

PBS KIDS Transmedia Suites Gaming Study

A REPORT TO THE
CPB-PBS *READY TO LEARN INITIATIVE*



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SUMMARY

Educators are well aware that in order to positively impact children’s learning, media and technology must be integrated into the teaching and learning activities of instructional environments. In order to be a powerful catalyst for learning, media and technology resources must complement the learning goals, the instructional practices, and the curricular materials used in a learning environment. Good tools, no matter how well designed, require planning, preparation, and careful implementation in order to be effective. While content creators, practitioners, and researchers believe that transmedia and digital games are valuable new tools with promise for supporting learning, it is important to identify how these tools are shaped by different learning environments and what possibilities and points of entry for the use of media resources are present in different types of learning contexts.

By conducting a series of observations and interviews for the CPB-PBS *Ready To Learn Initiative* in settings where PBS KIDS transmedia were available to a diverse group of young children in a range of out-of-school learning environments, Education Development Center, Inc. (EDC) and SRI International (SRI) collected evidence about children’s experiences, educators’ approaches, and parents’ perspectives with respect to transmedia and the use/potential of PBS KIDS transmedia for supporting children’s learning. Our analyses highlighted the following findings:

- Children perceived PBS KIDS transmedia and digital games to be fun and engaging, though they usually could not identify the learning content within a game and may have needed adult facilitation to recognize the learning goals embedded in a transmedia game.
- Parents and educators reported that PBS KIDS transmedia games from the PBS’s KIDS Lab provided both educational content and an opportunity to practice 21st-century skills. Children made connections to the characters and narratives within the games, and these served to support engagement.

- The learning and game play environments, including technical supports and logistics, played a substantial role in determining the nature of children's experience with the PBS KIDS transmedia. Settings where adults are engaged with children and address the game content are more likely to support prolonged focus on a particular game activity and are more likely to result in children understanding the learning goals of a game.
- PBS KIDS transmedia game environments can be modified in ways that will keep children from wandering from one environment to another through random clicking.
- PBS KIDS transmedia game design can encourage sustained engagement by providing increased challenges as play proceeds and by facilitating children's log-in ability so that each return to a game does not require a return to the game's first level of play.
- Different social and technical accommodations are needed in PBS KIDS transmedia game environments to successfully support different levels of development in children's cognitive, social, and motor skills.

Below, we elaborate on these issues and present more information about how educators made use of the PBS KIDS transmedia, what parents had to say about their children's use of transmedia, and what children did during game play.

INTRODUCTION

The role of transmedia as a support for learning, particularly for early learning, is still largely unexplored. Educators see potential for engaging children in multiple ways and through multiple modalities, grounding this engagement in a narrative and with familiar characters that cross digital boundaries and reside in a range of portable and other electronic devices. In order to continue learning about how transmedia can play a role in fostering children’s learning, we proposed to examine children’s use of transmedia in informal learning environments where different possibilities present themselves in terms of children’s choice of content, activity, or pacing, in contrast to the learning environments of the classroom and the home.

The primary goal of the CPB-PBS *Ready To Learn* Transmedia Gaming Study was to explore how informal learning contexts support children’s experiences and engagement with PBS KIDS transmedia assets. This study is one among five Year 2 CPB-PBS *Ready To Learn* studies; while all studies focused on identifying how PBS KIDS transmedia can support children’s learning, each study was distinct from the others in terms of the learning environment it highlighted, the nature and extent to which the PBS KIDS transmedia were embedded in curricular structure, the opportunity for children’s self-direction to guide their media interactions and, by extension, their learning, and the types of adult support available. While the Preschool Pilot Study of PBS KIDS Transmedia Mathematics Content (Education Development Center & SRI International, 2012) and the Context Study of the Use of Technology and PBS KIDS Transmedia in the Home Environment (Education Development Center & SRI International, 2012) targeted preschool classroom settings and family/home contexts respectively, the Transmedia Gaming Study highlighted “informal” spaces, an umbrella term comprising a variety of out-of-school learning environments (e.g., youth-development programs, summer learning programs, community-based outdoor recreation programs). Informal settings are, arguably, less constrained by the expectations for teaching and learning that are typical of school-based activities; at the same time, many do offer structure, instructional guidance, and adult support, and identify learning as an important goal of participation.

Education Development Center, Inc. (EDC) and SRI International (SRI) gathered data on children's use of PBS KIDS transmedia through observations and interviews in settings where children had opportunities to engage with these media over an extended period of time. We captured children's experiences with PBS KIDS transmedia games; outlined children's learning trajectory as they moved from novice to more experienced/expert users; and documented educators' approaches to using transmedia to support learning, including the modifications to programming that are necessary to suit the learning goals and children's developing familiarity and comfort with PBS KIDS transmedia. In addition, we documented the diversity of the informal learning space, highlighted the different possibilities for transmedia, and identified the supports that may be necessary to ensure that educators optimize the learning potential of PBS KIDS transmedia in these settings.

This study was conceived during an early phase of the development process for the various properties that make up the PBS KIDS transmedia suites currently available to children as part of the *Ready To Learn Initiative*, which is led by the Corporation for Public Broadcasting and PBS. Like all proposed research studies, the initial plans and expectations for this study have evolved to reflect the changing realities of the larger *Ready To Learn Initiative* and the development timelines of the PBS KIDS transmedia developers. Originally designed as an analysis of back-end user data collected by the PBS KIDS transmedia properties through a data-tracking system integrated into transmedia programming (what will be the PBS KIDS Progress Tracker), we restructured the study to explore how educators build on children's developing understanding of PBS KIDS transmedia through repeated interactions and regular play. This shift was necessary because Progress Tracker data will not be available for analysis until Year 3 (2013) of the CPB-PBS *Ready To Learn Initiative*.

RESEARCH APPROACH

A central interest for our team consisted of examining the possibilities offered by informal environments for learning with PBS KIDS transmedia. Specifically, we were interested in learning more about children’s media experiences as well as educators’ approaches to teaching and learning with PBS KIDS transmedia and their strategies for supporting children’s learning. Given the contrasts in structure and instructional arrangements among informal settings, classrooms, and homes, we were interested in describing patterns of PBS KIDS transmedia use in “third spaces” (Gutierrez, 2008) that bridge the knowledge and discourses of formal classroom settings with children’s home- and community-based experiences. As such, we were interested in identifying the contextual factors that characterized informal learning spaces and the extent to which they acted as supports or constraints for media-enriched learning.

RESEARCH TOPICS AND QUESTIONS

The research questions guiding the Transmedia Gaming Study included the following:

Learning conditions of informal environments

1. How do conditions in informal learning environments influence the nature and the quality of children’s experiences with PBS KIDS transmedia?
2. What are the influences of specific learning arrangements (e.g., grouping/participant structure, platform) on children’s experiences with PBS KIDS transmedia?

Children’s experiences with media

3. What are children’s experiences with PBS KIDS transmedia in informal learning environments?

4. How do children make sense of PBS KIDS transmedia content in the specific teaching and learning conditions of informal spaces?

What are children's perceptions of the PBS KIDS games?

What do children want to know when they play the PBS KIDS games?

What do children find motivating or engaging about the PBS KIDS games?

What do children find challenging or difficult about the PBS KIDS games?

5. To what extent do children's perceptions toward PBS KIDS transmedia evolve over time, given more exposure to the PBS KIDS transmedia resources?

Educators' approaches to transmedia

6. What are educators' approaches to the use of transmedia in informal learning environments? How, and to what extent, do educators support children's learning with transmedia in informal environments? How does this vary across settings?

7. To what extent do educators' approaches to the use of transmedia shift and evolve over time, given regular use and repeated exposure to transmedia resources?

SAMPLE

From the 11 Transmedia Demonstration Stations (Education Development Center & SRI International, 2012) that form part of the *Ready To Learn Initiative* in 2012, we identified two stations to serve as sites for the Transmedia Gaming Study. We selected the two sites based on a review of each station's proposed plan for CPB-PBS *Ready To Learn* program implementation and on an interview conducted with the education director at each station (see Table 1).

Table 1. PBS KIDS Transmedia Gaming Study site visits

Station A				
Settings			Technology Used	
<ul style="list-style-type: none"> • Summer learning program housed at elementary school • Boys & Girls Club • Mobile Technology Lab at City Park 			<ul style="list-style-type: none"> • Desktop computer • Overhead projector • Net book, Laptops 	
Visits	Events Observed Per Visit	Parents Interviewed	Children Interviewed	Age Range
2	3	7	28	5-11
Station B				
Settings			Technology Used	
<ul style="list-style-type: none"> • YMCA PreK program 			<ul style="list-style-type: none"> • Tablet 	
Visits	Events Observed Per Visit	Parents Interviewed	Children Interviewed	Age Range
2	1	0	0	4-5

Our criteria for selecting the sample for the PBS KIDS Transmedia Gaming Study included the following:

- Serving a constituency of families identified as economically disadvantaged
- Programming that made PBS KIDS transmedia available to children across multiple informal settings
- A consistent population of children attending the *Ready To Learn* Demonstration Station programs across time, allowing children the opportunity for regular use and repeated exposure to PBS transmedia suites within a 1- to 2-month period
- Partnerships with community-based programs to support outreach to target populations

Based on the above criteria, we selected two sites, representing two different geographic areas, as the context for the PBS KIDS Transmedia Gaming Study. Located in the Pacific Northwest, Station A serves a diverse urban community, including significant African American (33.2%) and Hispanic (11.2%) populations. Nearly half the households are at or below the federal poverty level, and fewer than half the residents have attended college. The area has struggled with violent drug-related gang activity over the years and has had high levels of student turnover in its schools. Station A's community partners include a youth development agency, a Boys and Girls Club, and the city's Parks and Recreation Department. Programming, developed as a joint effort of the Station and the community partners, occurred in a summer learning program operated by the youth development agency, a mobile technology lab that was set up in an outdoor park (as part of the city's recreational program) and as part of the offerings at the Boys and Girls Club.

Located in a small ethnically and economically diverse northeastern city, Station B views its target audience as the city's Latino population, which includes an increasingly large Puerto Rican community as well as residents with ties to Mexico, the Dominican Republic, Colombia, and other South American countries. Average household income is low, as are educational levels; over a quarter of its inhabitants live below the poverty line (27.6%), more than half have never attended college (57.9%), 24% of adults have not attained a high school diploma or GED, and a majority of elementary school students in the city (81.4%) are on free or reduced-price lunch. A key community partner for Station B is the local YMCA; programs co-developed by Station B and the YMCA incorporating PBS KIDS transmedia serves preschool and early elementary-aged children (4- to 5- year-olds).

METHODS

We collected data from a variety of sources, including observations of programming activity and interviews with children, parents, and educators, to attend to the goals of learning about children’s experiences, educators’ approaches, and the contextual factors influencing the use of PBS KIDS transmedia resources in informal learning environments.

DATA COLLECTION

OBSERVATIONS AND CHILD INTERVIEWS

We designed observations to capture information about children’s use of, and experiences with, the PBS KIDS gaming resources. To collect observation data, we visited all settings in Stations A and B where programming activity occurred and where children were using the PBS KIDS gaming resources on a regular and continuous basis.

We collected observation data using a structured observation protocol, including close-ended sections, where we documented the frequency of specific activities and behaviors, and a narrative section, designed to capture rich descriptions of teaching and learning activities ([Appendix A: PBS KIDS Interview Protocol](#)). During observations, we observed children and adults working with the PBS KIDS transmedia and carefully documented (1) characteristics of the learning environments (the number of children and adults, the grouping arrangements, norms of learning environment, etc.); (2) different activities taking place (e.g., asking questions, interacting with adults or peers); (3) use of digital media and technology, including the platforms, specific media assets, and purposes for which children were using digital media; and (4) the nature of adult-child interactions and the ways in which adults were supporting children in the use of digital tools.

Embedded in the observation data collection were a series of child interviews ([Appendix B: PBS KIDS Transmedia Gaming Study Child Interview Protocol](#)). We directed our questions at gathering information about the aspects of the PBS KIDS game that children found appealing, challenging, and easy to complete, as well as their perceptions of the learning goals. Designed as a brief conversation that occurred while the child was in the process of completing a game, the interview emphasized the particular PBS KIDS game that was the target of the child's attention at the moment and elicited the child's views.

EDUCATOR INTERVIEWS

We also interviewed educators at all the *Ready To Learn* learning settings. These interviews were semistructured and modeled after the partner interview protocol used during the [RTL Transmedia Demonstration Stations Study](#) that we conducted this year. These interviews sought to ascertain the depth and breadth of each educator's participation in programs using PBS KIDS transmedia; what professional development they received, if any; and whether they felt that it prepared them to work with PBS KIDS materials; and their perceptions of the PBS KIDS transmedia center/resources and points of entry for incorporating them into the teaching and learning activities of informal settings.

PARENT INTERVIEWS

We also interviewed parents and/or caregivers of children participating in the PBS KIDS transmedia gaming activities, if they happened to be present at programming settings. Interview questions addressed families' access to media and technology resources in home- and community-based contexts; parents' own use of media and technology in everyday life; their views of the use of media and technology with young children; and their perceptions of how, if at all, the PBS KIDS transmedia might be used to support children's learning, especially in informal learning environments. (See [Appendix C: PBS KIDS Transmedia Gaming Study Parent Interview Protocol](#) for a complete interview protocol).

Because it was a goal of the study to document change over time, if any, in how children and educators approached and interacted with the PBS KIDS transmedia, we conducted two visits, each spaced 3 to 4 weeks apart, to Station A and B. We observed children's game play and interviewed educators at all the learning settings at each site, but children and parent interviews were conducted at only three out of the four learning settings. Elementary aged children attending programs at the west coast site (Station A) were considered old enough to participate in research conversations and respond to questions about their PBS KIDS game play experience. The children attending the YMCA-based preschool program supported by Station B (on the east coast) were 4-year-olds and, as such, too young for interviews. Also, because this setting was structured to resemble a formal classroom and observations occurred during the school day, parents were not present and could not be interviewed.

DATA ANALYSIS

Our goal in the analysis was to identify patterns of children’s experiences with PBS KIDS transmedia, educators’ strategies for integrating the media into teaching and learning activities, and the types of support that educators might need in order to effectively support children in learning with PBS KIDS transmedia. An additional aspect of the analysis was to identify how the contextual factors shaped the use of PBS KIDS transmedia in informal learning environments, including location, access to high-speed Internet, educators’ diverse background and experiences, their expectations for children’s behavior and learning, and characteristics of the child population (e.g., drop-in vs. more consistent).

Our approach to the analysis of data was exploratory, designed to highlight the possibilities of using PBS KIDS Transmedia to support learning in informal learning environments. We reviewed and cleaned notes from observations and interviews, then posted documents to a secure, central document library accessible only to the research team. A group of three researchers then reviewed all data documents, with the purpose of identifying themes that addressed the research questions; we were interested in distinguishing themes that were common across the two stations (and learning settings within them) as well as those that were unique to particular settings.

The analysis of observation and interview data paints a picture of how PBS KIDS transmedia are currently used in the context of community-based programming activities orchestrated by demonstration stations. Station A and Station B represent a range of programming and community outreach as well as variation in geography, learning settings in which the PBS KIDS transmedia resources are implemented, and the specific characteristics of the population (children and families) served. The two sites, Station A and Station B, serve as “critical” cases (Flyvbjerg, 2006) that highlight important lessons and illustrate the promise and some of the difficulties associated with integrating media into informal teaching and learning activities.

LIMITATIONS

While the focus of this study was on children’s ongoing use of PBS KIDS transmedia, the overall findings were limited by the brief time that most children were exposed to the PBS KIDS transmedia. Challenges such as limited access to technology, technical problems like inactive Internet connections, and limited adult support to help students engage with the media all contribute to limitations of the observed environments as places where prolonged exposure to PBS KIDS transmedia could take place. In addition, the children and adults who participated in the study may not be representative of larger populations.

FINDINGS

Our findings highlight the preliminary patterns associated with the use of PBS KIDS transmedia in informal learning settings. In the following section, we identify and describe the main themes that our research team unearthed, with respect to how PBS KIDS transmedia was integrated into the teaching and learning activities of informal settings. Specifically, our findings illustrate the diverse nature of informal learning spaces, calling attention to the dimensions along which variation occurs; describe children’s experiences with PBS KIDS transmedia in these settings; and highlight the ways in which educators are able to support children’s engagement with transmedia. Finally, we document the changes we observed, between the first and second site visits, in terms of how both children and educators were attending to the PBS KIDS transmedia.

LEARNING ENVIRONMENTS

DIVERSITY OF INFORMAL LEARNING ENVIRONMENTS

We observed a remarkable diversity of institutional arrangements among the informal *Ready To Learn* learning settings that comprised the sample for this study. The variation occurred along a number of different dimensions including, but not restricted to, the program’s learning goals and purpose, program structure, duration, educator backgrounds, and so on. The way in which these different elements manifested in any given learning environment shaped the nature of teaching and learning, and offered different possibilities and constraints for the integration and use of PBS KIDS transmedia.

As shown in Table 1 above, **four informal learning settings were observed for this study:** a mobile technology lab operated in a public park, a summer learning program located on the premises of an elementary school, a Boys and Girls Club, and a YMCA-based program serving preschool-aged children. In this section, we describe some of the key contextual elements of

informal learning settings, how they became operationalized in the settings of our study, and the influence they exerted on how PBS KIDS transmedia were incorporated in these settings.

These settings differed in terms of their location, and the physical space exerted an influence on children’s media experiences and how educators were able to support them.

Locations that were open to the public, such as the mobile technology lab, caught the interest of families and children walking by or playing in the park and attracted a population that was typically transient in nature. In contrast, the settings of the YMCA preschool program, the Boys and Girls Club, and the summer learning program, by virtue of requiring preregistration, served a consistent population of children. Because the mobile lab supported a drop-in population, educators’ attention was focused on identifying whether children were first-time or repeat visitors, whether a username and password needed to be set up, and so on. Also, because turnover was high— children arrived and left through the programming period—educators’ immediate priority involved checking in and checking out children. Although they addressed technical issues, educators often were left with little time or opportunity for jointly engaging with children around the content of the games in a sustained fashion. At the same time, since children arrived and left of their own volition, they appeared, for the most part, curious, motivated, and eager for game play.

The ages of the children served varied across the settings too. The summer learning program and the Boys and Girls Club program served early elementary-aged children (6- to 8-year-olds) and the YMCA-based program served preschool-aged children (4- to 5-year-olds). Given the location of the mobile lab, it was common for children to drop into the program in friend- and sibling-groups, and therefore, the program attracted children of a variety of ages, from 4 to almost 10 years old.

The learning settings were distinct from one another in terms of their stated purpose.

The YMCA-based program and the summer learning program targeted academic learning, front and center, while the Boys and Girls Club and the mobile technology lab emphasized opportunities for safe and beneficial recreation. As such, the educators in these environments set different expectations for children’s learning and orchestrated activities accordingly. For example, in the YMCA-based prekindergarten environment, where children were younger, educators were more hands-on in their approach to supporting children’s learning; additionally, a cadre of college students—“digital ambassadors”—worked closely with individuals or small groups to troubleshoot technical issues and ensure that children were focused on a particular activity and able to play the games. In contrast, educators in the mobile technology lab had few opportunities for sustained or substantive engagement with children, given the drop-in nature of the population and the varying amounts of time that children spent with the PBS KIDS transmedia.

“Informal learning environment” is a catchall phrase that applied to several types of out-of-school learning spaces, often with distinct characteristics. Moreover, different environments opened up different possibilities for the use of transmedia—for example, the integration of PBS KIDS transmedia into the activities of a summer learning program differed from how these resources were used in a mobile technology lab, given that the former emphasized the prevention of summer learning loss and served a consistent population and the latter emphasized extracurricular fun and served a transient population.

ACCESS TO TECHNOLOGY RESOURCES

In three out of the four learning settings observed, laptop or desktop computers were the technologies of choice, both because of the ready availability of laptops and desktops at the learning settings and because the current array of PBS KIDS transmedia is not supported by any single type of mobile platform. In some settings, the establishment of Internet connectivity for game play was challenging, but in all visits students were able to access the games via a functioning Internet connection.

The availability of sufficient and appropriate hardware and software resources is fundamental to the use of media for teaching and learning. [The Year 1 Context Studies](#) (Education Development Center & SRI International, 2011) completed as part of the *Ready To Learn* Initiative in 2011 documented the limited access and use of recently issued educational tools such as laptops, tablets, and interactive whiteboards in summer learning programs as well as the complicated challenges of setting up and using technology tools in temporary spaces.

The themes of restricted access, varied support, and the need to improvise were characteristic of the informal learning settings that we visited for the PBS KIDS transmedia gaming study, influencing children’s experiences. For example, to manage the shortage of headphones in one setting, the educator decided that no headphones would be used at all, and in order to manage the noise level in the room, the sound on all computers was muted. Given that game play instructions for some games were available only through audio, children found it difficult to infer the objective and the rules for game play. Although some children were able to call upon past familiarity to progress through the game, others struggled to understand game mechanics, which became the focus of their attention.

We observed that preschool children using tablet computers appeared to be differently engaged in the PBS KIDS games than elementary school children on laptop or desktop computers. For example, preschool children using tablets rarely interacted with other children nearby or initiated interactions with adults, while older children using laptops or desktops often conversed with one another or asked questions of passing adults. The tablet also may be a more developmentally appropriate option for younger children whose motor skills are not yet at a point where they can manipulate a mouse or track pad with ease. Our observations indicated that right-clicking with the mouse was challenging for children of all ages, an issue that is eliminated in a tablet environment.

THE USE OF PBS KIDS TRANSMEDIA

Children at the observed sites engaged in play with a variety of PBS KIDS transmedia objects. (See Table 2 for a complete list of PBS KIDS transmedia observed in use across both sites.)

Table 2. Transmedia used by children at PBS KIDS Transmedia Gaming Study sites

Site	Ready To Learn PBS KIDS Property	Non-Ready To Learn PBS KIDS Property	User Age Range	Device
Station A: West Coast				
Camp/ Elementary School Summer Program	<ul style="list-style-type: none"> • <i>Dinosaur Train</i> • <i>The Electric Company: Prankster Planet</i> • <i>Sid the Science Kid</i> • <i>The Electric Company: Prankster Planet</i> • <i>Fizzy's Lunch Lab: Escape From Greasy World</i> • <i>The Electric Company: Prankster Planet</i> • <i>Fizzy's Lunch Lab: Escape from Greasy World</i> 	<ul style="list-style-type: none"> • <i>Word Girl</i> • <i>Wild Kratts</i> • <i>Sesame Street</i> • <i>Wild Kratts: Draco Glid & Go Cheetah Go!</i> • <i>Arthur</i> 	6–11 years	Laptop (Children played 1-1 on laptops and had minimal adult support, often 3 adults to 14 or 18 children, with one adult available primarily for technical issues.)
Boys & Girls Club	<ul style="list-style-type: none"> • <i>The Electric Company: Prankster Planet</i> 	<ul style="list-style-type: none"> • <i>Wild Kratts: Go Cheetah Go!</i> • <i>PBS KIDS GO Cartoon Studio</i> • <i>Caillou</i> • <i>SuperWhy!</i> • <i>Word Girl</i> • <i>Cyberchase</i> 	6–12 years	Desktop computer (1-1, 1 adult and 18 children)
Community Park	<ul style="list-style-type: none"> • <i>Dinosaur Train</i> • <i>Curious George: Meatball Launcher</i> • <i>Cat in the Hat: Hermit Shell Game</i> • <i>The Electric Company: Prankster Planet</i> 	<ul style="list-style-type: none"> • <i>PBS KIDS GO Cartoon Studio</i> 	4–14 years	Net book (1-1, 1 teacher for 9 children)

Table 2. Transmedia used by children at PBS KIDS Transmedia Gaming Study sites, Continued

Site	Ready To Learn PBS KIDS Property	Non-Ready To Learn PBS KIDS Property	User Age Range	Device
Station B: East Coast				
YMCA Prekindergarten Classroom	<ul style="list-style-type: none"> • <i>Super Why!: Cake Maker</i> • <i>Curious George: Bunny Ride & Hide And Seek</i> • <i>Fizzy's Lunch Lab: Freddy's Carnival Count-off</i> • <i>The Cat In The Hat: Huff-Puff-A-Tron & Sketch-A-Mite</i> • <i>Curious George: Monkey Jump & Bug Catcher</i> 		4–5 years	Tablet (Children played 1-1 with tablets and had 1-2 supervision and support from adult.)

CHILDREN'S EXPERIENCES WITH PBS KIDS TRANSMEDIA CONTENT

A key topic of research involved children's experiences with PBS KIDS transmedia content: their perceptions of the games, what they wanted to know about the games, what they found motivating during game play, and the difficulties they encountered. To address these questions, we relied on data that had been gathered from observations of children's behavior during game play and, to a smaller extent, on interviews with children that occurred during the observations. Although children were willing to engage in conversations with researchers, often their responses to questions were focused on the mechanics of the game, and did not reveal much about how they were approaching the games as a learning experience.

Overall, children appeared to find the games entertaining and fun to play. Given the wide variety of familiar PBS KIDS characters, PBS KIDS game play narratives, and types of games represented in them, the PBS KIDS transmedia offerings had something that could satisfy every child and their proclivities for game play. Our observations and conversations with children indicate that a variety of games were popular among children, including both *Ready To Learn* as well as non-*Ready To Learn* (but PBS KIDS) offerings, namely *The Electric Company's Prankster Planet* and *Fizzy's Lunch Lab's Escape From Greasy World* as well as *Wild Kratts' Go Cheetah Go!* These were the games that we observed children selecting most often, that typically resulted in the longest sustained engagement. Researchers observed that children sometimes navigated away from the PBS KIDS Lab website to play non-*Ready To Learn* PBS KIDS games featuring characters they liked, such as *Wild Kratts*, *Caillou*, and *Word Girl*.

More complex laptop/desktop PBS KIDS games appeared to sustain elementary school children’s attention to a greater extent. Complexity could be built into a game in a variety of ways, including opportunity to advance through increasingly more sophisticated game levels, complete challenges or quests, collect points, redeem points for game-play resources, create and customize game play avatars, and so on. Children explicitly expressed a liking for “mini missions” and an interest in leveled games, emphasizing that these games were “so much fun because you can do every single level, you just have to unlock it first.” In conversations with researchers, many children highlighted the ability to earn points and/or complete missions to advance through *Escape From Greasy World* and *Prankster Planet* as desirable, appealing aspects.

Although it was typical for children to work independently at their own computer, game play was a social experience, with children taking advantage of opportunities to check in with their peers about game progress and trade strategies. In at least three out of the four settings, children appeared to enjoy playing in the company of their peers. At the mobile technology lab, for example, we observed four boys sprawled on the grass with the computers in front of them. Although they were all playing the same PBS KIDS transmedia property, gameplay was an individual experience and each child was at a different point in the game; however, throughout game play, the boys kept up a constant stream of talk as they checked in and compared notes on their progress with the game (“I’ll catch up to you,” “You can’t let those guys win,” “Oh, man this is hard.”).

In these instances, children appeared to feed off one another’s motivation to continue playing, both within a session and also across multiple sessions. For example, we observed a group of three girls at the Boys and Girls Club who reported playing *Escape From Greasy World* every day. During game play, they were constantly chatting with one another, asking questions, offering tips and tricks to tackle missions, and, in general, providing a running commentary about their progress through the game. One girl, who first discovered the game during the spring session, then shared it with her two friends when they joined her for the summer session. When asked why they preferred *Escape From Greasy World* to the other PBS KIDS games, the girls said, “I like that it takes a lot of teamwork,” and, “It’s nice to have people helping you.”

Children often seemed unsure about the academic learning goals of the PBS KIDS game. During mini-interviews, children seemed hesitant while replying to researchers’ questions about what they were learning while playing the PBS KIDS Lab games. Typical responses from children referred to the mechanics of game play rather than the content targets that the game addressed. For example, a 9-year-old noted “I do feel like I’m learning something, but I’m not quite sure. I have points, I win, and then I can learn how to get claws, they give better traction. That’s kind of learning.” Notable exceptions aside (e.g., one 8-year old interviewed for this study noted that he was learning “How to measure things: how tall things are, how wide, and measurements” from playing *Escape from Greasy World*), children pointed to the narrative of the

game (“You have to get to this girl who’s trying to prank, but you can’t let her prank”), the reward/challenge structure built into the game (“Get points—and do something in the game and help guys and sort stuff”), and the entertainment value they derived while describing what they were learning from their game play experiences (“How much fun you can have”).

In the absence of adult engagement and oversight, children often navigated away from PBS KIDS content and games. Younger children navigated away from the PBS KIDS Lab site accidentally, often by clicking on links that were displayed on the screen, which had the effect of taking them out of the game they were playing and into another game or to another website altogether. Older children mentioned an affinity for games on sites such as www.coolmath.com and www.funbrain.com, suggesting that they were more likely to deliberately navigate away from the PBS KIDS Lab site. In fact, one child even suggested that PBS develop games similar to Castle Defense games (www.coolmath.com), where players would be able to accumulate points and exchange them for resources (“buy equipment”) that could be used in the game (apparently not knowing that this content is already possible in *The Electric Company’s Prankster Planet*). Adult guidance (directions to stay on PBS Kids Lab site, instruction to play each game three times before trying a different game, etc.), the involvement of peers in the same game (which offered a group dynamic for game play), and longer, leveled games like *Prankster Planet* and *Escape From Greasy World* appeared to curtail children’s wandering and sustain their engagement with games at the PBS KIDS Lab site.

Children’s affinity for familiar and beloved PBS KIDS characters had, at times, an inadvertent consequence of pulling them away from game play. In search of opportunities to interact with their favorite characters, children sometimes navigated away from the *Ready To Learn* properties. Unless instructed to play a specific game (such as when the entire class at a Boys & Girls Club summer camp played *Prankster Planet*), children were observed selecting games featuring PBS KIDS characters that they knew and liked. Various other PBS KIDS games outside of PBS KIDS Lab were popular as children looked for characters from shows such as *Arthur*, *Caillou*, *Sesame Street*, and *Word Girl*. Games based on *Wild Kratts*¹ seemed particularly popular with older children, with one boy expressing a preference for *Wild Kratts* games because “It’s my favorite PBS show.” At the mobile technology lab, the educator encouraged children to play *Prankster Planet* or *Escape From Greasy World*, and, while most children followed this advice at first, some children later moved on to the *Wild Kratts* game suite. One boy, observing his neighbor playing *Draco Glide* exclaimed, “I love *Wild Kratts*!”

¹ Children were observed playing *Wild Kratts* games available on PBS KIDS during summer 2012. *Wild Kratts* transmedia games developed through *Ready To Learn* will be available by the end of 2012.

SOCIAL INTERACTIONS DURING PBS KIDS GAME PLAY

When technology is introduced, its design can greatly influence how play occurs. While some technology is designed to encourage more than one child playing a game at a time (for example, games with multiplayer modes) and some hardware facilitates this (for example, interactive whiteboards or headphone splitters that allow two people to listen to the same audio), most digital games and activities are designed as single-player experiences.

Within game study settings, children often were presented with PBS KIDS transmedia use predominantly as a one-to-one endeavor: one computer or tablet and one child. Nearly all activities we observed included individual children working on a computer or tablet. In many cases, one child would call out for help from another child, or from an adult, but rarely were two or more children observed playing the same game on a single computer or tablet.

During play, children tended to be social, engaging in coordinated joint or group play.

While the one-to-one computing was the norm in all four learning settings, children nevertheless turned game play into a social experience. While interacting with the PBS KIDS transmedia, children, especially the older children, continued to talk with one another, follow the game progress of peers, and ask for help from adults and other children. Often the most available assistance came from another child. When playing, children regularly looked around to see what their peers were playing and often followed another's lead to pursue a different game. In some instances, children called out their levels and competed with each other to advance to new levels. At other times, children simply asked out loud how to move forward in a game, and, once heard, would be provided with a quick answer from another student. Children playing longer, leveled games such as Prankster Planet and Escape From Greasy World were observed interacting with one another, often asking for help completing tasks and leveling up. Several children interviewed reflected on this interaction in a positive light, saying, "I like that it takes a lot of teamwork," ("D" age 8) and "It's nice to have people helping you" ("K" age 8).

EDUCATORS' APPROACH TO THE USE OF PBS KIDS TRANSMEDIA

Across the four settings, educators varied widely in terms of their backgrounds; prior experience in education, especially in informal learning environments; career aspirations; and even the extent to which they identified as educators. In the east coast site (Station B), educators included YMCA preschool teachers (who were typically required to have at least some group childcare experience and several college units in early childhood development/education) and college student employees from the public media partner who had received professional development. In the west coast site (Station A), several of the educators at all three

learning settings comprised youth development professionals, but the staff at the three settings also included team members who did not have much background or experience, or even aspirations for a career in education or early childhood development. The variation in educators' background, as well as differences across settings in purpose/learning goals for students, contributed to different patterns of adult facilitation.

Adult facilitation available to support children during their PBS KIDS game play experiences varied across the sites and learning settings. At the mobile technology lab, the drop-in nature of the program and constant turnover of children during a given period of game play kept educators busy helping children get set up on laptops and situated for PBS KIDS game play; consequently, they had less time available for engaging with the children around the PBS KIDS transmedia content or even technical troubleshooting. At the Boys and Girls Club, the educator facilitated game play in a whole-class setting. Although this provided opportunities for engaging with the children around game content, the educator was not in a position to engage one-on-one with children or provide individualized support. At the summer learning program, adults generally focused on ensuring that children were following directions (staying at their work stations, staying on the PBS KIDS site, trouble-shooting technical issues, or using the time to catch up on other tasks while children were occupied).

Typically, educators adopted a free-play approach to supporting the use of media and played the role of a “tech support” person. Most observed activities centered on the use of PBS KIDS transmedia were organized around free play periods in fixed or mobile computer labs. At these times, children had the opportunity to play the PBS KIDS transmedia games online, using desktop computers (summer learning program, Boys and Girls Club), laptops (mobile technology lab), or tablets (YMCA program). Since the informal learning environments we observed were less structured than classrooms, educators tended to adopt a free play or opportunistic approach to supporting media in which children were given basic instructions regarding behavioral expectations but little educational structure or support.

There were some important exceptions to the free-play pattern of adult-child interaction. A youth development staff member at the Boys and Girls Club orchestrated a whole-class game play experience; using a computer connected to a projector, “Mr. T” was able to model PBS KIDS game play to the class, while the children, working at individual workstations arranged in rows, facing the front of the room played along. In the context of this whole class activity, “Mr. T” demonstrated mechanics of computer use (e.g., how to log on and access the game) and supported children in engaging with the game by decoding questions and scaffolding their use of math skills. He also “paused” game play periodically, inviting children to jointly engage in the in-game missions, posing questions to the whole class, and inviting responses from multiple children. Another exception came from the YMCA program serving preschool-aged children

(Station B). Here, “digital ambassadors” interacted with children individually or in small groups. During the interactions, adults offered encouragement (“That’s right!” “You got it!” “Good job!”), helped children read the text on the computer screen, and supported children with hints and tips for game play.

At sites where adults were engaged with children more directly, their role involved making the PBS KIDS math content and goals of the games more explicit. For example, we observed a girl playing the Hide and Seek game in the Curious George series; she had reached the third level where she had to find the number “3”, the word “three”, and three chipmunks in the image. After tapping on the three chipmunks and the numeral “3”, the child sat for some time staring at the picture without making visible progress. When the digital ambassador leaned in and asked her what she was looking for, the girl pointed to the number 3 the digital ambassador said, “So you found the number 3. Now you need to look for the word ‘three.’ Can you find the word?” The girl went back to scanning the picture, found the word, and tapped it with her finger. Through interactions such as these, educators were able to provide support and focus and extend student learning that may have been obscured in the process of solo game play.

PARENT PERSPECTIVES

Many older children participating in activities at our Station A site had prior technology experience. These students would often announce that they already had a login and password because they played a game at home. In many cases, it seemed that families had worked to obtain digital devices for their children. One parent explained, “We have three computers at home, or two and a half...One is an older laptop. We have smartphones and eReaders. Mostly I read books downloaded from the library eReader on Tumblebooks. Found out about Tumblebooks by surfing the library website. We use the library, where we live.” However, there were parents who indicated they were not at all technology-proficient, and that they had their children help them with simple activities, such as logging out of a website. The majority of parents interviewed expressed support for and interest in having their child engage with technology: “...[technology] augments their learning and provides a multitude of methods of learning. With a tablet, they are more able to play with phonetic programs, or the way it is visualized. One boy is strong with math, the computer device allows him to accelerate at his own speed. The other boy grasps the concept of using computers to help himself learn, especially with student-to-teacher ratio. Games are so available that it requires them to think. Yesterday, they were using DSs [dual screens; Nintendo] to communicate with them. It’s important. Today’s world, they have to use computers. If not, they will be behind the power curve.”

Though not all parents stated they were comfortable with technology, several indicated they thought it was important for their children to be exposed to digital tools as much as possible

because of its importance to 21st-century workforce development. These parents also likely influenced children's experiences with transmedia and, perhaps, helped to support children's engagement with game play and technology use.

CHANGE OVER TIME

We were interested in exploring whether, and how, regular use and repeated exposure to the PBS KIDS transmedia would influence children's patterns of engagement and play and educators' patterns of facilitation and support. Because one of our research questions centered on change over time, we conducted two site visits, spaced several weeks apart, to each learning setting in the study sample. In the following section, we describe the changes we observed in children's interactions with and educators' approaches to PBS KIDS transmedia.

CHILDREN'S EXPERIENCES WITH PBS KIDS TRANSMEDIA

In the majority of observations, we observed no changes over time with respect to children's experience with the PBS KIDS transmedia resources. We surmised that contributing factors might include the transient nature and high turnover characteristic of informal settings in general, which precludes a consistent population of children, along with game design, which, in some cases, offers only a single level and no change in complexity or level of challenge. Children who did not have (or could not remember) a username and password mentioned returning to the same game day after day, trying to progress further into the game than the day before but first having to recomplete all the same tasks from their earlier play.

During the second visit, observers noted that children appeared more adept with the routines associated with the use of technology. For example, children, over time, became more comfortable with the sequence of steps required to boot up the computer, log in, locate the PBS KIDS transmedia properties, and begin game play. During the second visit to a YMCA site, observers found that kids lost no time settling down with the devices. They could navigate the menu, and they had developed favorite games and some level of technical fluency. Children at this site also helped digital ambassadors power off devices at the end, while children at the Boys & Girls Club were able to return their browsers to the PBS KIDS Lab main page.

Children also seemed to become proficient at the mechanics of game play over time. Researchers observed an increase in the information and strategy children shared with one another while playing the same PBS KIDS games, suggesting that children could be gaining familiarity with the game format, structure, and play mechanisms that allow for advancement. For games that included multiple levels, children began sharing information about game mechanics and appeared to enjoy competing against each other during game play, and these factors contributed to increased engagement and longer game play sessions. At one site, an

educator stated that children were developing skills in math as a result of repeated play. She explained, “Before, they would just pick till they get the right number. Now you can see some of them counting along, 10, 11, 12, 13. Now they realize you’ve got to count. They get excited when they hear ‘You’ve got a sticker for your sticker book.’”

EDUCATORS’ USE OF PBS KIDS TRANSMEDIA

Although we did not observe much change in general, with respect to educators’ approaches to using the PBS KIDS transmedia, one example stood out. While uncommon in our data, it illustrates one approach for integrating PBS KIDS transmedia as a learning tool. In this case, an educator (“Mr. T”, mentioned in a previous section) noted that his students were not engaged in a sustained way when playing games during long, free-play periods in the Boys and Girls Club computer lab. When we visited his classroom the second time, students noticed that Mr. T had modified the arrangement for gaming in the lab. Mr. T was now projecting his workstation onto the main screen, as a point of reference and also as the focal point for periodic whole-class discussions and problem solving.

When we checked in with Mr. T about the reason for the change, he explained it was his idea. He felt that concentrating on a single game “helps the children engage more deeply; their attention is sustained,” and “they are able to progress to more levels.” Researchers noted that by projecting his screen, he created an opportunity to pause and check in with students, often asking questions. It also set up a competitive dynamic—with children playing along and trying to beat his time and his score in particular tasks or challenges—that was also beneficial for children’s engagement and participation.

On the day when we were present, Mr. T selected the game Prankster Planet and was playing publicly at a pace that matched the children’s pace. While he did not require that every child be at the same point in game play throughout the experience, everyone was progressing through the levels roughly together. His focus was on engaging children in game play through the individual challenges presented by the game, and he did this both by modeling play and by maintaining a running dialogue with students during challenges.

This example suggests one way that educators can create environments that engage children in sustained game play and that can direct them toward the academic content in games in ways that will both make this content explicit, but can also enhance the game experience for children who may need some assistance with mechanics and general computer use (such as mouse or track pad support).

At other *Ready To Learn* study sites, instructors indicated their own increased comfort with the

technology, and also noted that they were now more familiar with the range of resources available to support mathematics learning using PBS KIDS transmedia. One teacher explained, “I started bringing my tablet, too [to the classroom, during ‘tablet time’]. I’m still learning mine [tablet], they helped me navigate mine.”

This example suggests a potentially powerful role for professional development as a crucial component in the support of teachers’ effective use of PBS KIDS transmedia. Teachers may still require substantial support to simply make use of new technology and media before they can be expected to innovate and modify existing practices to support the most effective use of these new tools.

RECOMMENDATIONS

The following recommendations to the CPB-PBS *Ready To Learn Initiative* grew out of the findings presented in this report; they are intended to support the ongoing design of PBS KIDS transmedia games, as well as the development of supports for educators so that the use of PBS KIDS transmedia can be optimized in diverse learning environments. Our recommendations address game content and structure, user interface issues, and support for integrating these tools into a learning context.

GAME CONTENT AND STRUCTURE

Games that include multiple levels and increasing amounts of challenge are more engaging for children, particularly those in the 6 to 11 age range. Games that have a single level of play do not invite sustained play or repeat play sessions; however, these games can offer opportunities for younger children to practice skills, provided they are supported with adult guidance to ensure that the game's learning goals are clear.

- PBS KIDS Transmedia games should be designed so as to encourage repeated visits and ongoing play. Such design will require that the game contents change with a player's experience and include a gradual increase in the level of skill required to proceed. For example, a counting game could begin with the numbers 1 through 5, but later rounds of the game could include numbers 6 through 10, thereby increasing the game's difficulty.

USER INTERFACE AND LOG-IN PROCESS

Focus of attention, mastery, and a sense of completion are important elements as children engage in game play. Our recommendations for improvement of the user interface include the following:

- A reexamination and redesign of the log-in process to support greater independence among young children, including the use of images, prompts for logging in, and examples of easy-to-remember log-in names.
- Limiting options/trajectories for exiting games and game windows, so that children are not regularly exited out of their game when they randomly click on different parts of the screen. A game option that removes the possibility for exiting a window by accident would be helpful for educators seeking to expose children to a particular game.
- Designing games with goals and logical end-points. Such design would provide a goal for children who are playing and offer a satisfying conclusion to a gaming session.

SCAFFOLDING AND SUPPORT STRUCTURES

PBS KIDS transmedia should be viewed as tool that optimally supports children's learning when accompanied with adult mediation, support, and scaffolding. Professional development and support for educators that take into account the learning goals, constraints, and other characteristics of informal learning settings are likely to promote greater uptake and more effective integration of PBS KIDS transmedia resources into the teaching and learning activities.

- Educators require professional development to make effective use of PBS KIDS transmedia, because the majority of educators are still unfamiliar with the integration of digital tools into learning activities, and because many educators are not trained to be confident technology users.
- Models of PBS KIDS transmedia use that appropriately account for the constraints of informal learning settings should be created and shared with educators to make available a range of implementation approaches and strategies that support effective use. For example, these resources should take into consideration that typically informal educators do not have much time allocated for professional development; at the same time, informal educators tend to be well-acquainted with different forms of digital media and are likely to respond well to resources and support taking advantage of present day social media (e.g., Facebook groups, Twitter, YouTube videos, etc.). The models can be based on existing examples of PBS KIDS transmedia use or can provide possible scenarios that may ignite teachers' imaginations and creativity.

IMPLICATIONS FOR FUTURE STUDIES

While the PBS KIDS Transmedia Gaming Study did not focus on the PBS KIDS progress tracking system to collect user-end data from children as originally intended, we kept in mind the needs of this system and considered how the Gaming Study findings might inform the type of data collected by the tracker, and how these data might be used to support ongoing game design and development. Researchers noted the paucity of opportunities for informal educators to examine student data of any kind. Teachers at one site provided stickers to students to mark progress on specific games, but there were no other activities that indicated adults attending to student progress beyond supporting basic game play.

We suggest that the PBS KIDS progress tracker may be most useful to researchers, developers, and designers who want to look at patterns of use by children over time. In this context, it will be important for data users to note that children's play is often not isolated. Game activities may be informed by one or more additional players, or by the activities going on in a classroom as directed by an adult. However, there may be information that can support further development of children's mathematics games available in a progress tracking system. Children's proficiency or duration of engagement with a specific type of game, or with a specific character, may become evident when viewing multiple children's data. Also, information about issues such as limiting error options or providing hints for wrong answers can be collected and used to inform later iterations of game design. These possibilities can be further examined in the context of future studies that look at PBS KIDS transmedia as a tool to support early learning in mathematics and other content areas.

This report provides a brief look at how PBS KIDS transmedia has been used in a variety of settings. However, more research is needed to address how best to support teachers to use PBS KIDS transmedia effectively, how to structure PBS KIDS transmedia games both to engage children and to ensure that a game's academic content is evident and transfers outside of game play, and how to determine what kinds of learning environments are best suited to the use of PBS KIDS transmedia.

REFERENCES

Education Development Center & SRI International (2011). *Year one context studies: Report to the CPB-PBS Ready To Learn Initiative*. New York, NY: Education Development Center and Menlo Park, CA: SRI International. Retrieved from <http://cct.edc.org/rtl/index.asp>

Education Development Center & SRI International (2012). *2012 Context Study of the Use of Technology and PBS KIDS Transmedia in the Home Environment: A report to the CPB-PBS Ready To Learn Initiative*. New York, NY: Education Development Center and Menlo Park, CA: SRI International.

Education Development Center & SRI International (2012). *2012 Preschool Pilot Study of PBS KIDS Transmedia Mathematics Content: A report to the CPB-PBS Ready To Learn Initiative*. New York, NY: Education Development Center and Menlo Park, CA: SRI International.

Education Development Center & SRI International (2012). *Ready To Learn Transmedia Demonstration Station Study: A report to the CPB-PBS Ready To Learn Initiative*. New York, NY: Education Development Center and Menlo Park, CA: SRI International.

Flyvberg, B. (2006). Five misunderstandings about case-study research. *Qualitative Inquiry*, 12(2), 219-245.

Gutierrez, K. (2008). Developing a sociocritical literacy in the third space. *Reading Research Quarterly*, 43(2), 148-164.

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