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One Screen, Many Fingers: Young Children's Collaborative Literacy Play With Digital Puppetry Apps and Touchscreen Technologies

This article examines the digital literacy practices that emerge when young children play together with digital apps on touchscreen devices. Children's collaborative composing with a digital puppetry app on a touchscreen—with many hands all busy dragging, resizing, and animating puppet characters, and many voices making sound effects, narrating, directing, and objecting—appears aimless, chaotic, and in sharp contrast to the orderly matching activities in prevalent letter and word recognition apps that dominate the early childhood educational software. The crowded collaboration around a single touchscreen looks messy but produces a complex text built with (a) touches, swipes, and other embodied actions that make up digital literacy practices; (b) sensory or multimodal layers of colorful images, dialogue, sound effects, and movement that make up animated stories; and (c) negotiation and pooling of children's individual story ideas for shared pretense that make up playful collaboration—all contained on a 9.7 inch screen.

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WHAT IS collaborative literacy play with digital puppetry apps and touchscreen technologies? And what does it really look like in classrooms? Let's begin with an illustration:

> Three girls huddle around an iPad tablet on the library table in the kindergarten classroom, giggling, making sound effects, and occasionally squealing in surprise as their fingers pinch, squeeze, and slide across the tablet's glass surface to animate the cartoon

Figure 1. Screen Capture of iPad Touchscreen: Characters On- and Off-Stage in *PuppetPals* Digital Puppetry App. Published with permission: Polished Play LLC.

characters that are scattered around the touchscreen.

At first glance, the children's play with a digital puppetry app looks crowded, noisy, and chaotic—the kind of play that teachers might move quickly to redirect to more orderly turn-taking and quiet composing. However, a closer look at just 15 seconds of continuous activity is enough to reveal the collaborative literacy play—coordinated storying, digital literacy learning, multimodal production, and play negotiation—that is actually happening here. What makes this vignette even more interesting is that it occurs during the first moments of María's first opportunity to play with this particular app. In this app, *PuppetPals*, children can immediately begin animating by pressing the red record button, dragging the cut-out characters on and off stage, moving them around the scene, and voicing their parts. Important to the focus on collaboration in this article, children need additional hands to animate more than one or two characters in order to create more complex stories.

The following transcript begins almost immediately after María opens the app and selects six characters and a backdrop: a crow, a chipmunk, a prince, a princess, a witch, and a dragon in a castle scene. (See Figure 1).

María: *Aiiigh! I'm going to eat you!*

[**Enacting Crow** by stretching and pinching the crow character with her thumb and forefinger on

Figure 2. Multiple Fingers Manipulating Characters on iPad Touchscreen in Digital Puppetry App.

her right hand to repeatedly make Crow grow and shrink until it fills half the screen].

Get the girl chipmunk out.

[**Directing Alma** by tapping Chipmunk with her left forefinger, also inviting Alma join her play and to touch the screen. She establishes herself as the director with this move.]

Alma: *Eek. Eek. Eek*.

[**Responding to María's direction; Enacting Chipmunk.** In one circling motion, drags Chipmunk from top left of scene to the off-stage margin, and then drags Chipmunk back on-stage at bottom left of the castle scene. She establishes herself as an actor in the story by adding a character cut-out to the story.]

María: *No, get him small*.

[**Directing Alma; Demonstrating resizing action** while using her thumb and forefinger pinch to squeeze Alma's Chipmunk to show resizing action. She also tacitly accepts Alma's opposing idea to add this character to the scene.]

Alma: [**Following direction; Attempting demonstrated action** but less effectively: she uses two forefingers on separate hands to resize Chipmunk smaller.]

María: Don't get him any smaller than this.

[**Editing Alma's character resizing** by placing her thumb and forefinger between María's fingers and stretches Chipmunk to make slightly larger (See Figure 2).]

A minute later, Kaila who has been watching intently, reaches in and on her first attempt successfully resizes the chipmunk to fill the screen, prompting discussion and clarification about which characters should be in the scene and what should happen next.

Clearly, a lot of lively story telling and digital composing is going on. But can one recognize the learning potential in this messy playfulness? Are educators teaching for these changing literacies and changing technologies?

Changing Literacies, Changing Technologies

In the early 21st century, definitions of literacy have evolved to include multiple ways of working with variety of screen-based media, including web pages, videos, video games, and apps on mobile devices (Burnett, 2010; Darling-Hammond et al., 2011). People not only read and write printed words on a page of paper; they now blog, podcast, text message, video-record, photo-edit, and otherwise manage complex combinations of print, sound, image, and animation as they send texts across vast social networks. One's text messages, blog posts, and YouTube clips are not individually-authored manuscripts; rather, they are multimedia coproductions shared with an interactive audience who respond, comment, like, post, and retweet to their followers (Knobel & Wilber, 2009). Even the pithy stories people write in 140-character tweets connect to other larger conversations that build on and echo each other, creating networks of linked texts and shared understandings.

Increasingly, very young children read and write on screens, often on mobile devices with touchscreens (Neumann & Neumann, 2013) such as smartphones and tablets. In fact, "children under 12 constitute one of the fastest growing segments of mobile technology users in the U.S." (Shuler, 2009, p. 3). What does this mean for educators who want to teach children to use the literacies that fill modern childhoods? Are we recognizing and incorporating the literacy practices that are so prevalent in children's worlds?

In this article, I argue that key digital literacy practices such as collaborative composing are easily learned when young children play together with digital apps on touchscreen devices. Children's collaborative composing with a digital puppetry app on a touchscreen—with many hands all busy dragging, resizing, and animating puppet characters, and many voices making sound effects, narrating, directing, and objecting—appears aimless, chaotic, and in sharp contrast to the orderly matching activities in prevalent letter- and word-recognition apps that dominate the early childhood educational software market (Guernsey, Levin, Chiong, & Severns, 2012). The crowded collaboration around a single touchscreen looks messy, but produces a complex text built with (a) touches, swipes, and other embodied actions that make up digital literacy practices; (b) sensory or *multimodal* layers of colorful images, dialogue, sound effects, and movement that make up animated stories; and (c) negotiation and pooling of children's individual story ideas for shared pretense that make up playful collaboration—all contained on a 9.7-inch screen.

Digital Literacies, Animated Stories, and Playful Collaboration

Finger Swipes and Embodied Actions in Digital Literacy Practices

Children are learning new ways of using bodies for reading and writing as they use the digital devices that surround them. For example, even toddlers understand that finger taps, pinches, and stretches on touch screens are important new ways of engaging text. The viral video on YouTube "A magazine is an iPad that does not work" quickly illustrates this (http://www.youtube.com/watch?v=aXV-yaFmQNk). Here, a toddler uses her fingers to press, tap, swipe, and pinch icons on the screen on an iPad to open various apps. However when she tries using the same finger movements on several magazines, nothing happens. Puzzled, she stops to test her finger by pressing on her own knee. This adorable video shows a toddler's emerging understanding that "turning the page" involves different actions with an iPad than with a magazine. On a touchscreen display, pressing an icon or swiping a finger across the screen changes the image and pinching and spreading thumb and fingers resizes a page. These actions are key abilities in touchscreen reading, a digital literacy practice, which as this baby discovered, simply does not work in the same way with print on a paper page.

As children use keypads and touchscreens on a broad range of technological devices, they learn to browse, view, interpret, navigate, interact, and

produce original texts (Burnett & Merchant, 2013). Merchant (2005) suggested that learning to read online texts requires a new kind of literacy knowledge and skills: Concepts specific to screen-based text (e.g., keyboard use, the mouse–cursor relationship, screen navigation) require new *concepts about screens*, awareness of the organization of space and image on screens that extends Clay's (1993) *concepts about print* needed to handle books (e.g., left to right tracking, return sweep). Table 1 lists a few digital literacy practices with computer technologies, drawn from studies of children's screen literacies and collaborative play in virtual worlds such as Webkinz (Black, 2010; Wohlwend, Vander Zanden, Husbye, & Kuby, 2011) and Club Penguin (Marsh, 2011; Wohlwend & Kargin, 2013). For example, in Club Penguin, children combine keyboard and mouse taps, cursor moves, finger jabs, and other ways of interacting with computer screens as they play side-by-side and navigate in and out of arcade games, trading posts, and igloos on-screen. Now with touchscreens, these practices must be further extended to include *concepts beyond print* with camera-enabled tablets. Table 2 suggests several additional digital literacy practices for digital devices equipped with touchscreen and voice-recognition capabilities such as tablet technologies and icon-based navigation.

Layering Multimodal Meanings in Animated Stories

Software applications often position children as readers and viewers, rather than authors and producers of digital media. However, filmmaking and digital puppetry now offer children an opportunity to produce their own animated stories, significantly in ways that encourage collaboration, build upon their play interests, and support their emerging digital literacies. Digital puppetry apps allow children to create stories by dragging cartoon or photo cut-out characters across a backdrop, while narrating or voicing their own dialogue and sound effects. Although such puppet shows can be easily produced in a matter of minutes, these videos are complex products of countless decisions that coordinate character choices such as the relative size of the characters, each player's moves, the shared storylines, and synchronized sounds and dialogue. In this way, digital video productions become multimodal ensembles (Kress, 2009; Winters, 2009), with story meanings deepened by the layered meanings represented simultaneously through speech, image, action, music, and sound effects (Flewitt, 2013; Siegel, 2006).

Furthermore, this complexity offers multiple pathways into literacy by giving children a choice of features to notice and a wide array of sensory modes to explore (e.g., sound, visual, movement, speech, and haptic modes; Simpson, Walsh, & Rowsell, 2013). In digital puppetry, this means

Table 1
Actions in Digital Literacy Practices With Computer Technologies

Computer Technologies	*Action*	*Sample Digital Literacy Practices*
Mouse	Double-Clicking	Select and open part of a digital text (e.g, webpage, e-book, video game, window)
	Clicking	Select or open a menu of options, or confirm a choice
	Hovering	See and read options, information, and menus
	Scrolling	Move through text or images across a window
Keyboard	Tapping	Confirm choice or print a symbol by pressing keys
	Toggling	Moving repeatedly (e.g., jumping) by quickly alternating two keys, especially with numeric pad or arrow keys

Table 2
Actions in Digital Literacy Practices With Tablet Technologies

Tablet Technologies	*Action*	*Sample Digital Literacy Practices*
Touchscreen	Tapping	Select and open or turn a page
		Enable voice-over or other read-aloud options
		Select, highlight, copy, and paste text
		Play or animate
	Swiping	Scroll through screens
		Turn a page
		Select and highlight text
	Pinching	Resize an object, image, or screen to make smaller
	Stretching	Resize an object, image, or screen to make larger
	Dragging	Add, delete, move or reposition objects
		Draw using a paint program
Voice Recognition	Speaking	Locate apps or search within a browser app
		Open a digital text or application
		Add narration and dialogue to a video

that children can contribute to the story in many ways: by drawing and coloring puppets, props, or background scenes; by taking photos of classroom toys for cut-out characters; by manipulating and moving characters and props; by creating voiceover dialogue and narrations; or by selecting and layering on music and sound effects.

Mixing Ideas in Playful Collaboration

Play is a collaborative literacy that uses bodies and artifacts, such as dolls and action figures, for creating and coordinating a shared storyline among multiple players. For decades, early childhood educators have known that young children make stories together as they play (Dyson, 2013; Paley, 2004). Whether playing house or playing video games, all players contribute to the emerging story and must work together, not only to create an unfolding script but also to maintain the pretend space. This is not to say that children's individual ideas always fit together neatly.

During play, stories are openly under construction as children propose characters or story action, disagree, negotiate, and improvise solutions as they work through differing visions of who should play whom and what should happen next in a coplayed text. Ethnographic studies of preschool play show that young children can manage this complexity by stepping in and out of pretense to negotiate (Corsaro, 2003) and improvise (Sawyer, 1997) to keep the play going. Vygotsky (1935/1978) theorized that this kind of imaginative pretense is an action-oriented precursor of paper and pencil writing. As children pretend, they give new symbolic meanings to real materials, similar to the ways that readers link printed words to symbolized ideas during reading and writing. In my work, I argue that it is time to update this notion to recognize that play is no longer simply a precursor to writing, but a literacy in its own right that connects to animation and live-action videos that now make up the new textual landscape (Carrington, 2005).

Supporting Collaborative Literacy Play and Digital Learning

Parents and teachers can support collaborative literacy play and digital learning in at least 2

ways. First, adults can mediate children's interactions by fostering negotiation and cooperative skill-building. Touchscreen play that produces a single story opens opportunities for cooperative learning as all players have a stake in keeping their shared story moving forward. Adults can mediate by encouraging children to listen to one another, to see from another player's perspective, to negotiate their ideas, and to develop strategies for sharing materials and decision-making (DeVries & Zan, 2012).

Second, parents and teachers can select open-ended apps for active collaborative play and rich storytelling, rather than basic skills alphabet recognition apps or read-aloud e-books. Features to consider when selecting literacy apps include:

- Ease of navigation (e.g., immediate observable reaction to a finger touch, drag and drop navigation, large uncluttered icons),
- Multiplayer (e.g., enough characters or features to operate per child, allows multiple simultaneous touches without crashing),
- Open-ended (e.g., prompts shared decision-making and negotiation among players),
- Productive (e.g., creates a meaningful narrative as in digital puppetry, animation, and filmmaking apps), and
- Richly multimodal (e.g., supports designing and recording voice, sound, action, music, color, texture; allows child to import own photographs, videos, music).

Digital apps and devices are continually evolving, but so are resources that can help parents and teachers evaluate the learning and play potential of commercial apps. Several national organizations regularly publish reports and recommendations on trends in digital media in early childhood, e.g., the Joan Ganz Cooney Center (http://www.joanganzcooneycenter.org/2014/08/15/whats-in-store-today-a-snapshot-of-kids-language-and-literacy-apps-part-1/) and the Fred Rogers Center for Early Learning and Digital Media (http://www.fredrogerscenter.org/blog/how-to-use-digital-media-with-young-children/).

Imagining Collaborative Pedagogies for Digital Futures

Today's schoolchildren will be 21st-century citizens who, very likely, will need to be experts at collaborating and inventing together … with literacies and technologies one cannot yet imagine. Elsewhere (Wohlwend, 2010), I have argued for new early-literacy pedagogies that encourage children to play into their future literacies, rather than policies that play it safe by shrinking the curriculum to fit the tiny bubbles on standardized tests. Researchers have already conceptualized collaborative digital literacies (Rowe, 2012) and productive pedagogies (Marsh, 2009) and identified teaching practices that support children's playful and productive interactions with new technologies (Levy, Yamada-Rice, & Marsh, 2013; Paciga, Lisy, & Teale, 2013; Rowe, 2012; Rowsell, Saudelli, Scott, & Bishop, 2013; Siegel, Kontovourki, Schmier, & Enriquez, 2008).

To address the possibilities and realities of modern childhoods, educators need new basics (Dyson, 2013). This means thinking beyond even the best practice in literacy teaching—such as familiar reading and writing workshops—and envisionling a play-enriched and technology-inspired literacy learning that makes sense for today's pixel-saturated 24/7 connected world. In other words, we need to expand reading and writing workshops into vibrant and creative classroom studios or "playshops" (Wohlwend, 2011, p. 122) where children collaborate to produce animated puppet shows, live-action plays, and digital films. Playshops bridge literacy practices, play, and children's multimedia knowledge in classrooms where teachers support children's video explorations and collaborative film projects to engage digital literacies through play and media production. This shift can be dramatic. When film captures previously temporary play scenarios, children can create stories on their terms using the child-friendly technology and media narratives that they know best.

Finally, a key to teaching the new basics of collaborative and productive digital literacies is the recognition that even the youngest students

already bring significant knowledge about current technologies to school and that teachers need to reframe literacy curricula to build on these strengths. We can start by building on children's existing digital literacy abilities, pervasive mobile technologies, and collaborative play skills as appropriate and powerful resources for engaged learning in the early childhood classroom.

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