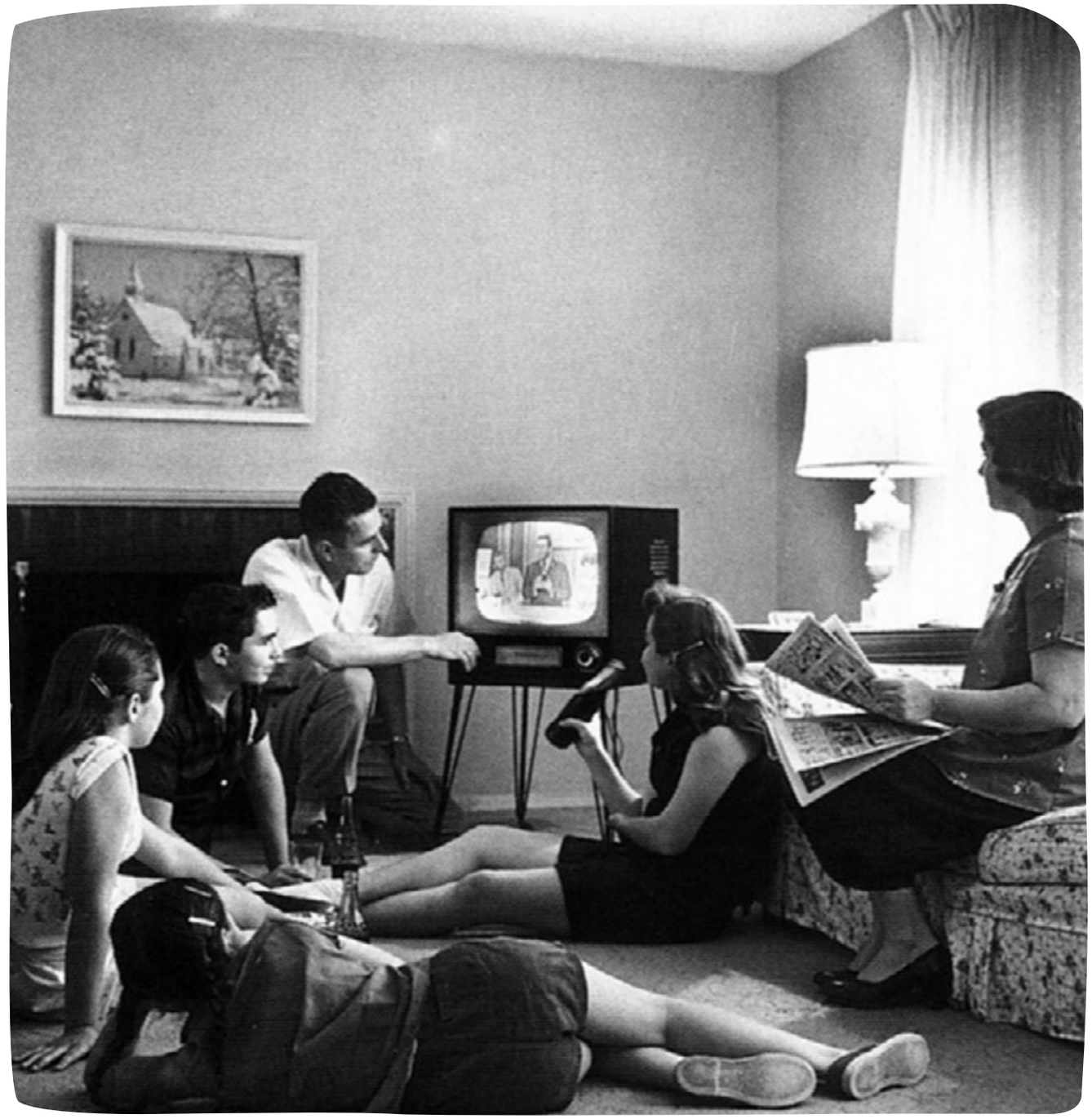
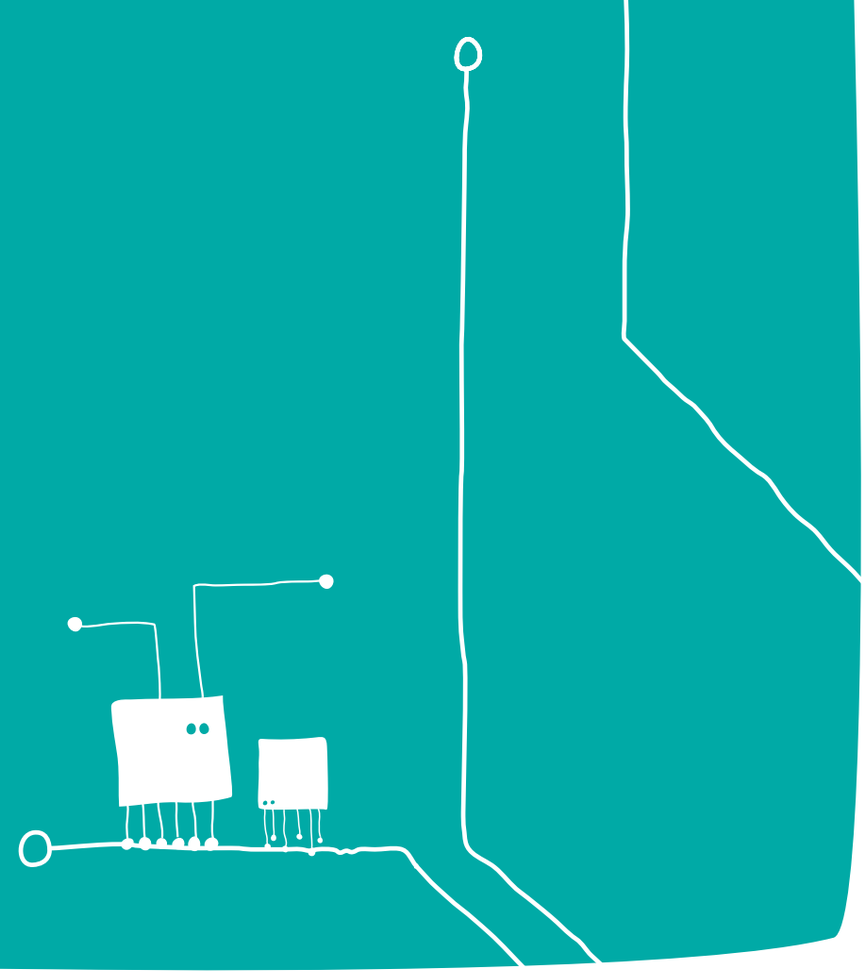


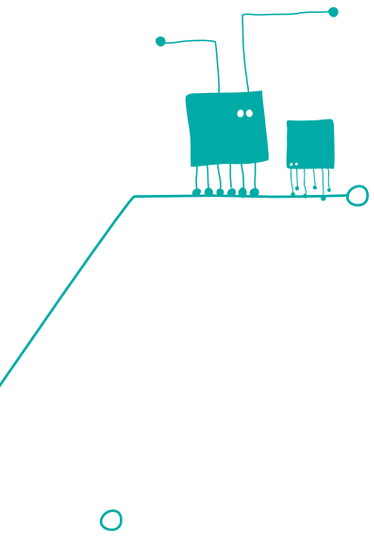
Photo courtesy of National Archives and Records Administration.

case studies of joint media engagement

In this next section, six participants from the November 2010 workshop share the work they have been conducting around issues of joint media engagement. We've classified three as "research cases" and three as "industry cases" to distinguish their origins, though it's worth noting that all six address the challenges of designing for learning.

Cases were selected for the diversity they represent: one takes us into family living rooms to see how preschool-age siblings watch TV together, and another examines the roles that after-school mentors can play in nurturing the technical skills of adolescents living on the South Side of Chicago. Other cases feature video games and e-books. All surface useful insights that have been incorporated into the design principles featured later in this report.





research case 1

Ethnographic field studies of joint media engagement

By Siri Mehus and Reed Stevens

Research questions

For children, the learning benefits of interacting with others and discussing television shows with others while viewing have been well documented. But what do these interactions look like when they occur in children's everyday lives? How are they initiated? What types of media afford such interactions? Are there aspects of the environment that foster or constrain them? And, most importantly, what is it about these interactions that support children's learning? Do particular social arrangements and ways of interacting produce different learning benefits? To answer these questions, we need to begin with detailed understandings of concrete cases of JME as they occur in the real lives of children and adults. However, surprisingly few direct, observational studies on JME in natural environments have been conducted.

The study

Our group has conducted ethnographic field studies of children's learning from video games and television. We record children in their home environments and simultaneously record the screen on which the video game or television show appears, an action which allows us to closely analyze the ways in which children interact with others around media.

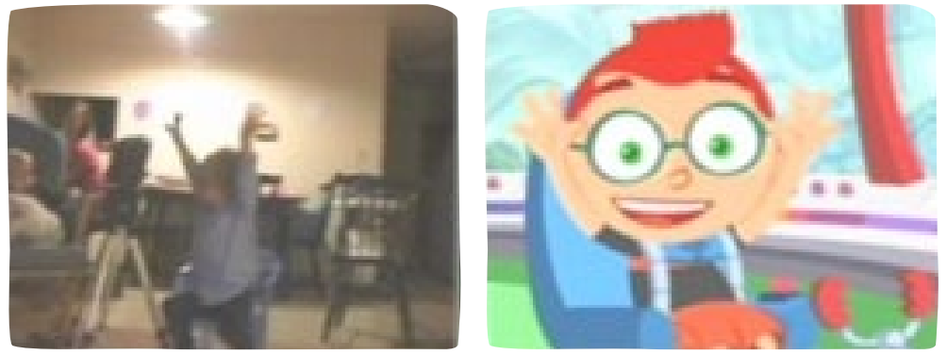
We report here on our recent study of young children's television viewing, which included 16 focal participants from 10 families (half boys and half girls) ranging in age from 13 months to 6 years. Children were observed and videotaped in 1- to 2-hour sessions. We video-recorded at times when children would ordinarily be watching television, and the children watched the shows they would be watching if we were not there. We used one camera to record the children's activity as they watched, and simultaneously recorded the video stream from the television. We then created a split-screen track including both sources of video to facilitate analysis (see figure, page 20). These methods were adapted from a previous study on children's video gaming (Stevens, Satwicz, & McCarthy, 2008).

Approximately 63 hours of video were recorded. Researchers viewed and logged all video-recordings and tagged phenomena of interest for close interactional analysis.

Findings

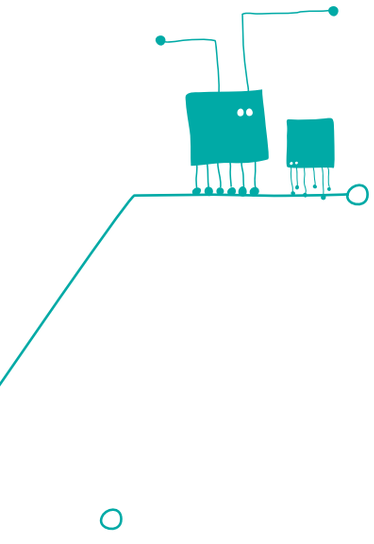
By examining what happens when children watch television in everyday life, we were able to gain insights that challenge common assumptions about television viewing and expand on what has been learned from other types of studies. For instance, our study revealed that

- Joint media engagement is often initiated by children rather than parents.
- Learning interactions do not always relate to the learning goals of the show (and may occur even when viewing "non-educational" shows).
- JME occurs more often when the television is kept in a central area of the home, such as the living room or kitchen, rather than in a separate media room.
- JME occurs with siblings and peers, not just adults.



Split-screen track used in television viewing research.

As part of our analysis, we focused on the ways in which children engage with one another when viewing participatory (or "interactive") shows, i.e., shows that include prompts for viewer responses. We selected events in which children watched one of four such shows: *Go, Diego, Go!*, *Dora the Explorer*, *Super Why!*, and *The Little Einsteins*. Thirty-two such events were identified, involving seven focal children from five families. For each event, we coded the total prompts from the television and each participant's responses to those prompts. These formed the data for a quantitative analysis through which we sought to find patterns of response to prompts across the data set. In order to pursue one hypothesis of how social factors might influence children's actions while viewing, we also conducted a quantitative comparison of one child's rates of response when watching alone and when watching with his sibling. We then followed up with qualitative



microanalysis, which allowed us to identify several learning-relevant modes of interaction in which children engaged with one another around responding to TV. We found that

- Children do not respond to all prompts included in a show (23% on average across our data). There is great variation in rates of response between children and, for individuals, between viewing events.

- One source of variation may be whether children watch with others or alone; our data suggest that children respond to prompts more often when watching with others.

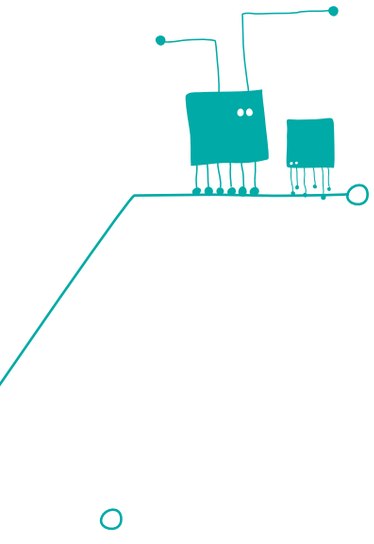
- When children watch and respond to TV together they are participating in a social interaction with one another that is mediated by the television (they are not just independently responding to the same show).
  For instance,
  - o Children imitate each other's responses.
  - o Children coordinate their actions to respond in unison.
  - o Children elaborate on each other's responses.
  - o Children engage in discussions triggered by the prompts and responses.

- Children learn from one another how to respond to television. Older children can serve as models and even explicitly guide and encourage younger siblings to respond.

These interactions offer opportunities for learning beyond those "built in" to the show. As such, watching with others not only makes children more likely to engage with a show and benefit from its intended learning opportunities, but also provides a way for children to *create their own learning opportunities*.

Implications for design

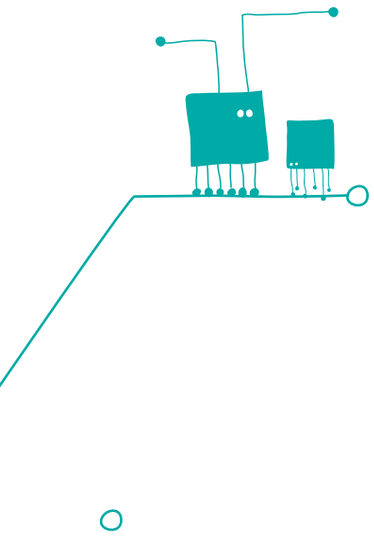
Given the hectic pace of contemporary family life, parents may be able to engage with their children around media more often when media sources are kept in central areas of the home, where viewing children are observable as parents engage in other tasks. Technological solutions for remote coviewing can also be developed. We further suggest that parents can enhance the quality of JME interactions by allowing children the opportunity to initiate them and guide their direction; i.e., if, rather than pursuing their own agendas for children's learning (or those of the television show), parents attend to their children's reactions to the television and elicit and respond to their comments.



research case 1

Children may engage more actively with participatory shows (i.e., respond to more prompts) when they watch with others who are also actively engaged—especially peers. Our data suggest that television producers should be challenged to design "interactive" shows to not only facilitate interaction between a single child and a screen, but to rather take advantage of the powerful learning opportunities that arise when viewers interact with one another around a television show.

Siri Mehus, PhD is a Research Scientist for the LIFE Center, and Reed Stevens is Professor of the Learning Sciences at Northwestern University.



research case 2

Active engagement with media in the Ready to Learn/PBS Kids study

By William R. Penuel, Carlin Llorente, and Shelley Pasnik

The learning problem

Young children from low-income families are far less likely to enter kindergarten with foundational early literacy skills than are their more economically advantaged peers, putting them at high risk for later reading difficulties (Snow, Burns, & Griffin, 1998). Addressing this gap early is critical, as longitudinal analyses show that elementary schools do not close the reading achievement gaps between low- and middle-income children present at kindergarten entry (Alexander, Entwisle, & Olson, 2007).

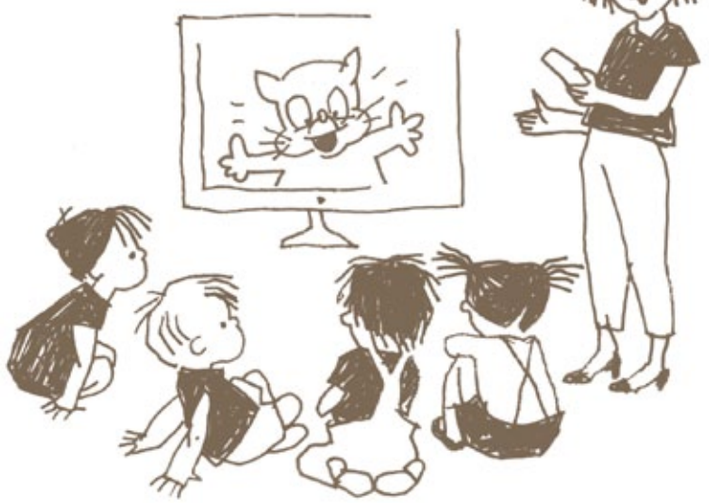
Research question

The challenge for the Corporation for Public Broadcasting and the PBS-led team of producers, curriculum developers, and researchers in the most recent round of Ready to Learn (RTL) funding was to identify strategies for integrating media content from the group's educational television programs into a curriculum supplement intended for use in preschools. The goal was to design and study materials that were both highly interactive and effective in helping students most at risk for later reading difficulties improve their early literacy skills. The overall goal of our research was to address the question: *Can integrating public media content from different platforms into curriculum materials improve literacy outcomes for young children?*

One of the key design principles we followed was to encourage and support teachers to be active social partners when engaging children with media. We sought to inspire teachers to direct children's attention in ways that could facilitate language development, including naming and identifying objects, repeating new words, asking questions, and relating the content to children's own experiences (Lemish & Rice, 1986). We also sought to use activities that did not employ digital media, but that provided children with additional opportunities for practice so that we might actively promote media synergy (Neuman, 1995). We also used theories of effective professional development to design supports for teacher learning of active coviewing (Martin, et al., in press).

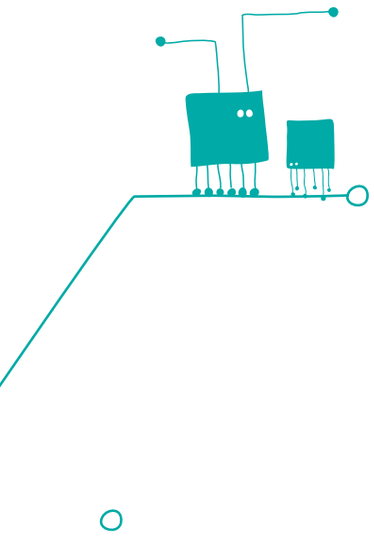
The study

The Education Development Center, Inc. and SRI International partnered to lead the study, which was the culminating study of the summative evaluation of the Ready to Learn Initiative. The study focused on a media-rich curriculum supplement that incorporated activities in which teachers used digital video, online games, and hands-on activities to provide children with a motivating way to gain letter knowledge, knowledge of letter and initial word sounds, and an understanding of print concepts. These media-rich activities employed digital content from three public television programs that aim to support literacy learning among preschool-aged children: *Sesame Street, Between the Lions,* and *SuperWhy!* Integral to the design of the supplement was guidance from coaches, who modeled teacher-led activities and observed preschool teachers implementing the supplement. As part of the evaluation of the supplement, we conducted a cluster randomized trial with 436 children in 80 preschool classrooms to estimate the impacts on early literacy skills.



Design and methods

We used an experimental design to estimate the impacts of the curriculum supplement on letter identification, the sounds letters make, the initial sounds of words, and concepts of story and print. We assigned a total of 80 preschool classrooms—each serving primarily low-income children—to either a treatment or treated control condition. In the treatment condition, we provided teachers with professional development and necessary materials to implement the media-rich literacy supplement. In the control condition, we provided professional development and necessary materials to implement a supplement focused on science. We instructed teachers in both conditions to continue to implement their regular literacy instruction during the study.



Findings

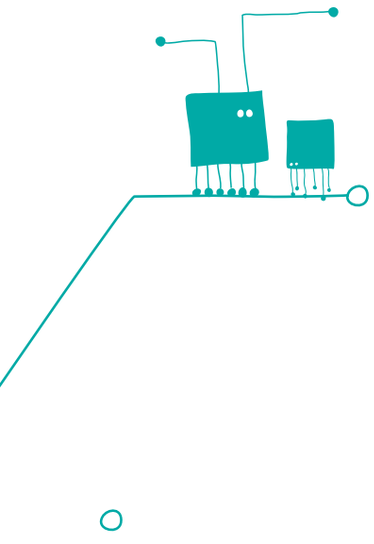
Children from classrooms assigned to the media-rich literacy supplement showed positive impacts ($+0.20 \leq d \leq +0.55$) on the ability to recognize letters, sounds of letters and initial sounds of words, as well as concepts of story and print. We also found that student gains were related to students' initial literacy levels (students with the most to learn gained more). Student gains, however, were not related to teachers' coviewing with children in the study.

Implementation findings did show how frequently teachers engaged in active coviewing during the study. During sessions when coaches were present, treatment teachers led activities in 72% of the sessions and co-participated in activities 38% of the time, indicating that in most of those activities, teachers mediated engaged coviewing with children. In just 20% of the sessions when coaches were present were teachers observed to engage in activities unrelated to the intended supplemental activity.

Implications for design

The study did not identify which components were critical for impact; however, our design adhered to some core principles:

- Focus on a few core skills, rather than on literacy more broadly.
- Provide intensity of exposure and repeated opportunities to practice those skills.
- Establish a rhythm of moving between different media-based activities and interactive classroom activities.
- Consider the teacher a partner in implementation: Provide both the technological and pedagogical supports teachers need to implement supplements.
- Encourage adult mediation of media engagement by embedding direction in media (e.g., "pause points" presented on screen) and teacher materials (e.g., directions for things teachers can say).



What next?

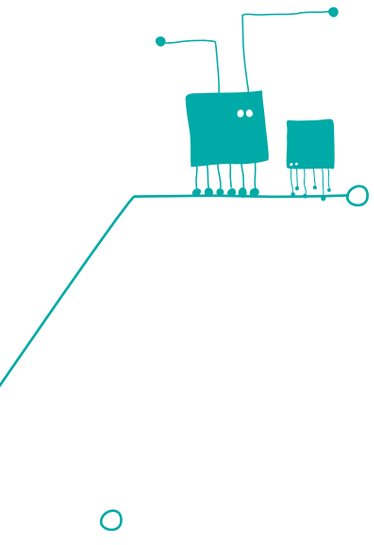
We are continuing as evaluation partners on the CPB-PBS Content Alliance, where we will engage in a number of studies that can inform the design of supports for active coviewing—or as we refer to the phenomenon now, joint media engagement.

- A need study conducted in preschools and afterschool programs that will identify gaps and opportunities in current literacy and mathematics practices that could be addressed through joint engagements with media.

- A need study conducted with parents that will identify gaps and opportunities for engagements with media that could connect home and school literacy and mathematics practices.

- Implementation and efficacy studies in preschools and afterschool programs of interventions that integrate transmedia gaming suites into multi-week interventions in reading and mathematics.

William Penuel, PhD conducted this research as Director of Evaluation Research at SRI International, and is now Professor of Educational Psychology and Learning Sciences at the University of Colorado. Carlin Llorente is a Senior Researcher for the Center for Technology in Learning at SRI International. Shelley Pasnik is Director of the Center for Children & Technology at EDC. Penuel and Pasnik co-led the research for the RTL grant.



research case 3

Case studies of joint media creation as a form of JME

By Brigid Barron

Research questions

Over the past seven years we have been studying the conditions under which young teens become involved in digital media hobbies that involve designing and making expressive and functional artifacts. These items include activities like robotics, programming, movie making, animation, game design, web design, and the creation of visual art. We came to this work with a learning ecology framework that directs our attention to how configurations of activities, resources, and learning partnerships provide opportunities for learning within and across settings, and an interest in the ways that learners might pursue their own learning once they became passionate about a genre of production or content domain (Barron, 2004; 2006). We sampled different communities and learning environments in order to understand the dimensions of spaces and places that engage young people and can bridge divides associated with differential access to tools and learning opportunities. Thus, in this research case, joint media engagement refers to the co-creation of digital media artifacts rather than co-watching professionally created shows or co-game play. Our research question concerns how parents, peers, and mentors jointly engage in the activity of making and creating.

The studies

We have carried out multiple longitudinal case studies. Here we focus on two samples: The first was an affluent sample of eight youth from Silicon Valley, each of whom had at least one parent involved as a knowledge worker in the technology industry (Barron, Martin, Takeuchi & Fithian, 2009). The second was a study of nine youth from the South Side of Chicago attending a hybrid school and afterschool program focused on providing access to learning opportunities. In this group, no parents worked as knowledge workers and family income levels ranged from low to middle.

Findings

In our Silicon Valley samples, we found that the onset of participation in these kinds of activities is strongly linked to teens' social networks and more broadly to their learning ecologies. Friends, teachers, parents, museum staff, and informal mentors were often instrumental in sparking and sponsoring activities that become passionate expressive

JME to critique and improve a live performance.

pursuits. Parents frequently co-engaged with their children in these generative digital hobbies in a variety of ways, ranging from collaborative work where both child and parent learned as they went, to more distal facilitators of activity when they chose to provide access to resources that were needed for learning (other categories included brokering, teaching, learning, employing, and consulting on non-technical aspects of projects).

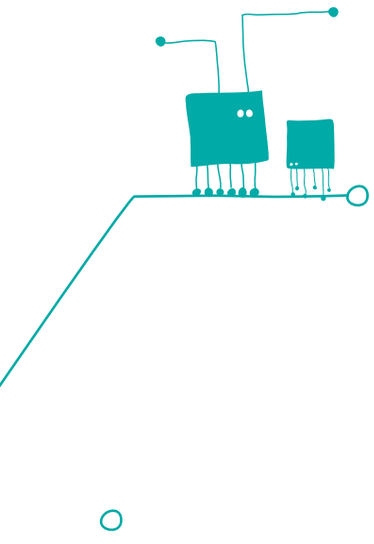
Once engaged and interested, young teens in both Silicon Valley and Chicago pursued opportunities that advanced their own learning by creating new learning opportunities for themselves; frequently this happened across the settings of home, community, school, and through online and distributed resources. In Chicago, laptops were given to all sixth graders in the DYN school, which made this exploratory learning possible. Across the two sets of case studies we also observed that

- The breadth and depth of parent or mentor joint media engagement was correlated with child expertise, suggesting it is consequential for learning.

- Parent and mentor expertise with technology was correlated with the depth and categories of JME. Adults with more expertise were able to teach and broker more easily. Adults with less expertise found it easier to be a learner or to collaborate.

- Mentors were attentive to the child's level of commitment when choosing whether to give them extra attention, and learners were observed to actively recruit mentorship.

- Mentors and parents sometimes missed opportunities for JME because they were unaware of a child's digital media-making hobby.



In the Chicago cases, *JME-Creation* (JME-C) was sometimes used as a learning tool in order to improve a real world performance. For example, in the figure on the previous page, we see a mentor and a group of boys jointly studying a just-filmed spoken word performance. They use this artifact to offer suggestions for improvement to the young spoken word performer.

Implications for research and design

- Study ways that parents can be supported to engage in JME-C, even when they don't have expertise. Studies of materials that help scaffold collaborative learning around design-and-create projects would be useful.

- Carry out micro-interactional studies to better theorize cognitive and relational aspects of JME-C. These should include affective components of JME-C, including the contagion of enthusiasm, interest, delight, and laughter, as well as frustration or anxiety.

- Study processes and tools that make visible children's interests in building and making. These can be social (e.g., engaging parents in discussions about their child's hobbies and pursuits as well as their own). Equally important is the study of appraisal processes and roles of stereotypes in occluding perceptions of interest.

- Study cycles of JME-C over time to better theorize how joint work can alternate with solo work to build expertise and interest.

Brigid Barron, PhD is an Associate Professor of Education in the Learning Sciences and Technology Design program at Stanford University, and a faculty lead of the LIFE Center.

industry case 1

Electric Racer: An intergenerational gaming experience designed to promote literacy

By Mindy Brooks, Ashley Fenwick-Naditch, and Erica Branch-Ridley

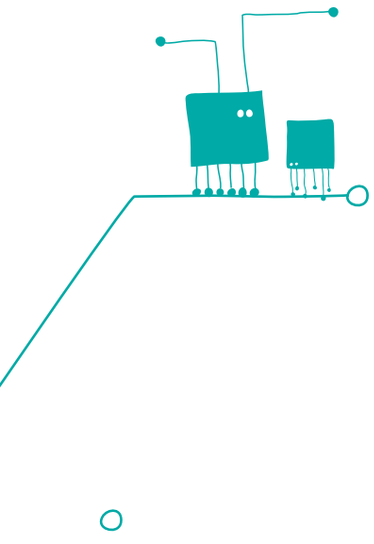
The need

Technology can provide educational opportunities between children and parents when the content, format, and structure are designed in targeted and appropriate ways. At Sesame Workshop, we continually seek to design experiences to engage parents in their children's learning. The idea for an intergenerational computer game originated with generous support from the Corporation for Public Broadcasting and a partnership with the Entertainment Technology Center at Carnegie Mellon University. Our mission was to develop, design, build, test, and deliver a distribution-ready game that engages children ages 6 through 9 and their parents or other adults in interactive play, using curriculum and content from *The Electric Company* (TEC). This project utilized new 3D gaming technologies, as well as innovative two-player game mechanics to "scaffold" learning to support 6- to 9-year-olds' literacy competencies.

Screenshot of *Electric Racer*

The product

Electric Racer is a two-player downloadable driving game designed for a driver and a passenger. The driver is required to navigate through words containing a particular target sound as displayed on the road, while the passenger unscrambles words with the same target sound for extra points.



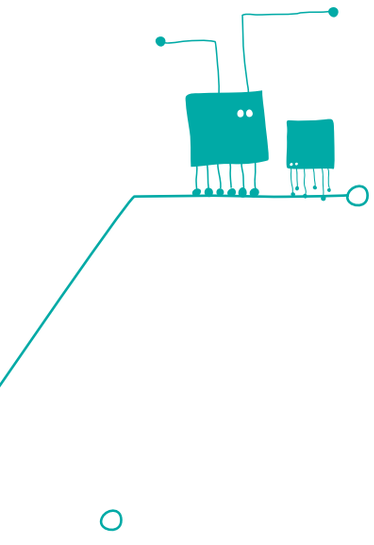
The game supports active participation for both child and adult players through the use of mechanics that differentiate their roles, taking into account the different sets of knowledge and skills that each player brings to the game. To reward the co-play, the more the team works together, the more points the team will receive to unlock new (and more educationally advanced) levels of game play.

The original intent was for the child to play as driver and the parent to play as passenger; however it is possible for the players to switch roles, or for two children to play together. The child's primary role as driver puts the child in control of the racing vehicle, empowering him or her to direct game play and to read and identify the target words. When the parent plays as the passenger, he or she simultaneously "unscrambles" the target words as the child collects them. Although the co-play dynamic is not integral to win the game, the driver is not able to earn as many points without the presence *and* participation of a passenger. Furthermore, if the players choose to do a "role reversal"—having the child act as passenger and parent play as driver—it is not detrimental to game play should the child unscramble only one word during the entire level.

Lessons learned

An integral part of the Sesame Workshop production process is ongoing formative research. The focus for the research team is to give feedback to production in ways that will make the end product as educationally sound as possible. During the formative research process for *Electric Racer*, we became acutely aware that while excitement for an intergenerational game seemed high, parents and children needed more role clarification. Our initial user test found that parents had a hard time understanding that they had a strategic role in the game despite its basic instructions. It often took multiple game plays and/or researcher prompts for the parent to even realize they had a role to play, as evidenced by body position and hand placement on the mouse. Furthermore, even when parents understood that they had a role, they were still uncertain of how to play the game with their child.

The formative research process unveiled that the very nature of a two-player game would not guarantee that parents in particular would know *what* to do or *how* to play—not to mention enjoy the actual game. The questions for the interdisciplinary team (producers, curriculum specialists, and researchers), became "How can



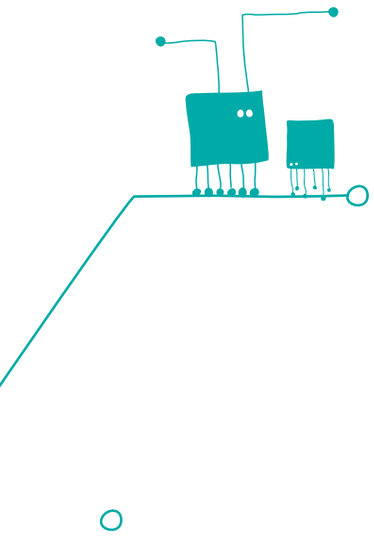
we structure an intergenerational game play experience so that: (a) parents will know they have a specific role to play, (b) the parent's participation will further the learning process for their child, and (c) there will be increases in scaffolding and positive interaction with fewer directives and passive observations (i.e., "Watch out for the word!")?

Through additional formative research we identified three major areas that helped address these questions and that are applicable to *Electric Racer* as well as future intergenerational games: (1) role clarification, (2) a point system, and (3) additional instructional support through added voiceovers, icons, and timeout prompts.

- ***Role clarification:*** We found that typical voice-over instructions were not enough to grab parents' attention and engage them in game play. As a result of testing, we found the interactive video tutorial adds an efficient and even fun way to provide role clarity. The tutorial introduces the players' roles by letting the pair interact with the game for a few seconds, and then follows with further instructions. By initially establishing the roles through an interactive tutorial, the video helped both players feel more comfortable and, as a result, almost 100% of the participants were able to actively, not to mention enjoyably, engage in game play.

- ***A point system:*** We drew attention to the point system through a series of design considerations, such as making the on-screen point tracker have corresponding sounds that reinforced correct answers with both visual and audio cues. In addition, points were highlighted through the scoreboard (or a game summary screen) that clearly delineated how each player performed. We also drew visual and auditory attention to the in-game speed boost feature, which allowed for more collaboration and verbal communication between players, as well as an increase in points. Clarifying the point system throughout the game experience made it significantly easier for players to monitor their progress and to know that their actions significantly influenced their progress.

- ***Instructional support:*** The third element that enhanced role clarification was to provide additional support through small but substantial in-game instructional features. One such change to *Electric Racer* was to add a clickable icon on the dashboard to remind players of the target sound they were looking for. When clicked, this icon repeated the target educational sound the players were supposed to collect, which helped to reiterate game goals and reinforce the educational content. Another small change that made a significant difference was the addition of more timeouts during



the driving course to prompt players to actively drive through the target words. It was through these minor design changes that we brought attention to role clarification and ensured clear articulation of game goals.

What next?

The success of *Electric Racer* has prompted our team to discuss how to expand the game to encourage further intergenerational game play. In particular, the growing presence of mobile technologies may encourage parents and children to more frequently engage in game play together in various settings. Furthermore, mobile technology may also support asynchronous collaboration such that a parent and child might be engaged in ongoing play even when they are not together. We look forward to continual collaboration among producers, educators, game designers, and researchers to ensure that what we create is educational and entertaining for children and their families and also provides a valuable opportunity for them to spend quality time together.

Visit **The Electric Company** website *on PBS to learn more about* Electric Racer *and to download the game for free.*

Mindy Brooks, Ashley Fenwick-Naditch, and Erica Branch-Ridley all work at **Sesame Workshop**, *where* Sesame Street *and* The Electric Company *are made. Brooks is Assistant Director of Research for Domestic Research, Fenwick-Naditch is a Producer in the Digital Media Group, and Branch-Ridley is Assistant Vice President of Platform Innovation for the Creative Innovation Lab.*

industry case 2

Raising the (mommy) bar: Encouraging parent-child interaction during preschool TV

By Shalom Fisch

The need

Research has shown that when parents share stories with their children—whether those stories are in books (e.g., Whitehurst et al., 1988), on television (Lemish & Rice, 1986), or in interactive storybooks (Fisch, Shulman, Akerman, & Levin, 2002)—they don't necessarily just read the stories. In some cases, they elaborate on the stories in various ways, such as by labeling objects in pictures, asking children to predict events or infer characters' emotions, or by tying aspects of the story to children's own lives. Such interactions have the potential to contribute to the development of children's language and literacy.

The product

The fact that such interactions sometimes occur (at least in some families) raised the question of whether television production techniques could be designed in such a way as to stimulate parent-child interaction that might not have occurred otherwise. To that end, my colleagues and I conducted a research study with 58 pairs of parents and their 3- to 5-year-olds, using material from Cartoon Network's *Tickle U* block of preschool programming (Fisch et al., 2008). When it premiered, the *Tickle U* block included a feature that Cartoon Network referred to as the *Mommy Bar*—a stream of text aimed at parents that appeared across the bottom of the screen. The intent of the original Mommy Bar was to engage parents' attention with jokes and information in an attempt to keep them in the room while their children watched television.

Could this sort of approach be used toward more explicitly educational ends? To find out, we adapted the approach to create three different versions of the same half-hour *Tickle U* video. The only difference among the three versions was the type of text that appeared at the bottom of the screen:

- ***No text:*** No text was shown at the bottom of the screen.

- ***Original Mommy Bar:*** The on-screen text presented jokes and (to a lesser degree) general parenting information aimed at parents (e.g., "You're a preschool parent if… you know exactly how long it takes to microwave four fish sticks perfectly.").

- ***Educationally-enhanced Bar:*** The on-screen text presented prompts that were related to the on-screen action and designed to stimulate the sorts of interactions observed in past research (e.g., "Does your room ever get messy?" or "Why is Toto sad?").

Each parent–child pair was observed and videotaped as they watched one of the three versions of the video at home. Results indicated that while watching the version with the educationally-enhanced bar, parents were significantly more likely to make comments about characters' emotions, connect on-screen events to the children's own lives, encourage viewer participation with on-screen games and activities, and somewhat more likely to ask children to evaluate characters' actions. In particular, specific types of interactions occurred during the segments in which they were prompted, supporting the conclusion that the on-screen text was responsible for the increased interaction. By contrast, the original Mommy Bar did not produce such effects.

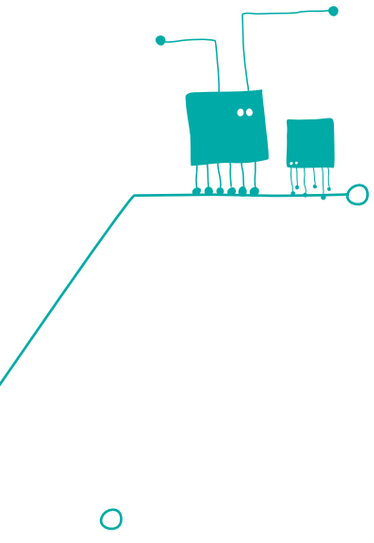
Lessons learned

As our findings demonstrate, something as simple as a line of on-screen text can make a significant difference in parents' (and children's) behavior while watching. Still,

Original Mommy Bar

Educationally-enhanced Bar

Harry and His Bucket Full of Dinosaurs produced by CCI for Cartoon Network, U.S.
Images © Cartoon Network. Used by permission.



not all forms of on-screen text are equally powerful in prompting such interaction. Rather, interaction is more likely to result if the text is tied to on-screen action and suggests specific comments or behaviors for parents to employ, such as:

- Labeling on-screen objects and actions (e.g., “That’s a dog” or “What’s the girl doing?”)

- Retelling aspects of the story (e.g., “What happened?” or “See, he cleaned his room.”)

- Making inferences about characters’ emotions or motivations (e.g., “He looks surprised!” or “How do you think he feels?”)

- Evaluating on-screen events (e.g., “Was that a good thing to do?” or “What do you think they should do?”)

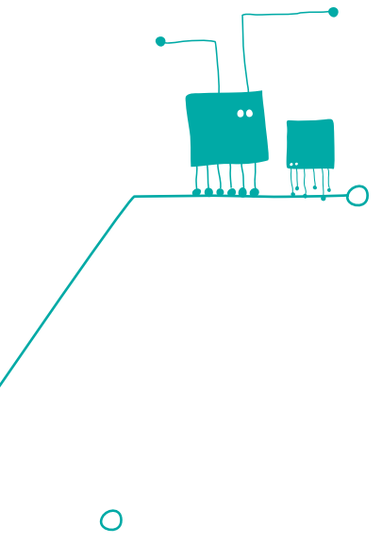
- Tying objects or events to children’s own lives (e.g., “That’s like the time we went to Grandma’s.” or “Ooh, ice cream! Do you like eating ice cream?”)

- Encouraging viewer participation (e.g., “They’re singing the alphabet song. Can you sing it too?”)

Of course, it is important to remember that the purpose of the educationally-enhanced bar was not to force or trick parents into interacting with their children. These particular behaviors were chosen because they represent types of interactions that some parents initiate naturally while watching television with their children, regardless of whether any text appears on the screen. Nor was the bar intended to prod every parent into engaging in every behavior all of the time. Rather, the educationally enhanced bar was intended to serve as a tool that parents could choose to employ—a reminder of the sorts of things they could discuss with their children if they chose to do so, and if they hadn’t already thought to say something similar themselves.

Next steps

In this sense, the data from our study show that the educationally-enhanced bar can be a highly successful tool, from the standpoints of parents and broadcasters alike. In fact, after we shared our results with the international TV production community at Prix Jeunesse, producers in several countries experimented with educationally-enhanced Mommy Bars of their own, and research in Germany found comparable evidence of its effectiveness there. If the content is designed



appropriately, then on-screen text can successfully stimulate important forms of parent-child interaction, which is good news for parents and children alike.

Shalom Fisch, PhD is President and Founder of MediaKidz Research & Consulting, a consulting firm that provides educational content development, hands-on testing, and writing for children's media.

industry case 3

Coviewing: Just for separations?

By Hillel Cooperman

The need

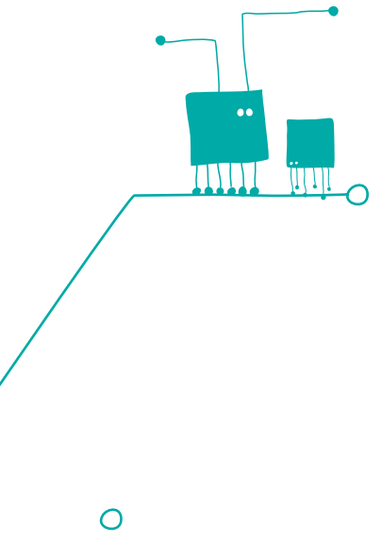
With the mass adoption of the car, the (relative) price accessibility of air travel, and the proliferation of inexpensive long distance communications, families have become more and more separated by significant distances over the last 100 years than at any other time prior. Moving far away no longer means staying disconnected from one's family and friends to the degree that it did in the early 20th century or even earlier. While adults can make their own decisions about these types of separations, often kids are affected by them in challenging ways. In addition to distant grandparents and parents on business trips, in a country currently fighting two different wars abroad, we have tens of thousands of children who don't see one of their parents (typically their father) for as long as a year at a time.

The product

In November 2009, we launched a product that touches on the issues of families separated over long distances. It was (and is) essentially time-shifted coviewing. The

A Story Before Bed

service—*A Story Before Bed* (**www.astorybeforebed.com**)—lets one party record themselves reading an illustrated children's book so that another party can watch that recording (see figure above). The recordings include audio and video that are synchronized with the turning of the pages of the book that autoplay so the viewer can watch the pages turn automatically when the reader turned them. The viewer can also turn the pages themselves, going backwards and forwards in the story and resetting the video to the appropriate location with each page turn. The product works in a standard Flash-enabled web browser on a Mac or PC and on Apple's mobile devices including the iPhone and iPad.



We designed the product to address the issue of separated families, whether their distance was caused by work, military service, or just a Saturday night out for Mom and Dad. We also knew that the service could be helpful for families with divorced parents. When we launched *A Story Before Bed*, we were pleased by the positive reception we received from a public that had never experienced a product like this before. However, we were surprised by a small number of vocal folks who had an initial negative reaction and perceived our product as a high-tech babysitter. Their sentiment: "Oh great! Another tool for lazy parents to use to avoid interacting directly with their kids." We were taken aback, but our eyes were opened. For some, there is romanticism and a higher purpose around the act of reading a physical book to a child. We felt that we were enhancing that experience, making it possible where it hadn't been before, and even preserving the experience for the future. These critics felt like we were trying to circumvent it.

Lessons learned

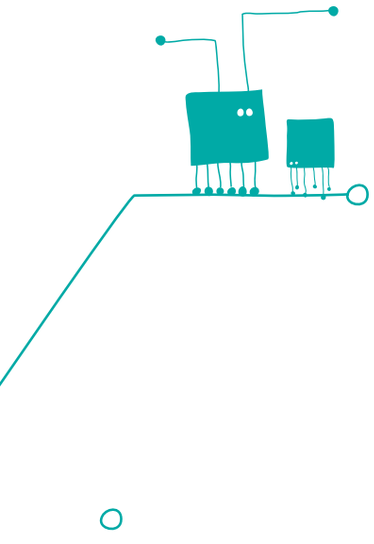
It's been over 18 months since we first launched the product and tens of thousands of people have used it. Through a random sampling of recordings made using *A Story Before Bed*, we've been able to see how our assumptions, as well as some of those early criticisms, have borne out in the ensuing time.

- We underestimated that a number of teachers and librarians would be interested in using the service, in some cases having early readers practice their reading, and in some cases having older readers record stories for their younger reading "buddies" in lower grades and kindergarten.

- Educators for the vision-impaired are using the service to teach American Sign Language. Teachers record themselves signing a book. Then, students can watch the recordings, learn the signs, and finally record their own signing of the story which can then be reviewed by their teachers.

- Speech therapists are using the service to help students practice their diction.

- It's hard to know if kids are present when their parents (or grandparents) record their stories. However, we do get anecdotal reports of stay-at-home moms recording several stories for their child to watch independently while they get work done around the house.



- Almost 18% of the recordings were done by a parent and child (or children) combination. The service was fostering not just time-shifted coviewing/reading activities but fostering synchronous coviewing.

- An additional 24% of the recordings featured only kids (sometimes in groups) recording themselves reading the stories.

- In almost 5% of the recordings, Grandma and Grandpa made the recording together.

- In only 53% of the recordings did individual adults (Mom, Dad, Grandma, Grandpa, or a teacher) record themselves solo reading to a child.

Based on this sampling, almost half of the usage of *A Story Before Bed* was in patterns and configurations for which it wasn't intended.

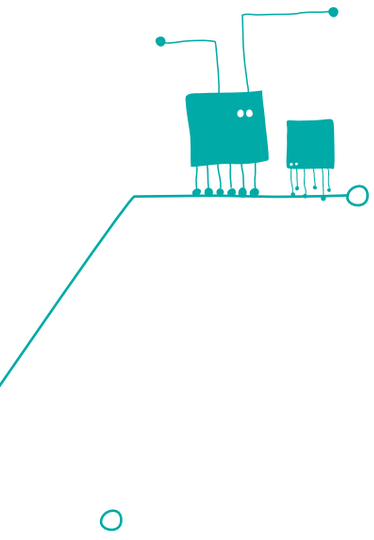
Many of the knee-jerk instincts about how to integrate technology into children's content do not exist in our service. There are no animations, no sound effects or music, and no interactivity to speak of other than turning a page (which is the same degree of interactivity you find in the physical books we all grew up with). The only technology "enhancement" is time shifting the storytelling by a familiar face.

While we haven't yet studied the viewing side of the equation, anecdotal evidence suggests that one reason kids appear on more recordings than we expected is that they love to play back videos of themselves.

What next?

If we've learned anything, it is that understanding how to make a product an essentially seamless part of the fabric of a user's life is a long, slow, and difficult process. We are always making small changes and polishing rough edges to make the experience even easier to use. Enabling recording of stories on iPad 2s created an entirely new physical configuration in which to use our service: lying down in bed. Unsurprisingly, this increased engagement, given that in bed is often where parents read to kids.

Our main focus going forward is finding out just where *A Story Before Bed* is finding its most receptive audience and is as effective as possible in impacting customers' lives. Right now we are studying usage in schools and libraries, looking at how teachers integrate *A Story Before Bed* into their curriculum and what we can do to help

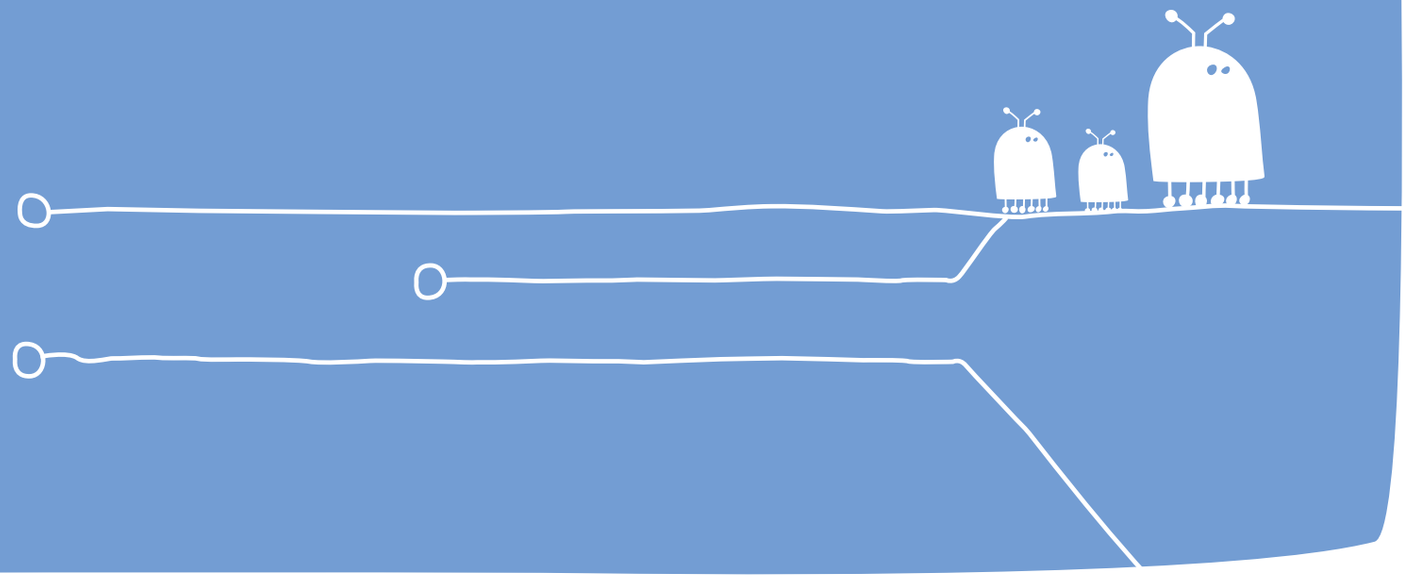


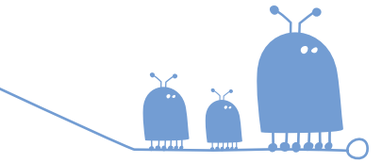
make it more effective. We will also be studying recordings created on our service and what role they are playing in consumers' lives. Finally, we will explore what role feedback loops on consumption (e.g., Grandma can know how many times her grandson watched the story she recorded) could have on overall engagement with customers.

Seattle-based entrepreneur Hillel Cooperman is co-creator of **A Story Before Bed** *and co-founder of* **Jackson Fish Market**.

design guide

In this section, we describe the ideal in JME, *productive* joint media engagement, detailing the predictors of such learning experiences and challenges to them. What follows is constructed to inform the design of future productive JME experiences: seven principles that we believe can help foster productive JME and a set of related factors that media producers should consider in their designs. We end with a measure of success—Story Visit is an exemplary product that embodies many of the principles and factors outlined in this guide.





what are we designing for? productive JME

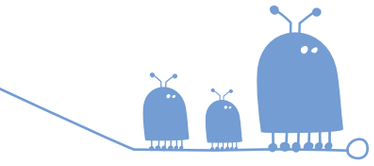
People jointly engage with media all the time. Couples surf the web for shopping bargains, siblings work up a sweat in Kinect Sports matches, and some families still watch primetime TV together. But not all JME is created equal. Certain media-based experiences can result in deeper understanding, inspiration, greater fluency, and physical, emotional, or mental wellbeing than others. These types of experiences are what educators and producers should aim for when designing media for joint engagement. Here we describe some of the conditions and processes that can lead to productive JME as identified across the six case studies. They are ideals and, as such, do not all need to be present for productive interactions to occur. However, each represents an important process that the Design Principles later described (see page 45) were crafted to address.

1. ***Mutual engagement:*** Younger and older, more and less knowledgeable, distant and near partners are equally motivated to participate in the activity and find it sufficiently appealing and/or challenging to sustain engagement throughout. Neither partner is bored nor participates out of sheer obligation to the other.

2. ***Dialogic inquiry:*** Activity should inspire collaborating with others to make meaning of situations. As suggested by the term coined by Gordon Wells (1999), dialogic inquiry often takes the form of conversation, but may be manifest in other communicative interactions. Dialogic reading (Whitehurst,1992), as a specific form of such inquiry that a more capable reader often leads, prompts new readers to repeat words and elaborate on text content, giving them practice in decoding and comprehension.

3. ***Co-creation:*** Partners don't just consume media together; they use media to build things, whether they are artifacts (e.g., comic strips, YouTube videos) or common understandings. Intersubjectivity—shared understandings constructed by people through their interactions—also provides ground for communication and learning (Rogoff, 1990; Vygotsky, 1987).

4. ***Boundary crossing:*** Productive JME spans time and setting. More than just isolated, one-time events, these interactions are stimulated and informed by partners' past experiences, such as a child's fascination with the dinosaur exhibit at the museum. Similarly, they inspire future activity, the way an anime tutorial on YouTube at school might inspire coviewing partners to put pen to paper and draw what was demonstrated later, at home.



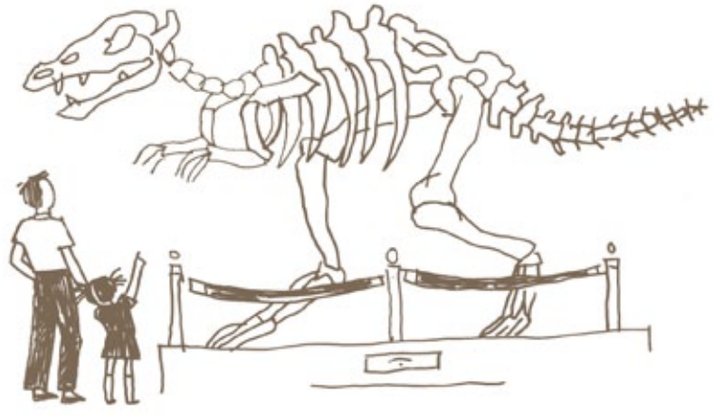
5. ***Intention to develop:*** At least one partner intends for herself or a partner to grow through the activity. A child may aim to level up in a game by closely watching how their brother does it, or a parent may read her daughter bedtime stories to foster her love for books. Intention requires awareness of one's own or another's needs and/or interests.

6. ***Focus on content, not control:*** Partners are able to see through the delivery platform to the content. Technical features and user interface neither distracts nor hinders interactions between partners or partners' interactions with content. Language such as "Don't touch!" or "Wait, not yet." are kept to a minimum, as are scolding gestures and jockeying for controllers.

Challenges to productive JME

As the case studies suggest, it's not enough to make media content educational for partners to derive any benefit from it. There are challenges to achieving productive JME that have little to do with the good intentions of media producers or even media consumers, for that matter. Here are some of the more salient ones that arose in the case studies:

Learn more



- Parents are too busy to sit down with their children around media, or simply absent.

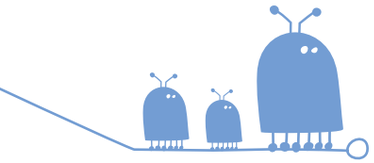
- Available parents may be unaware of their child's learning needs and interests or, even if they are, they may not be versed in how to guide their children using media.

- For the most part, adults and children don't enjoy the same content.

- Desired forms of interaction don't always happen naturally around media.

- JME events have little continuity with or connection to other family activities and experiences.

- Distractions arise that are either environmental or presented by the medium itself.



design principles for JME

How can producers go about laying the groundwork for people to engage meaningfully around media? How can their designs address the challenges mentioned above? The following design principles were conceived from a series of discussions among the report's authors and further refined vis-à-vis the lessons learned from our case studies.

These principles focus specifically on JME among young children and adults, and build upon other established principles of effective learning design. As such, by no means do we consider this list comprehensive in and of itself. Rather, it's a solid start to what will grow into a more complete set of heuristics as we observe more R&D work on joint media engagement across a wider age span.

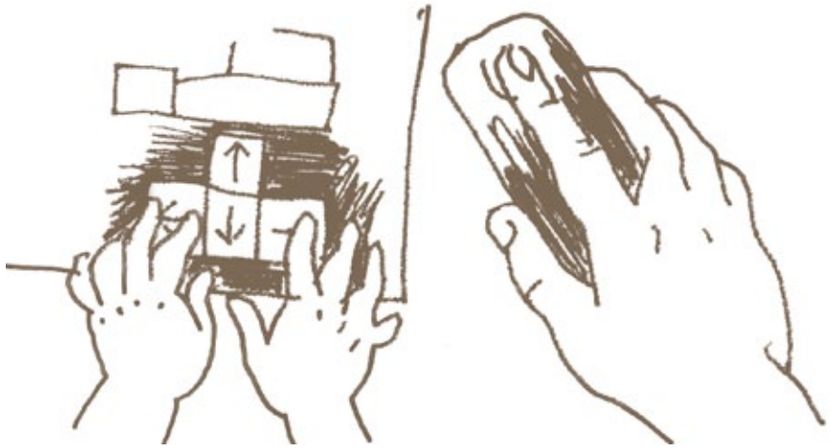
1. Kid-driven

Children naturally take initiative when it comes to learning with media, whether by asking questions about a TV show they're watching, or pursuing a tech-based hobby. Adults can help them achieve the goals they set for themselves, but only if they're aware of what these goals are. Build tools and experiences that revolve around a child's existing interests, not just prescribed topics. To do so, producers need to design mechanisms that make children's interests visible and can assist adults in responding to them.

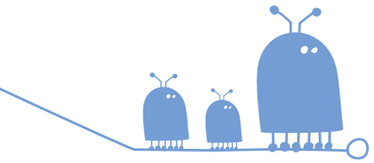
2. Multiple planes of engagement

With vast developmental differences between co-participants, one size simply cannot fit all. All too often, media is designed for the lowest common denominator to the exclusion of all partners' developmental abilities and interests—which merely patronizes and alienates. Keep everyone engaged by offering content that suitably entertains and sufficiently challenges. *Sesame Street* has been using this strategy for over four decades with proven success (Fisch & Truglio, 2001). Children love Elmo and the cartoons, but parents are drawn to sit down beside them knowing that Jimmy Kimmel or Kobe Bryant may make a cameo appearance. *Sesame Street*'s humorous allusions to popular culture may fly right over preschoolers' heads, but they still learn from the show, and learn even more when an adult watches with them (Reiser, Tessmer, & Phelps, 1984).

3. Differentiation of roles



Assigning roles to participants so that tasks and content match up to individual maturity is another way of ensuring that everyone is suitably challenged and/or entertained. This can also minimize confusion over who's in charge of what and mitigate the negative, controlling language that usually accompanies such confusion. Have partners work toward a common goal together, and force them to talk to coordinate their efforts. Interaction often needs to be engineered this way; less structure may fail to elicit dialogic inquiry. Distinct roles, especially in team situations, can also motivate individuals to try their best and not let their partners down.

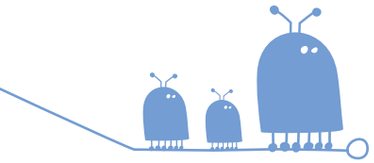


4. Scaffolds to scaffold

Parents, teachers, and other adults may wish to share educational resources with their children, but teaching with media and new technologies doesn't always come naturally, not even for experienced instructors. Provide guidance for the more capable partner in ways that don't require a lot of prior prep or extra time, actions that can help ensure that the intended benefits of the resource are realized. In certain situations, however, explicit scaffolds can turn the situation into something perceived as pedagogical, and can dampen a video game match or after-school time in front of the TV. Subtler cues will suffice.

5. Previous/Next

Consider how a media resource can build upon a child's past experiences and existing curiosities—revealing these experiences and curiosities to adult partners in the process—and how it can motivate interest in or offer knowledge for subsequent experiences. Design narratives that span time and setting, and involve people from across a child's day (e.g., teachers, parents, siblings, peers). Also consider using a variety of platforms (print, video, games) to tell a single story. Transmedia storytelling, as this strategy is often called, can deepen interest on focused topics, and help children apply their knowledge across settings.

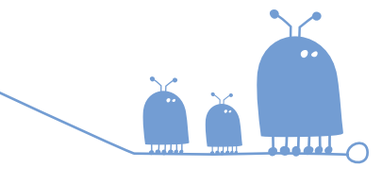


6. Co-creation

Give partners opportunities to make things together. Consuming content together entails little interaction, but creating a movie, story, game, or other artifact requires quite a bit of dialog and coordination between partners. Building upon #5, afterward, partners have something to share with others who were not involved in the creation process, such as siblings or grandparents. The literacy, technical, expressive, and collaboration skills children develop through these activities will prepare them for school and work even further into their futures.

7. Fit

To get families to use a new platform with any regularity, it should easily slot into existing routines, parent work schedules, and classroom practices. There are, after all, only so many hours in the day to accommodate new practices. This may explain why mobile devices are finding pick-up in households with young children: e-books on tablet PCs can be taken to bed for story time and kids can play games on handheld gaming devices in the back seats of cars and supermarket checkout lines. If you want a particular population (e.g., preschool teachers, Latino families) to adopt a new platform, investigate their norms, values, and practices. Don't underestimate the importance of cultural factors in getting people to embrace your resource.

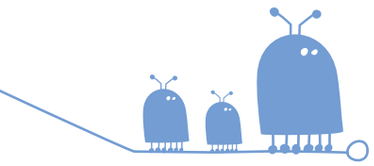


other design considerations: factors of JME

When creating media for joint engagement, producers need to make decisions about the design of the medium (*in-medium* factors) as well as what happens around it (*in-room* factors; Stevens, Satwicz, & McCarthy, 2008). This table presents eight important factors to consider when making these decisions and, beneath each, a set of specific issues and questions generated at the November 2010 workshop at Northwestern.

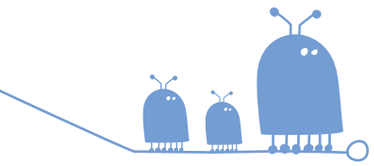
Note that in-medium factors are grouped on page 50, and in-room factors are grouped on page 51.

Purpose	Technology
What is the intended outcome of the activity?	*What technical features support joint engagement?*
• Fun vs. education • Child-focused • Shared vs. individual interest development • Antidote to boredom?	• Asynchronicity • Time shifting: replay-ability, revisit-ability, pause-ability • Record-ability • Time and distance traveling • Sustained learning/play over multiple visits • Size of screen • Portability vs. non-portability • Author-ability • Connectivity • Video teleconferencing • Smart/just-in-time help • Simplified setup



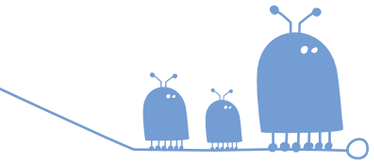
In-medium factors

Content	Interface	Appeal/Affect
What is the overarching narrative? What topics and ideas are partners exposed to?	*How do partners interact with content?*	*What draws partners to participate? What are the emotional consequences?*
• Connection to personal experience • Production of media • Working through stories and concepts (where is the coherence coming from?)	• Amount of interactivity • Sitting back as a form of participation (but being ready to jump in) • Stresses and supports • Physical embodiment • Number of access points to control screen	• Novelty of technology/platform • Multigenerational appeal • Use of merchandizing (Star Wars, Harry Potter) • Intergenerational in that both generations are familiar with game • Differences in affect (serious, playful) • For multiple ages vs. single age • Customizability



In-room factors

Participants	Context	Interaction
Who are the partners? How are they related? What are their individual and cultural characteristics?	*Where and when does the activity take place?*	*How do partners interact with one another? What shapes these interactions?*
• Preexisting relationships between co-participants • Age and age differences of participants • Different levels of tech ability • Comfort with technology vs. comfort with content • Tech savvy of parent (younger parents) • Attention spans of individuals	• School, home, afterschool center, car, outside • Which room in the house? • Affordances of the physical space • Drawing upon other resources that support central medium • Availability of manuals/other resources in play experience • Transmedia: Experiences across a variety of media • What happens before and after the JME event? • Media multitasking • Length of time together	• Whose turf is it? • Who drives the experience? • How does turn-taking take place? • How are attentions negotiated through gesture/talk? • Parallel activity • Assigned tasks/roles • Appropriation of controls • Level of conflict over control • Face-to-face vs. side-by-side • Physical proximity of participants • Ease of determining joint attention (knowing whether a partner is looking in the same place) • Language promotes sharing (or not) • Content- vs. behavior-focused language • Legitimate peripheral participation (Lave & Wenger, 1990)



story visit: coviewing in a digital age

By Glenda Revelle

Story Visit (Raffle et al., 2011) was created by researchers at Nokia Research Center at Palo Alto and the Joan Ganz Cooney Center at Sesame Workshop to facilitate joint engagement among young children and adults over a distance. Since preschool children have short attention spans when talking on the telephone or over video chat, Story Visit provides a familiar activity to engage them in remote interactions: story time. Story Visit combines video conferencing, connected e-books, and a beloved children's character overlaid in interactive video. *Sesame Street's* Elmo asks dialogic reading-style questions and comments on story elements in the book, keeping children entertained and providing a scaffolding model for adults. Visit **www.storyvisit.org** to learn more.

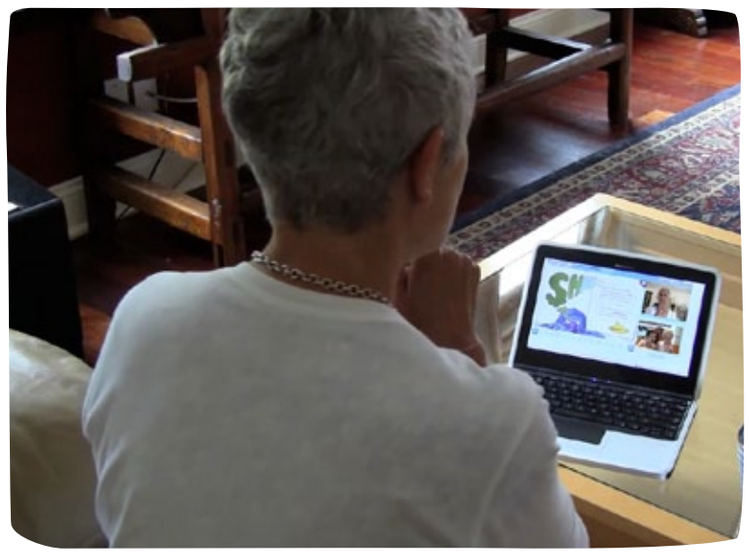
Glenda Revelle, PhD is Associate Professor in Human Development and Family Sciences at the University of Arkansas and Principal Investigator and Cooney Center Project Lead for ongoing research work conducted in collaboration with Nokia Research Center.

Design principles

1. ***Kid-driven:*** Children can initiate interaction and select the book.
2. ***Scaffolds to scaffold:*** Elmo models dialogic reading techniques for the adult.
3. ***Multiple planes of engagement:*** Children love Elmo and engaging picture books; adults love reading to their young loved ones.
4. ***Fit:*** Reading books together is a familiar and cherished routine in families.

Technical features that support JME

5. ***Video teleconferencing:*** Both parties see themselves and their partners in equal-sized windows.
6. ***Simplified setup:*** Shared family user accounts allow one person to set up online accounts for all remote parties, easing the technical complexities of calling, authentication, and hand-shaking.
7. ***Connectivity:*** The Internet enables real-time conversation between family members who live around the block or around the world from one another.
8. ***Just-in-time help:*** Elmo suggests context-specific conversation topics on each page.

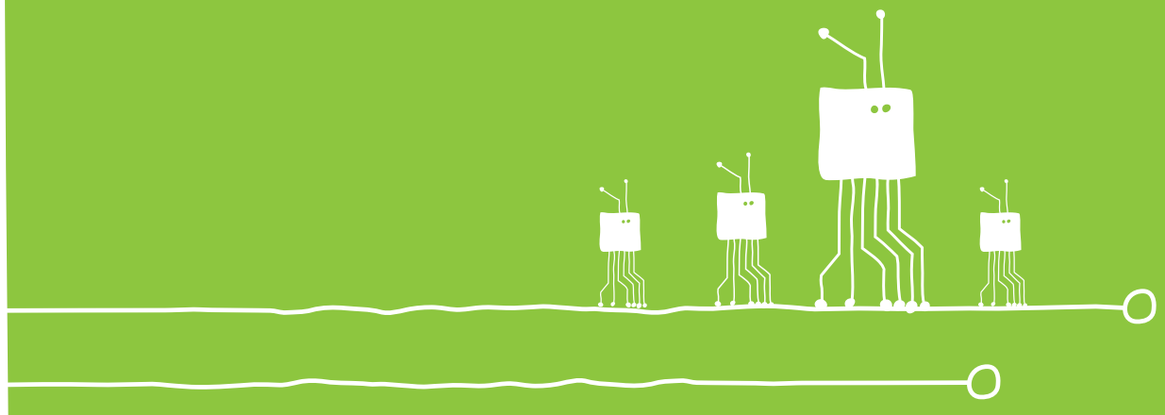


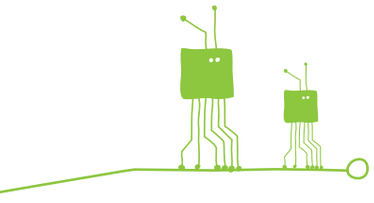
Design principles

Technical features that support JME

future directions for research and development

At the most basic level, we have too narrow a picture of how people are using media together and what and how they are learning while doing so.

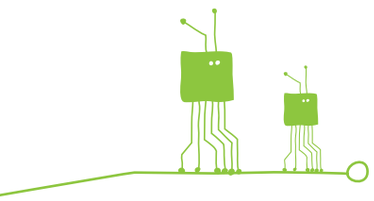




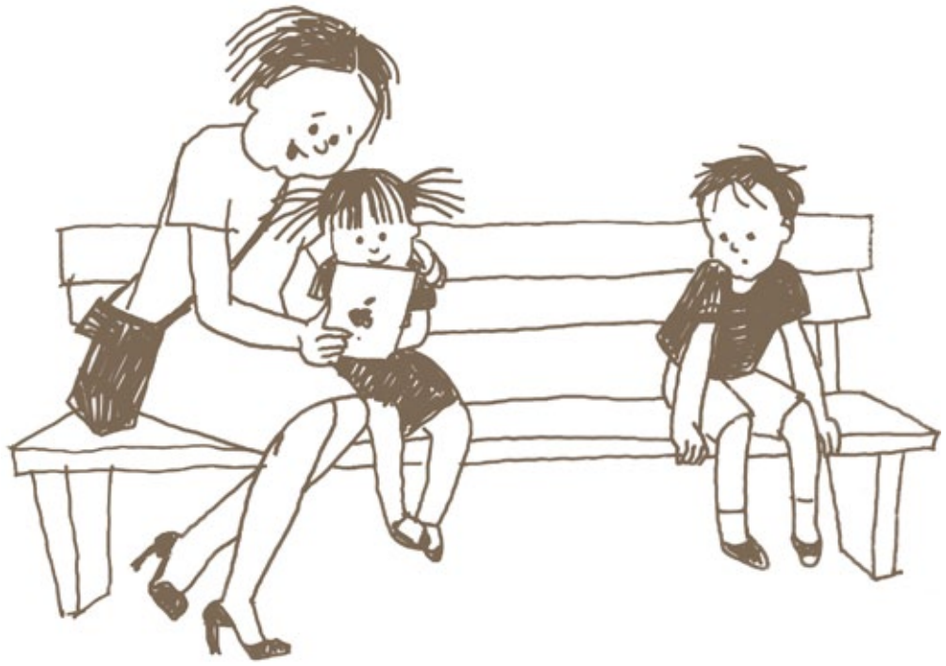
Among the important areas for future research and development are:

- ***The qualities of media design and deliberate use that encourage productive JME.*** The design principles shared above assume that there are forms of JME that can be productive for learning and development, and that we can design media and their delivery platforms to encourage these productive forms. While these principles address important issues that relate to who is jointly engaging with the media, they do not address the full range of the personal, social, and institutional relationships of joint media use that matter. How, for example, does a teacher or parent's co-engagement with media of a child's choice (e.g., of a game, a program, or an app) change its meaningfulness to the child? What about peer or sibling variants of JME? Surely those are likely to differ from JME between adults and children. What about intergenerational JME that spans more than one generation (e.g., grandparents and grandchildren)? Are there distinctly gendered ways that JME happens among and between boys and girls or mothers and fathers? And what happens when we take advantage of the Internet and social media's potential for linking people who don't have pre-existing face-to-face relationships; what are the opportunities, challenges, and even dangers of creating contexts for JME among relative strangers who are not bound together in other forms of traditional community life?

- ***Families across a wide spectrum of American life.*** A particular emphasis belongs on the family as a locus of joint media engagement, especially for young children. As is so common with research in many areas, the bias has been toward the study of middle-class families. That leaves an incomplete picture of other families, including lower-income families, non-traditional families, immigrant, and/or multi-lingual families. As we know decisively from anthropology and the other cultural sciences, everyday life differs greatly among American families. As well, a lack of direct research on these families sometimes invites stereotypes, such as those often painted by surveys that associate lower-income families with purportedly excessive use of commercial media. To be sure, survey research can tell us how much and what kind of media people report using, but it cannot tell us what we most need to know: how people are using media together and the outcomes of that use. Are children learning with media? Are parents using media in the context of a broader approach to cultivating their children's interests and development? How does media

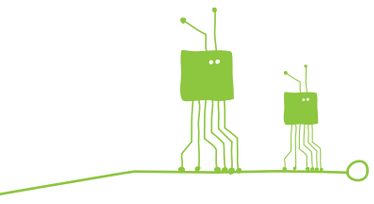


really fit into family life, at home and in other contexts? What are the culturally specific ways of using media and integrating it into contemporary family life? There are pockets of research that have begun to tackle these questions (e.g., Ito et al., 2009; Takeuchi, 2011), but more deep research of this type on a greater number and variety of families is needed.



- ***The ecologies of time, space, and attention.*** An issue that intersects with the quality of relationships among joint media users involves the ways that lives and places are structured for JME and how media use is distributed across the moments of our lives. Life has rhythms into which media use fits or doesn't. A better sense of the flow of children and families across time and space would surely give us a better sense of potential hot spots for JME. As such, attention itself in our media-rich, multitasking world becomes a critical resource to understand; there can be no doubt that different forms of media are competing for our attention in our homes and in our public spaces. How should we respond to that competition for our attention and our media affections? These ecological questions also give some substance to issues about how different families use media. For example, differently resourced families have different available time and energy budgets for supporting or even observing their children's media engagement. How do we take that into account when we try to design for equitable opportunities for JME?

- ***JME in schools and other designed learning environments.*** A great possible benefit in using commercial public media for education is that young people have a relatively shared knowledge of much of this content due to significant convergence of media in recent years (Jenkins et al., 2006). As well, young people bring with



them strong interests in these media in the form of music, movies, television, video games, and so on. Building on this familiarity and interest as a bridge to more academic or disciplinary skills and knowledge has been shown to be possible (Lee, 1997), but how this could play out more broadly across educational institutions is an open question. How should learning environments be arranged for productive JME? How do we select media that are appropriate for use in educational environments? What kinds of new training will teachers need to make this a reality?

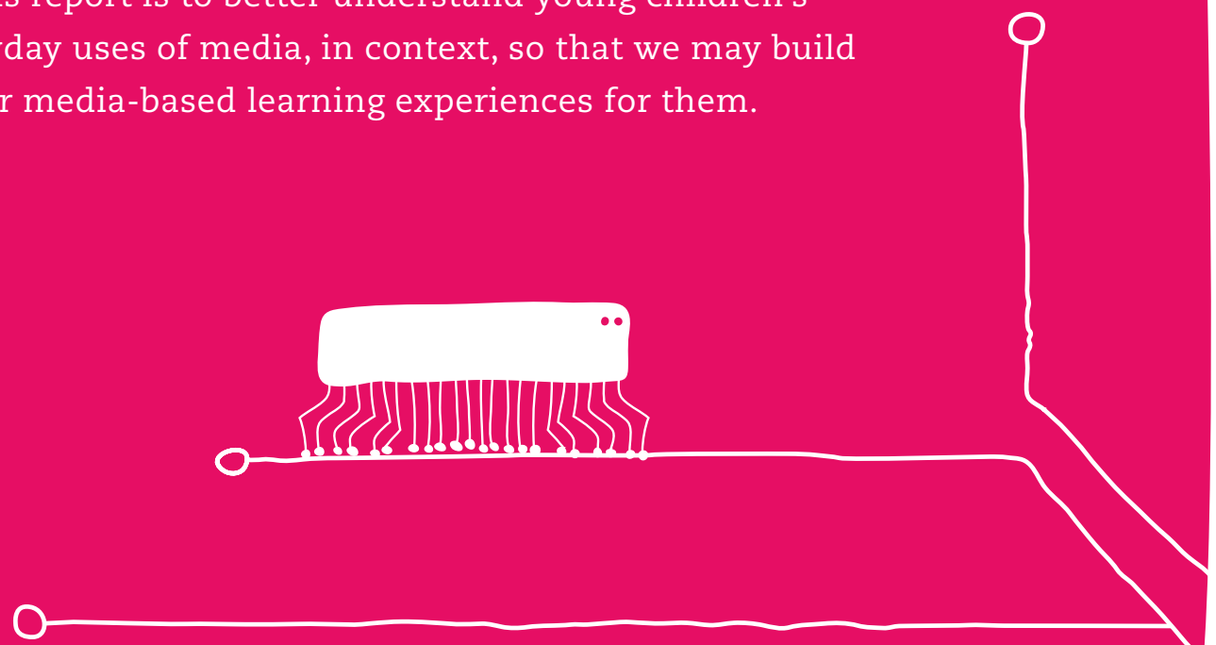
- ***Developmental considerations.*** Finally, research into JME should consider the changing needs of children at different ages and developmental stages. As the research has shown, certain forms of parental mediation have been found to be more prominent with young children and others with school age children and teens. Joint media engagement can be a useful support for developing literacy, including basic reading ability, cultural literacy, scientific literacy, media literacy, and other 21st century skills. How might JME be conceptualized less as a defensive tool and more as a way to teach more critical literacy skills? Research has demonstrated that children don't develop a sense of competition until they are out of elementary-school age (see Johnson, 1993). However, it may turn out that this and other developmental rules of thumb are more flexible than existing research suggests. We still lack research that tests these rules in every possible context or with every possible media platform; variances may exist.

closing thoughts

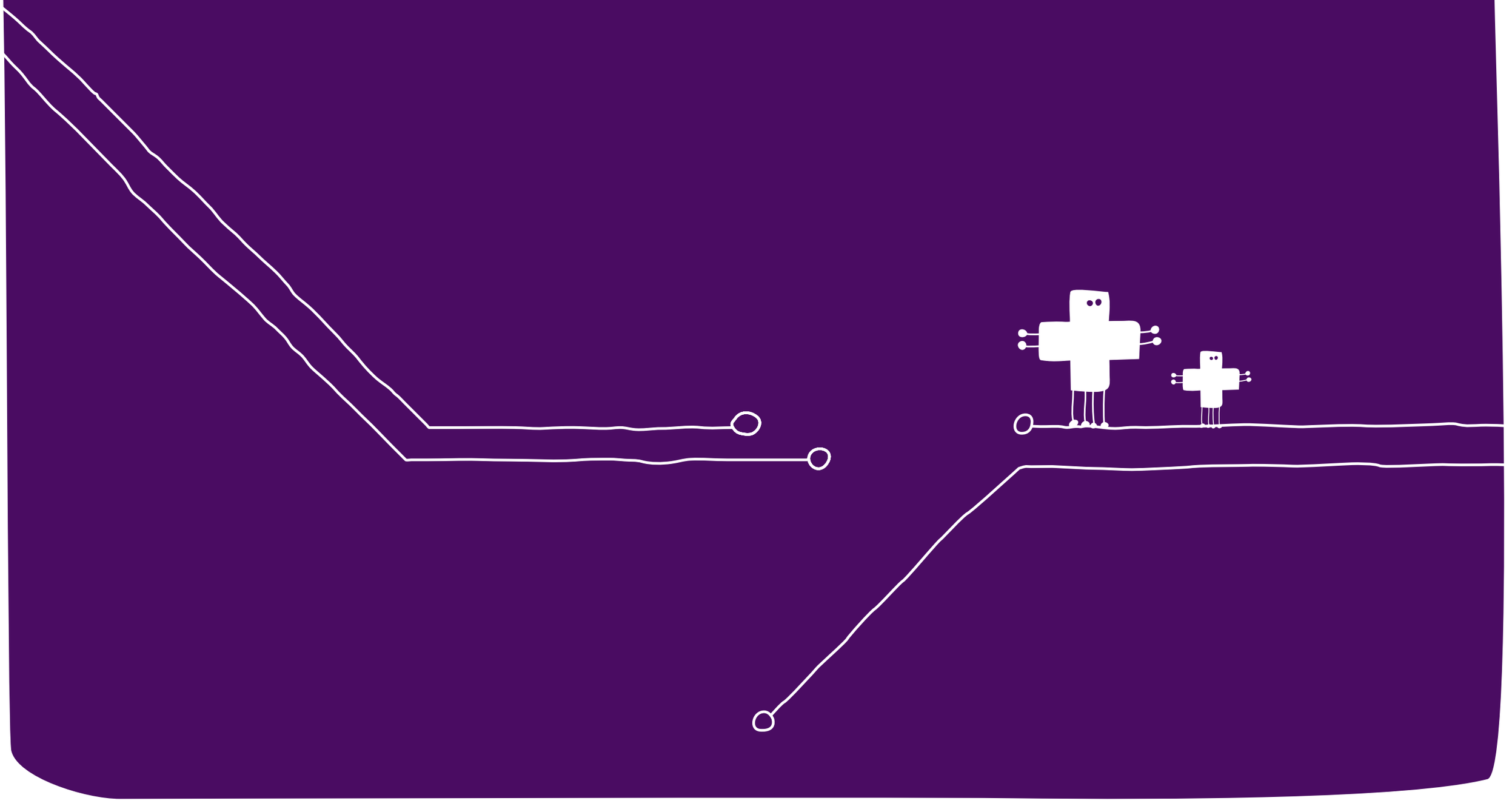
A clear line can be drawn from early coviewing interventions to the current initiatives to study and design for joint media engagement.

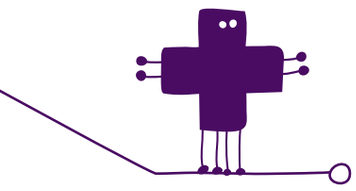
In each case, the working assumption has been the same: What goes on between people around media can be as important as what is designed into the media. This, of course, flies in the face of what we sometimes believe media to be—namely, content that leaves a more or less determinate impression on its audience. But context matters a good deal more than that. In schools, it is an old idea to believe that a curriculum's enactment is impervious to local culture or can be made teacher-proof. Such thinking should be put out to pasture in the study and design of children's media as well.

What children learn and do with media depends a lot on the content of the media, but they depend perhaps as much on the context in which they are used or viewed, and with whom they are used or viewed. A focus on joint media engagement—on what people do together with media—highlights a different approach both to research and to design. The ultimate goal of the emerging work represented in this report is to better understand young children's everyday uses of media, in context, so that we may build better media-based learning experiences for them.



appendix





the new coviewing workshop at Northwestern University

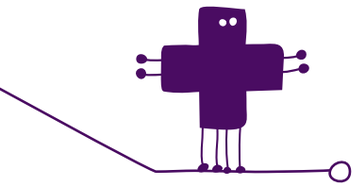
November 9, 2010

School of Education and Social Policy, Annenberg Hall

Sponsored by the Corporation for Public Broadcasting, the John D. & Catherine T. MacArthur Foundation under Prime Award no. 09-93480-000-HCD, and The Regents of the University of California.

Agenda

9:30am	Welcome and workshop goals
9:45am	A brief history of coviewing
10:15am	Video provocation: What does coviewing look like today?
11:15am	The new coviewing: Joint media engagement research demonstrations
12:15pm	Break
12:30pm	Lunch at the Allen Center: Demonstration of *Electric Racer* R&D project
1:30pm	Other R&D tools/products that support joint media engagement
1:45pm	Design goals and challenges: Designing for different settings and populations
2:30pm	Break
2:45pm	Setting an R&D agenda
3:45pm	Next steps and wrap-up
4:00pm	Adjourn



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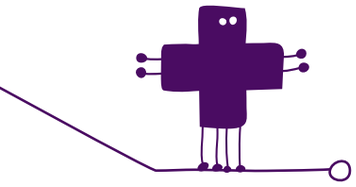


7 reliable sources of design advice

Malone and Lepper's (1987) book chapter "Making learning fun: A taxonomy of intrinsic motivations for learning," is a seminal work on design for learning. The authors propose a straightforward set of heuristics for designing *intrinsically* motivating learning environments (e.g., games), which they argue yield deeper learning than ones offering extrinsic rewards.

For human-computer interaction designers, web usability guru Jakob Nielsen provides *10 Usability Heuristics* (originally developed in Molich & Nielsen, 1990) on **www.useit.com**.

Multimedia Learning (2001), by psychologist Richard E. Mayer, goes beyond the purely verbal by combining words and pictures for effective teaching. Drawing upon 10 years of research, Mayer provides seven principles for the design of multimedia messages and a cognitive theory of multimedia learning.

Famed designer/psychologist Donald Norman's *The Design of Everyday Things* (2002) is a classic on the cognitive aspects of design. It contains examples of both good and bad design and simple rules that designers can use to improve the usability of objects as diverse as cars, computers, doors, and telephones.

Written for game scholars, game developers, and interactive designers, Salen and Zimmerman's (2004) *Rules of Play* is a textbook, reference book, and comprehensive attempt to establish a solid theoretical framework for the emerging discipline of game design.

Wiggins and McTighe's (2005) *Understanding by Design* promotes the notion of "backward design," a method of curriculum design that sets goals before choosing activities or content in order to promote deeper understanding for students.

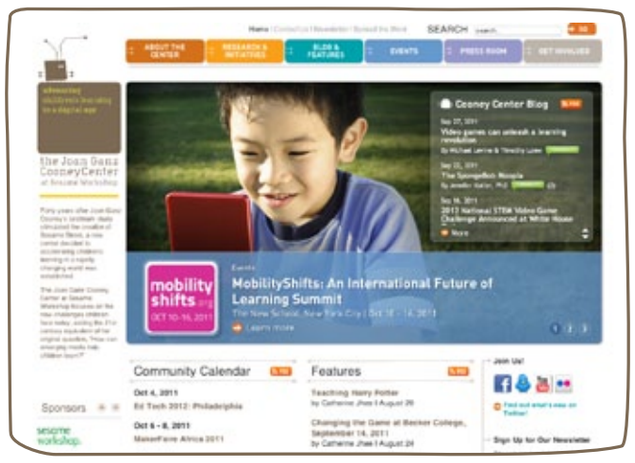
Aleven, Meyers, Easterday, and Ogan (2011) provide a brief but thoughtful examination of learning design in their article, "Toward a framework for the analysis and design of educational games." It references and builds upon established models and principles of sound learning design.

relevant websites

LIFE Center

The New Coviewing

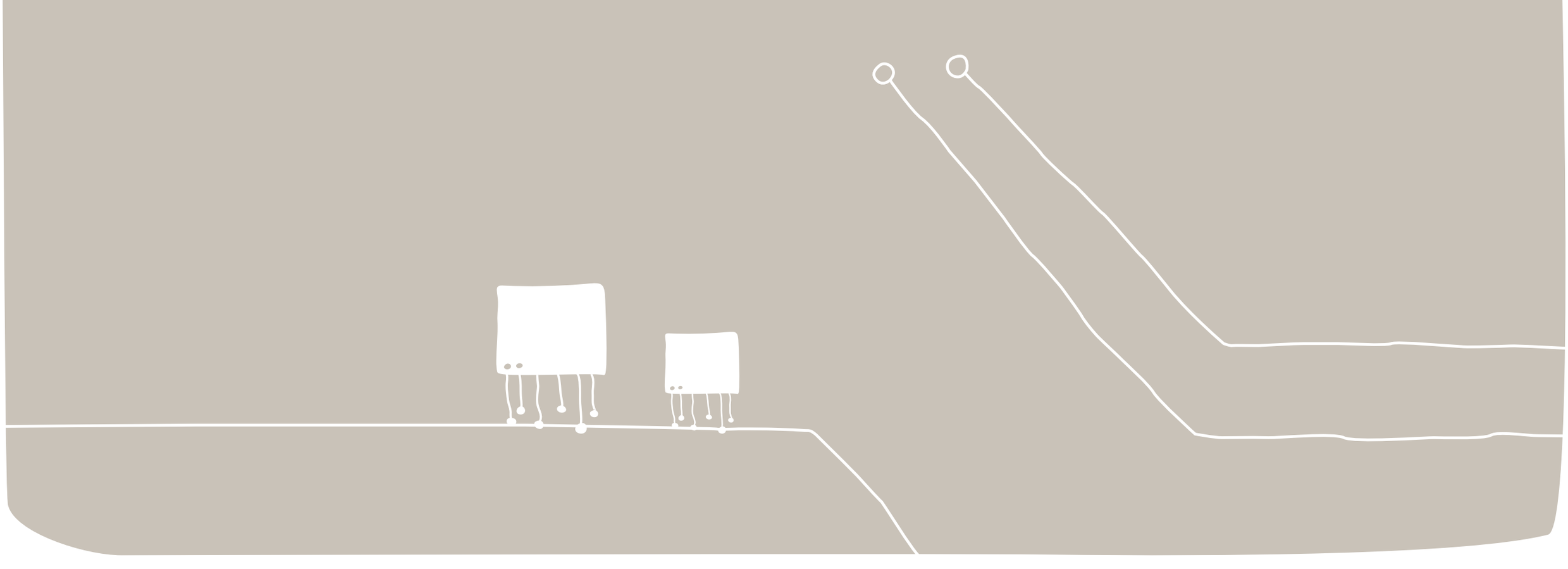
William D. and Catherine T. Macarthur Foundation

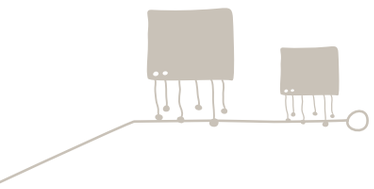


Joan Ganz Cooney Center at Sesame Workshop

Digital Media and Learning Research Hub

references





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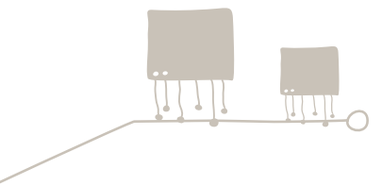

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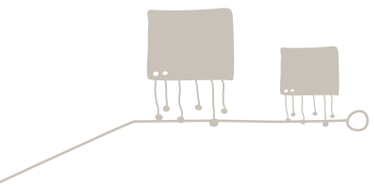

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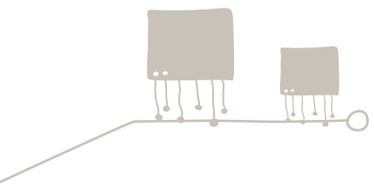

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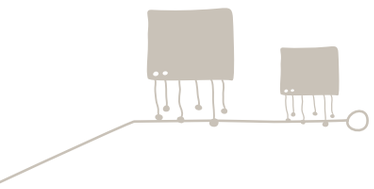

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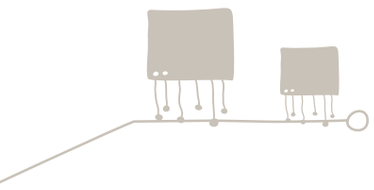

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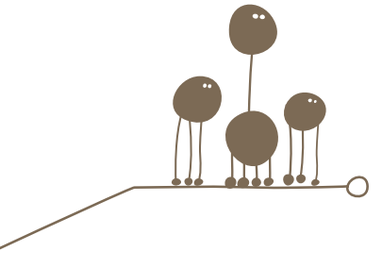
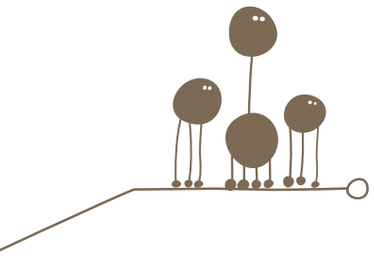


about the authors

As Director of Research for the Joan Ganz Cooney Center, Dr. Lori Takeuchi oversees research projects and partnerships. She started at the Cooney Center as a postdoctoral fellow after earning her PhD in the Learning Sciences and Technology Design program at Stanford University, where she was a research assistant on LIFE Center projects. Dr. Takeuchi spent more than a decade designing and producing curriculum-based science software in the greater Boston and San Francisco Bay areas. Before that, she managed the Instructional Television Department at New York's Thirteen/WNET. Dr. Takeuchi conducts research on how children use technology across the various settings of their lives, and the implications these tools hold for their cognitive, social, and identity development.

Professor Reed Stevens is a Professor of Learning Sciences in the School of Education and Social Policy at Northwestern University. For the past seven years, he has co-led the NSF Learning in Informal and Formal Environments (LIFE) Center. In the Center and in his prior research, Professor Stevens specializes in field studies of learning outside of K-12 schooling, often with a focus on STEM topics. This has included studies in interactive science centers, professional architectural and engineering firms, early childhood learning centers, and family homes. The goal of this work is to broaden the field's understanding of learning and to better understand learning as a trans-setting phenomenon (i.e., across homes, schools, etc.). Much of his recent ethnographic work has been focused on children's uses of and learning with popular media, including television and video games.



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The LIFE Center

LIFE (Learning in Informal and Formal Environments) is a multi-institution NSF Science of Learning Center hosted at the University of Washington in partnership with Stanford University and SRI International. The LIFE Center seeks to develop and test principles about the social foundations of human learning in informal and formal environments with the goal of enhancing human learning from infancy to adulthood.

www.life-slc.org

advancing
children's learning
in a digital age

the Joan Ganz Cooney Center
at Sesame Workshop

The Joan Ganz Cooney Center at Sesame Workshop

The Cooney Center conducts research related to middle childhood (ages 5 to 11) and strives to understand the relationships that exist between digital media and the particular developmental needs of children in this age range. Our work seeks to identify the essential knowledge, aptitudes, and attitudes necessary to children's success today and in their future adult lives, and answer related questions about the tools, resources, assessments that best support learning and achievement.

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