



Collaborating, Animating, Improvising: Young Children in Mixed-gender Dyads Participating in Digital Pretend Play with a Story-making App

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ABSTRACT: Children in preschool classrooms generally do not select playmates of the opposite gender during traditional play activities; boys play with boys and girls play with girls most of the time. When boys and girls do play together in mixed-gender groupings, play practices at times are unequal. There is limited information, however, on how children play together across gender lines during digital play situations. The present study, informed by Vygotsky's sociocultural perspectives of children and their environments, addresses this limitation by providing close examination of young children's interactions as they played in mixed-gender dyads with an open-content *iPad* app. Data from children's peer interactions, their video productions, and teacher interviews analyzed using constructivist grounded theory techniques suggest that digital play provided children of both genders opportunities to use their imaginations and creativity as they created pretend scenarios. Findings also point to the ways enduring play themes, embedded gendered scripts, and play objects influenced the different play opportunities girls and boys experienced.

Keywords: *Digital play, young children, peer interactions, digital pretend play*

Introduction

When young children select partners for play-based activities in early childhood settings, they typically elect to play with peers of their own gender. Children's preference for same-gender playmates begins at age three and extends through the preschool years (Fabes, Martin, & Hanish, 2003; Maccoby & Jacklin, 1987; Martin, Kornienko, Schaefer, Hanish, Fabes, & Goble, 2013). This manifestation of preschool children's gender segregation is long standing, widespread, and relatively stable (Hoffman & Powlishta, 2001; Maccoby, 1990; Martin, Fabes, & Hanish, 2014). As a result, fewer than 10% of young children's play interactions involve opposite-gender peers (Martin & Fabes, 2001; Martin, Fabes, & Hanish, 2011). Same-gender play behaviors among boys differ from girls' behaviors playing with girls. Boys engage in more competitive play, whereas girls participate in more prosocial play (Charlesworth & Dzur, 1987; Rose & Rudolph, 2006). Boys are more likely to pursue their own goals through control, commands, and boasts (Maccoby, 1990; Maltz & Borker, 1983). By contrast, girls more often listen to peer suggestions, build on others' ideas, and reciprocate during turn-taking (Fabes, Martin, & Hanish, 2003; Martin & Fabes, 2001; Martin, Fabes, & Hanish, 2011). Although children prefer to play with same gender peers the majority of the time, when they do play with opposite-gender peers, boy partners tend to exercise control during play activities in ways that limit girls' access to resources and opportunities to play (Green & Rechi, 2006; Powlishta & Maccoby, 1990). Since opportunities for children to engage in digital play with peers (of either gender) are still uncommon in most preschool settings (Edwards, Henderson, Gronin, Scott, & Mirkhil, 2017; Stephen & Edwards, 2018), information on children's cross-gender peer interactions during digital play is limited.

The present study addresses this limitation in the digital play literature by closely examining young children's interactions as mixed-gender pairs of children engaged in a specific type of digital play – digital pretend play. This report begins with brief reviews of literature on children's traditional pretend play, forms of digital play, characteristics of digital pretend play, and connections between traditional and digital pretend play. Subsequent sections detail the methods and findings from a qualitative inquiry of mixed-gender digital pretend play practices and outcomes followed by discussions and implications, which offer suggestions and considerations for digital play practices with mixed-gender groups.

Children's pretend play

Vygotsky (1967) believed the interactions and activities people have with others, with things, and the cultural and social context of their surroundings influence human development. Especially significant to children's cognitive development are the social

interactions they have with others (Vygotsky, 1978). Although children interact with adults and children in a variety of contexts, most social interactions with peers happen within the context of play (Coplan & Arbeau, 2009). Vygotsky viewed play as opportunities for children to interact with their environments and use their imaginations to give objects and people new identities. And because of the symbolic substitutions and representations that occur while children interact in imaginative (or pretend) play, Vygotsky believed that play could propel children's development claiming that play is "the leading source of development in the preschool years" (Vygotsky, 1967, p.6).

Play has been categorized according to a variety of forms, functions, and dimensions by numerous researchers and theorists (Copple & Bredekamp, 2009; Pellegrini, 2011; Rubin, Fein, Vandenberg, 1983). Common to all typologies is the presence of pretend play. In pretend play (or sociodramatic play) children may substitute one thing for another, act as if they were someone else, and imagine a situation or location that is elsewhere (Fein, 1987). Children may also pretend that objects in the play situation are alive and animate them by altering their voices. When children participate in social pretend play with peers, they may assume different identities and relate to one another in their pretend identities within an imagined drama they create (Fein, 1981). Children's pretend dramas may involve altered movie scenes or stories; they also may be improvised from the start and progress through a series of spontaneous improvisations (Sawyer, 1995, 2001). In order to maintain coherence in the drama, children signal their intentions to each other with verbal and nonverbal behaviours (Kavanaugh, 2009; Pellegrini, 2011). The context of the play scene also provides clues for how to proceed in the play (Corsaro, 1986). Whether modifying a well-known story or creating a new one, children share a joint understanding - an intersubjectivity - that they are engaged in a pretend play activity of their making (Göncü, 1993).

Children's pretend behaviours on playgrounds follow familiar themes that have been prominent for decades (Opie & Opie, 1969; Sutton-Smith, 1997; Willet, 2013). Pretend personas of witches and princesses, cops and robbers, and weapons and magic, performing in pretend war games, chasing scenes, and fairytale scenarios are ever present, yet the narratives, characters, and actions change over time due to the influences of media and cultural practices (Willet, 2013). Current renditions of the chase-escape theme, for example, may include superheroes with superpowers pursuing others in fantasy-based settings, which children adopt from films and video games (Dyson, 1997; Willett, 2013). Similarly, the fairytale scenario of princesses requiring rescue by knights (Wohlwend, 2009) has been influenced by the production of Disney Princess dolls (and associated marketed good) (Golden & Jacoby, 2018).

Digital play, hybrid digital play, digital pretend play

Digital play can pertain to children engaged in play with any type of digital device or software such as digital cameras and recorders, computer programs, tablets, etc. (Bird & Edwards, 2015). Characterizing digital play especially with tablet apps is compounded by the variety of content in apps designed for children. Educational apps for children contain either open or closed content. Closed-content (or closed-design, close-ended) apps, which are believed to represent a transmission model of learning (Flewitt, Messer, & Kucirkova, 2015), provide opportunities for children to practice learning skills such as literacy and mathematics through interactive game-like tasks for which there are predetermined answers. Open-content apps, which follow a constructivist view of learning (Dezuanni, Dooley, Gattenhof & Knight, 2015), allow children to create something original with digital paints, crayons, words and other materials and position children as creators rather than consumers of content (Carrell Moore, 2017; Rowe & Miller, 2016).

Hybrid or converged play practices (Edwards, 2013; Yelland, 2015) during which children use digital technologies in conjunction with traditional play may also be considered as digital play. As in traditional pretend play with toys and props, digital technologies can also provide opportunities for children to take on imagined roles, direct others in a created play scene, and animate objects and characters in those scenes. For example, children can use digital cameras and video recorders to capture non-digital pretend play scenarios they created for themselves or for others (Bird & Edwards, 2015). Children can also engage in real-time storytelling and role-playing and then use an open app to make an animation of the play with added drawings and voice-overs that represented the pretend storyline (Fleer, 2018).

Research on young children engaged in technology-based play in conjunction with traditional play, although limited, has provided insight into children's behaviours during play activities. Bird and Edwards's (2015) study of preschool children playing with a variety of digital technologies, including an iPad, identified two forms of behaviours. Epistemic behaviours included exploring and practicing with the features of a technology whereas ludic behaviours pertain to using a technology to create a play scene (or a tangible product). Similarly, Rowe & Miller's (2016) research with young children using digital cameras, iPads, and a variety of apps to create individual eBooks identified two groupings of behaviours. "Product-focused behaviours" involved children naming and narrating images as steps to composing eBooks. At other times, children's eBooks resulted from playful "process-focused behaviours" such as pretending or exploring device functions. And, at times, children exhibited both groupings of behaviours. While using images to compose eBooks, for example, some children named and narrated the characters in the images and then assumed roles of those characters.

Carrell Moore's (2014) study of pre-kindergarten students engaged in classroom-based digital play while playing independently with an open-content iPad app revealed that children engaged in a variety of types of digital play behaviours such as sampling, experimenting, creating and engaging in pretense. Similarly, Lawrence's study (2018) of young children's social interactions during digital play with closed and open-design apps found that dyads of children playing on a shared iPad exhibited behaviours according to four types of digital play: practice/task, exploratory, construction, and pretend-related play, and suggested that these forms of play were app dependent. For example, with an open-design drawing and painting app, children cooperated by sharing ideas and collaborated to create digital images. And in a few instances, children imagined pretend scenarios based on those images.

Although instances of digital pretend play previously mentioned illustrate how some children interacted as they used their imaginations to animate and voice characters (and themselves), an app specifically designed for pretend play can supply abundant opportunities for peer interactions and creative actions. Wohlwend's research (2015) focused on kindergarten-aged play partners engaging in digital pretend play on a shared iPad with a digital puppetry app. A same-gender group of three girls participated in "collaborative literacy play" (p.155) as they created a video with a fairytale theme. Children's exhibited interactions illustrated that they coordinated their ideas and negotiated characters' on-screen moves. And while engaged in shared pretense, children animated the characters, spoke for them, and acted in the story as if they were one of them.

The research cited above on preschool children's digital play adds considerably to our knowledge of how digital technologies can enhance children's learning and creativity when playing individually or in same-gender groups. Yet neither these nor related studies examine how boys and girls experience playing and pretending together in digital spaces.

The Current Study

The aim of the present qualitative study is to add to the limited, though growing body of research on young children's digital play practices by focusing on how preschool children in mixed-gender pairs participate in digital pretend play on a shared iPad. Data from observational field notes of children's interactions during mixed-gender dyadic play, transcriptions of their digital video creations, and interviews with teachers were analyzed using constructivist grounded theory. Three questions guided the research: How do children in mixed-gender pairs interact with each other during digital play? What characterizes the outcomes of that play? What factors seem to shape the play?

Method

Participants

Preschool children (four to five years old) from one classroom were participants in the current research on mixed-gender pairs of children engaged in digital play. This focus on mixed-gender digital play stems from a larger project, comprised of 45 digital play episodes during which children played in both same-gender and mixed-gender pairs. Twenty-three of the 25 children enrolled in the classroom were given parental permission to participate in digital play with peers. Sixteen of the 23 children who had permission constituted the mixed-gender digital play sessions under study; nine children were girls and seven were boys. Two children were biracial (African American and white); 14 children were white. All children spoke English as their first language; no child had a diagnosed learning disability.

Early childhood educators and adult researchers were also participants in the study. Two experienced white female teachers designed and enacted the play-based curriculum. Eight female researchers (the primary researcher and seven research assistants) collected observational field notes during digital play sessions. The primary researcher and three assistants were white. Four assistants were women of color: two assistants were Asian American, one was African American, and one was Latinx.

Since issues of confidentiality and anonymity are paramount when conducting research with young children, guidelines and requirements for research with human subjects established by the university's Institutional Review Board (IRB) pertaining to data collection and confidentiality were strictly followed for this study. Parents' signature on a Parent Consent Form verified that they understood that their child's participation in 10-15 minute digital play session was voluntary, the child could discontinue participation at any point, the child would only be playing with open-content creative apps, and no child's name or identifying characteristics would appear in recorded data or written reports. Parents also understood that the play sessions would be facilitated by two adults experienced in qualitative methods of research, and knowledgeable of ethical issues of research with young children. Additionally, all data collection protocols and instruments pertaining to participants were approved by the IRB.

The setting and procedure

A university-based private preschool in a lower-to-middle socio-economic community that served both university and community families was the site of data collection. During structured and free-play periods, assigned pairs of children had the opportunity to play together with a shared iPad in a designated classroom space. Play with iPads was

voluntary, and no child opted out of iPad play. Because teachers believed that children should have equal opportunity to participate in digital play, teachers monitored who participated in play sessions. For each digital play session, the iPad was opened to reveal researcher-selected apps. Children were instructed to share the use of the iPad and decide together which app(s) they wanted to play. All children learned how to access, use, and explore the apps from the primary researcher during the previous semester.

The device was loaded with three open-content apps (also referred to as open-design). Open-content apps were selected because they have been identified by digital play researchers and early learning educators as ones that provide children opportunities to use their imaginations while creating new content (Carrell Moore, 2017; Marsh, Plowman, Yamada-Rice, Bishop, & Scott, 2016; Wohlwend, 2015). Two of the three apps were coloring and painting apps: *Doodle Buddy* (Pinger, 2012) and *Draw and Tell HD* (Duck, Duck, Moose LLC, 2008-19). The third app, *Puppet Pals HD Director's Pass* (Polished Play LCC, 2018) was a story-making app that enabled children to select, animate, and voice characters, choose backdrops, record and view a story. During digital play sessions, children could choose any of the apps.

Play with *Puppet Pals* was the selected focus for the present study because it is the app that children played with most often and for longer time intervals. The app permitted multiple fingers on a screen for coordinating character movements, co-creating video productions and co-viewing the playbacks. The selection of *Puppet Pals* as the platform for digital play combined with study's aim to learn more about mixed-gender digital pretend play resulted in the identification of 13 mixed-gender digital play sessions as sites for data collection and analysis. All children knew each other from large group classroom routines and activities; none had previously chosen each other for play at any of the activity centers.

Each peer partner could select two from among 54 pre-selected characters and two of the 21 possible backdrops. The number of characters available to children was limited in an effort to have similar numbers of male, female and neutral characters and to keep decision making manageable. Researchers reminded children of the time limit of the play sessions and reviewed app functions and features. The cartoon-like characters supplied by the app included human to form as well as four-legged animals, insects, and inanimate objects. Male human characters represented gender-stereotyped male occupations such as police officers, firefighters, and astronauts. Female human characters included some gender-stereotyped fairytale characters such as, a pink-gowned princess and a witch as well those in non-stereotypical professions such as medical doctors, aviators, and politicians. Animals and insects, such as sheep, squirrels and butterflies, had non-human bodies but human-like facial features (i.e., smiling butterflies and scowling crows). Inanimate objects were vehicles. Backdrops portrayed streets, nature, and outer space scenes.

Data collected

Three sources of data were collected for analysis. The main sources of data were observational field notes of children's verbal and non-verbal social interactions as they played with Puppet Pals. Each play session was observed and monitored by a pair of researchers, either the primary researcher, and an undergraduate research assistant or two research assistants. One researcher recorded field notes of children's interactions while the other observed and scaffolded the play (i.e., reminded children about sharing, answered questions, and provided technical assistance). After each session, researchers met to discuss and refine field notes and ensure that pseudonyms were used when referring to individual children.

Transcriptions of children's video creations (ranging from 1 to 4 minutes) constituted another main source of data. The in-app video feature of Puppet Pals allows children to record and view their productions. The third source of data included teachers' perspectives on children's play behaviours obtained from individual hour-long semi-structured interviews (Seidman, 2006) that were audio-recorded and transcribed. Open-ended questions focused on teachers' views about digital technology in their classroom and their perspectives on children's interactions during iPad play. Examples of questions include: Did you notice children acting any differently during iPad play compared to other play activities? What stands out for you in terms of peer interactions while children were playing with iPads?

Data analysis

Field notes from real-time observations of children's interactions during digital play and transcriptions of children's video productions were analyzed using constructivist grounded theory, a systematic, dynamic and flexible qualitative method for studying group and individual social processes (Charmaz, 2006). Constructivist grounded theory acknowledges that all data are social constructions and recognizes the importance of agency, context, and interpretation (Charmaz, 2014) for understanding both the what, and the how, of phenomena under study. These guiding principles seem fitting not only for understanding the ways in which peers interact during digital play, but also for exploring factors that may shape their play actions and video creations.

The designated units of analyses for the study were social interactions, both those occurring between members of the dyads as well as those occurring between animated characters on the screen. Field notes of interactions during play sessions and transcriptions of video productions were synthesized and reviewed each week to identify the forms and features of children's behaviours. These textual depictions of behaviour were divided into meaning units during open coding and labelled with gerunds such as

“expanding and pinching,” “rapidly switching backgrounds,” “making engine sounds,” “adding to the storyline,” “giggling together.”

The research team met weekly to discuss and refine lists of codes. In order to identify focused codes - codes that were recurring, salient, and could be used to label larger chunks of data (Strauss & Corbin, 1998) - the lead researcher selected two sample coded sessions to discuss in team meetings. Some determined focused codes included responding, demanding, improvising, chasing, laughing, etc. Reliability of the focused codes were further checked by an early childhood professional who applied focused codes to two of the 13 digital play sessions. Focused codes applied to the sessions by the professional educator were compared to those arising from team decisions and yielded 90% intercoder agreement. Focused codes were then further refined and applied to all sessions.

Salient and recurring codes arising from analysis of digital play sessions also were used for qualitative content analysis of the text of teachers’ transcribed interviews. Qualitative content analysis can involve varied techniques: a direct content analysis approach, for example, permits codes and themes arising from one form of data for use as codes in a different form of data within the same study (Hsieh & Shannon, 2005). In the present study, educators’ views about digital play behaviours were labelled with some of the focused codes constructed from analysis of play sessions such as connecting, listening, sharing, having fun, etc.

Focused codes were instrumental in the construction of categories - a higher order grouping of children’s exhibited actions that are related in some way. Examples of categories included cooperating, leading and following, exploring features, narrating actions, and following/changing storylines. Continued “constant comparisons” (Glaser & Strauss, 1967) between and among categories highlighted relationships among data and were instrumental in the construction of themes such as digital dramas, human and nonhuman agency, combat narratives, sustained dialogues. Further comparison and consolidation of thematic content across levels of analysis resulted in the construction of overarching themes - themes that led to “interpretive understandings” (Charmaz, 2008, p. 402) of how preschool children in mixed-gender pairs interacted during play as well as what characterized the outcomes of their play.

Findings and Discussion

The “interpretive understandings” stemming from multiple levels of qualitative analyses captured within four overarching themes revealed how children in mixed-gender pairs played together in shared digital space, the forms and features of their play, the productions that stemmed from the play, and the context surrounding the play. As such, these themes address the research questions posed: How do children in mixed-gender pairs interact with each other during digital play? What characterizes the outcomes of that play? What factors seemed to shape the play?

The first theme, “imagining and pretending in digital spaces,” describes the ways children used their imaginations as they interacted in digital pretend play with each other. The next theme, “digital play explorations and productions,” characterizes the outcomes of their play. A close examination of the gendered behaviors children exhibited as they created digital dramas constitutes the third theme entitled “narratives and counternarratives in gendered scripts.” The impact that the presence of digital technology in the play space had on children’s behaviors is addressed in “the role of digital technology in peer collaborative play,” the fourth theme. A discussion of each of these themes follow.

Imagining and pretending in shared digital space

During play with Puppet Pals children manipulated app characters using fine-motor finger movements to move characters, twirl them around and upside down, and position them on the screen. Children altered the physical dimension of characters by pinching to minimize and expanding to enlarge and announced the results of their actions (i.e., “She’s a giant princess” and “He’s falling over now.” And when children saw these distortions of humans and non-humans on the screen, they squealed with excitement, giggled, and laughed out loud.

Peers also created pretend play scenarios for app characters. At times, children were directors of characters’ positions and narrated character moves as if telling a story such as, “The bird quacks and everybody laughs” and “She’s going to step on the airplane.” Most of the time, however, children employed animation - a play practice whereby children treat digital characters as if they were alive (Björk-Willén & Aronsson, 2014). Children also pretended that they were the characters and spoke using first person pronouns: “I’m on fire; I need to get to the moon” “I’m getting even bigger than you!” As children enact different roles in real time pretend play, they may also alter their voices to speak in various roles. When children are playing and speaking in specific roles (similar to actors in theatre), children are described as “directly voicing” themselves (Sawyer, 1996, p.292). If children are utilizing toys, puppets or other inanimate props as the actors in a scenario, they speak for the actors through “indirect voicing” (p. 293) by employing

sounds and tones they imagine their fantasy actors possess. These behaviors with app characters were similar to avatars in digital gaming who enact two roles: as stand-ins for children during the play or as directors orchestrating characters' behaviors (Burns, 2013), and they permeated all digital play sessions in the current study.

Children's demonstrated imaginative play with app characters shares many properties with children's traditional (e.g., non-digital) pretend play. Social pretend play in real life involves symbolism, substitution, and representation and a child may act as the imagined other in an imagined world (Fein, 1981, 1987). In digital pretend play, children similarly employed substitution and representation as they narrated and animated characters in a scenario to act on their behalf often using first person pronouns (for example, pretending to be a fairy godmother announcing, "I will help you; I can help you!").

During social pretend play on playgrounds and in classrooms, young children improvise scenarios together and make adjustments as they play, similar to "group improvisation" (Sawyer, 1995, p. 129). Children in digital pretend also improvised interactions of characters by having characters respond to each other (for example, "I'm big enough; I can carry you now!" followed by "No, you're not!") and by countering the actions of peer's character such as obscuring the screen with hyper enlargements of their characters. Like improvisation in traditional play that adds twists and turns to the storylines (Fein, 1987), children's digital improvisations served to expand the pretend scenario and sustain peer play. And, teachers believed that children engaging in iPad play in these ways furthered children's social emotional development and enhanced a number of skills, such as "taking turns, sharing, listening to other ideas, compromising, self-regulating."

Digital play explorations and productions

Exploratory play

Statements of narration and animation were present in all thirteen digital play sessions, and the degree to which children displayed these behaviors influenced the forms and outcomes of their play engagement. In five of the sessions, children's statements were brief and topics undeveloped. Children's actions were primarily exploratory and mainly focused on sizing or moving characters and switching backgrounds. And although children talked, voiced exclamations, and uttered sound effects, there was no identifiable storyline. The following excerpt from a video entitled "Story about nothing" by Vera and Ross is representative of the type of interactions children had with one another and with their characters during exploratory play episodes.

... Ross moves his 'stink bug' all around the inside of the castle asking Vera's princess character, "What are you doing?" Without responding Vera shrinks the princess; Ross follows and shrinks the bug....He then enlarges the bug to screen size boasting, "Huge, I'm huge, I'm humongous" several

times. Vera moves princess to the stage and switches the background to a sky scene...When Ross returns the bug to the scene, he speaks as the bug, "I'm the stink bug, I'm the stink bug, I'm bigger than the tooth fairy!" Vera remarks quizzically, "That's a tooth fairy? It's just a fairy."... When Vera has difficulty enlarging princess, Ross remarks, "I know how to do it; I'm an excellent job at making bigger!" Vera says she wants to make the princess big herself and enlarges it emphasizing, "I made this bigger." ...Vera changes backgrounds again and declares excitedly while looking at their 4 characters, "Hey, look where we are; we're in the sky!"...

Throughout the session Ross and Vera took turns making exploratory moves with their fingers on the screen as sized and moved characters, and switched backdrops. They also narrated character actions and animated the characters' words to some degree. Occasionally children also stepped out of the pretend play frame to speak as themselves, offering technical assistance and acknowledging technical ability. And throughout the session the children smiled and had fun as they played and when they viewed their completed video.

Exploratory digital play sessions such as the one highlighted above resemble a type of epistemic play: play during which children experiment with the tools of a technology, such as with app functions (Bird & Edwards, 2015). Exploratory play is also consistent with Carrell Moore's (2014) and Lawrence's (2018) typologies of digital play involving experimenting with app features. Additionally, these play sessions share some characteristics of parallel/associative play (Parten, 1932). During parallel/associative play in classrooms with non-digital (i.e., traditional) play objects, children tend to play with their own materials with minimal peer interaction. Similarly, children participating in exploratory digital play appeared to play independently on one screen, often with two characters on each side, without much dialogue between them or their characters. Nevertheless, children engaged and explored together and found characters' distorted appearances and absurd positions quite humorous. Teachers noted that these exploratory sessions seemed particularly advantageous for some children who seldom took risks. The opportunity to experiment with features of the app and see their accomplishments on video seemed to enable children to "try something new" and have fun in the presence of a peer.

Digital dramas

In contrast to children's brief verbalizations during the five exploratory play sessions, children employed extensive narrations and animations for the digital dramas they created during eight construction/creative play sessions. Not only did children narrate character moves and voice the characters as if they were talking for them, they also had their characters interact with others through "animated dialogues" (Björk-Willén & Aronsson, 2014) which functioned to form a storyline. All eight digital dramas, which children created, had distinctive storylines; as such, the production of digital dramas is

consistent with a form of ludic digital play (Bird & Edwards, 2015; Burns, 2013). These creations also align with the categories of digital construction play and digital pretend play (Carrell Moore, 2014; Lawrence, 2018).

Of the eight digital dramas with storylines, three involved scenarios of adventure or travel, and five scenarios followed chase-escape (or chase-attack) themes. In adventure episodes, children moved scenes and backdrops in ordered sequences (as in travel from one point to another) and engaged with each other in real time. They also engaged with peer partners through their characters as they narrated or talked about pretend situations. For example, in their fantasy video, “Everybody goes to the future and meets” Hudson and Anya exchanged ideas about a discovery Hudson made:

....Hudson enlarges the police officer (who is holding a donut). While looking at characters through the enlarged donut hole, Hudson shouts excitedly to Anya, “We’re going in a donut! We’re going in a donut!” Both children take turns enlarging the donut hole and giggle at what they see; Hudson even jokes with characters saying, “Hey, want a donut?”....As Anya stares at characters through the hole, she says that the hole “looks like a halo” and suggests to Hudson, “How about it’s the future?” “Maybe we’re in the future?”....Anya then moves her princess and knight characters closer together and she narrates their actions and animates them in an imagined time period: “Once upon a time there was a princess named Belle, and a knight came over and said, ‘Would you like to marry me? The princess said No!’”

While engaged in sizing characters, Hudson seemed quite surprised with his discovery and suggested what it might mean. Anya built on Hudson’s idea and then added her own speculation about what was appearing on the screen. The back and forth sharing of possible meanings for the outcome on the screen seemed to delight them and hold their interest. And while constructing a storyline, children giggled, joked and had fun with each other and their characters.

While the three adventure/travel themed dramas had varied itineraries, five digital dramas, which children produced followed a type of chase-escape (or chase-attack) theme, which has been prominent on U.S. playgrounds for decades (Opie & Opie, 1969; Willet, 2013). Upon close examination of the five digitally-enacted chase-escape dramas children created, there was an obvious commonality. The initial chase (or attack) as well as subsequent threats and attacks were orchestrated by boy partners while girls responded to each action in creative ways.

The following excerpt from Paige and Curt’s video “Cuckoo” is typical of how animating and voicing characters evolved during digital chase-escape scenes. In this scenario, Paige selected a princess and butterfly while Curt chose an astronaut and moon rover vehicle. Curt begins the action by rapidly moving characters across the screen:

....he then drives the vehicle over the princess. Paige utters in a firm and demanding manner "Ouch my head! You broke my head off! Stop it! Both children stop and giggle as Paige voices the princess in a tone that is not her own.Paige then shrinks both the astronaut and princess until they are both the same small size. Curt counters by enlarging and animating the astronaut to chase the tiny princess across the screen while singing "The princess, the princess, we don't like her; put her in a cage." ...Curt then announces firmly to the princess, "I'm going to take you away! I'm taking you to jail!" Paige enlarges the princess and speaks for her in a singing, taunting tone, "You can't take me; I'm too big to carry. Yay, yay, yay!"....Curt enlarges and positions the moon vehicle on the princess's head. Paige objects loudly and hyper enlarges princess to fill the entire screen with the pink dress.....Curt moves the space vehicle all around the screen singing in a silly voice tone, "I'm a cuckoo driving all around outer space."

Paige and Curt participated in reciprocal turn taking and screen sharing throughout the scenario, and both seemed focused on keeping up with actions on the screen and competing to get ahead through moves and countermoves. Curt as pursuer improvised several threats and attacks while Paige as resister improvised varied evasions and challenges to the pursuits. For example, when Curt's animated characters initiated the collision, Paige had her princess sustain a pretend head injury and Paige voiced her to utter "Ouch!" - a digital response cry (Aarsand & Aronsson, 2009; Goffman, 1978). Princess also demanded an end to assaults, minimized Curt's characters, and disputed Curt's claim of power (e.g., yes-I-can/no-you-can't). And, in her final maneuver, Paige filled the entire screen with the princess image which served to temporarily stop all action. Yet despite children's somewhat competitive actions, their interactions were also playful and silly at times; and, after the play, they settled into their seats to view their production laughing loudly together.

The other four chase-and-escape dramas involved similar initial and improvisational moves: boy-initiated threats to a partner's characters such as a bee closing in on a princess announcing, "Sting, sting, sting, sting!" or a crow moving on top of a (female) baker warning, "I'm going to eat you!" Girl partners followed by animating characters to avoid/respond to each attack by improvising in distinct ways. And in one particular drama, when Stephen animated a truck to conduct widespread attacks on multiple human and non-human characters, Sylvia employed magic to repair all the injuries to "get everything back to normal" and even persuaded the truck to agree to refrain from any further attacks.

In all of the digital dramas both peers were engaged in the scenario they co-created, and neither drifted away from the theme. Several factors kept the fast action flowing. As in pretend scenarios during traditional play, children's use of announcements (i.e., I'm going to take you away), changing voice intonations (from silliness to demanding), and different play actions (such as approaching a peer's character), signaled to one another information about the roles they were taking (Cook-Gumperz & Corsaro, 1977) and provided ways for

peer partners to “plug into” the play scene (Corsaro, 1986, p. 98) and continue the storyline while adding complexity to the play.

Narratives and counternarratives in gendered scripts

As evident in the previous theme, the content and procedures of the storylines in the five chase-escape digital dramas were gendered events. Although playground chase-escape narratives are not in themselves gendered since both boys and girls participate in chase episodes during traditional play on playgrounds (Willett, 2013), boys more than girls seem to enjoy the action inherent in chase scenarios (Sutton-Smith, 1997), and are more likely to initiate chase-escape play themes (Pellegrini, 2009). These observations of traditional play were echoed in digital chase-escape play. Female characters were the ones chased, attacked and threatened by boy partners who were the ones to initiate the chase.

The characters children selected for their play were also gendered. Girls in the 13 mixed-gender dyads selected the following: 15 female actors (ten were princesses), five male characters (four were knights) and six non-human (four were butterflies). Boys selected 13 male actors, one female fairytale character, and 12 non-human actors (ten were vehicles). These 52 digital characters were similar to gender-stereotyped characteristics found in young children’s art, stories, and pretend play in preschool settings (Alter-Muri & Vazzano, 2014; Boyatzis & Eades, 1999; Opie & Opie, 1969; Pellegrini, 2009). Nearly all of the boys’ selections were male-identified or machines. Fifteen of girls’ twenty-six characters were female actors with princesses as the most popular choice - a situation still prevalent in young children’s pretend scenarios during traditional play (Golden & Jacoby, 2018; Willett, 2013). Furthermore, girls’ chosen male characters were primarily knights who have typically partnered with princesses in fairytales (Baker & Davies, 1992; Davies, 1990).

Despite the prevalence of stereotypically-gendered characters in children’s creations, stereotypical characters, especially princesses, do not always appear passive as in established fairy tale narrative themes (Wohlwend, 2009; Willett, 2013). Children often revise established themes by injecting fantasy - revisions that can help children to feel powerful in ways that also counter gender-stereotyped roles (Dyson, 1997; Fernie, Davies, Kantor, & Murray, 1993; Weida, 2011). Princesses in this study were certainly not passive. Girls employed fantasy, agency and power and used their imaginations to get digital characters out of threatening situations. They voiced princesses and other characters to reject a move and demand an end to an attack, they used their technical knowledge to resize their characters to challenge the pursuer, and, they empowered their characters with magic. Girls’ creative improvisations enabled them to fully participate in

the play theme initiated by boys, and they seemed to enjoy the give-and-take with peer partners – conversing, challenging, and giggling at moves on the screen.

The role of digital technology in peer collaborative play

When mixed-gender pairs of children were invited to digital play sessions, neither peer refused the invitation, even though the children had not previously played with assigned playmates, either in dyadic arrangement or small group configuration. Instead, children moved toward the iPad table gleefully sometimes skipping to their seats. Furthermore, as play sessions evolved children did not want play to end. It seems that the composition of play dyads was not a factor in children’s decision to participate in digital play.

A more likely factor influencing children’s attitudes about digital play across gender lines was the digital technology itself. The iPad, and associated apps, continues to be a successful digital device and remains a prized resource for young children who tend to view it as a toy (Dezuanni et al., 2015). And because iPads were not usually available to children in the preschool, an iPad in the classroom was a novelty.

Like other play objects, digital devices (such as iPads) are agents that can play a variety of roles and functions (Allen-Robertson, 2017); children can use them as recorders, viewers, readers, games, story-tellers, etc. But the iPad also can influence other actors such as children and activities involved in social play (Allen-Robertson, 2017; Mustola, 2018). In the current study the iPad influenced children’s digital play behaviors by its mere presence in the classroom. Children could hear sounds emanating from the iPad table and the children playing, and they were eager to engage with the device, often inquiring at the iPad table “is it my turn?” It seems that any opportunity to play with iPads, a powerful lure that appeared to “beckon children” (Lafton, 2015), superseded any tendencies children might have had to refrain from play across gender lines or with those they did not know well.

Classroom educators also recognized the agency of the iPad and felt digital play with the iPad “brought children together.” Teachers also felt that the lure of the iPad also precipitated new play interactions for some children. Teachers remarked that certain introverted children “kind of came out of themselves – out of their shells” and became “more verbal.” Hearing formerly isolated children giggling and acting silly while participating in peer digital play was a heartwarming experience for teachers. While holding her hand over her heart, one teacher commented, “the image of Martin laughing and being silly will stay with me...I never heard him laugh before.”

Not only did children enjoy digital play with peers not of their choosing, four of the thirteen mixed-gender dyads continued to play together in different activities after a digital play session ended. Those paired activities included creating a hide-the-bottle

game together, printmaking with plastic bottles, playing a literacy game, snacking and playing together on the playground. These, as well as other, mixed-gender post-digital play relationships were also recognized and appreciated by teachers who attributed the new play arrangements to the capacity of the iPad as an agent for collaboration: “some of the girl-boy pairings with the iPad transferred over to relationships at other activities and that probably would not have happened otherwise.” Teachers were appreciative of the influence of digital play on children’s new playmates. As one teacher remarked “They discovered each other, and that was kind of sweet.”

Conclusions

Preschool children in this study engaged in mixed-gender peer play with PuppetPals in enjoyable and productive ways. Whether interacting with peers during exploratory play or engaging in frequent back-and-forth peer interactions during production/creative play, children had fun together. The unconventional images children created such as a human-sized bee on the moon, tiny tractors inside a haystack, or an enlarged astronaut sitting on a castle caused them to giggle and squeal while creating and watching them in action. As is typical of children altering reality in traditional pretend play (Fein, 1987), children making digital images with distortions and bizarre renditions of reality can be pleasurable acts for young children (Mustola, 2018; Wohlwend, 2015). Children also enjoyed producing something new during the play sessions. Peer partners were proud of their video creations: recordings that depicted a variety of sizing maneuvers accompanied by squeals and giggles as well as digital dramas with storylines. Both types of productions illustrated the ways children used imaginations and symbolic representations (Vygotsky, 1978) to make imagined objects talk and act for them.

In addition to enjoying the play process and the resulting play productions, children also seemed to enjoy their new play partners. Even though not all children knew their classmates’ names, the digital play sessions ran smoothly with minimal tension. Peers exhibited many cooperative behaviours during the play: shared the iPad screen, took turns equitably, made suggestions, joked with each other, responded to one another’s ideas, and collaborated to create a novel product. Children also provided support to peers such as when a girl put her arm on her partner after viewing their video and said, “Good job!” and when a boy suggested to his partner, “you can have one of my characters if you want.” And, at times, children engaged with their new playmates after digital play ended.

Children’s exhibited cooperative behaviours and collaborative efforts, vital for productive play, appeared related to both human and non-human agents. The iPad was a novel toy in the classroom, and since all children wanted to play with it, the iPad seemed to serve as an active agent bringing unlikely classmates together and keeping them together during

play. And, as a result of peer play sessions with the iPad, some children discovered new playmates; others engaged with classmates for the first time. Adults in the classroom also influenced the play in positive ways. Researchers scaffolded the play by reminding children about rules and procedures, furnishing technical assistance, and problem solving. Similarly, teachers also scaffolded children's play. Assuming that sharing an iPad would be difficult for some, teachers enacted a role play that emphasized sharing with teachers and children acting in reverse roles. Thereafter, children issued reminders to peers saying, "Hey, that's not how we do it - we share" or "Remember how they (the teachers) did it?" Multi-level scaffolding measures such as these can minimize misunderstandings and enhance peer digital play (Lee, 2015; Wohlwend, 2015; Yelland & Masters, 2007).

Despite children's cooperative peer interactions and the fun they experienced in the digital play sessions, the mixed-gender sessions did not always result in equitable peer play. During the five chase-escape digital dramas, for example, girl partners were often on the receiving end of the initial chase (or attack) and had to devise ways to respond to a scenario that had been set for them. Typically, boys' eagerness and fast hands on the screen began the pretend play scenario by making their character chase and/or attack partners' characters, often the princesses. The scenarios evolved quickly, and unless girl partners were content to see their characters to get squashed, lose their heads, or go to jail, they responded. An option girls did not take was to leave the play. Girls stayed with the play episode by employing creative maneuvers: improvising responses to attacks, blocking the screen to stop action, and adding new twists that changed the storyline. These empowering responses also served to counter the culturally-based gender stereotype of the helpless female (i.e., princess) present in peer culture.

Even though digital play with opposite-gender peers can yield positive outcomes as this small-scale study illustrates, teachers must consider the subtle inequalities in mixed-gender play. Enduring narratives about passive females and playground themes embedded in peer cultures such as chase-escape (which boys prefer more than girls) can influence play outcomes in ways that limit girls' opportunities for equitable play in mixed-gender groupings. Adults must continue to acknowledge and plan for these silent but powerful cultural forces operating in children's play. From the current study and previous research, we know that gendered play practices can change. Girls may select princesses as their primary characters in pretend, but they do not necessarily follow fairytale storylines; instead, princesses can act with agency and power (Wohlwend, 2009). Children can and do reinterpret and revise gendered narratives during traditional play activities (Änggård, 2005; Fernie, et al., 1993; Henward & MacGillivray, 2014), and as demonstrated here, they can make similar reinterpretations and revisions during digital pretend play. As such, they offer hope that continued efforts by children and adults will ultimately change long-standing gendered narratives both off and on screens.

Implications, limitations and future directions

Results demonstrate that, for children in this study, grouping them with unfamiliar peers (even across gender lines) for digital play activities can lead to cooperative, collaborative, and creative outcomes when accompanied by intentional and effective scaffolding. These findings, however, may have been particular to the characteristics of the children and the site for data collection. The preschool setting provided children with a structured play-based curriculum and the enrolment was rather homogeneous in terms of race, class, and language. Research in different classrooms with a more diverse population may yield different results and be more beneficial to a wider audience. Additionally, studies of digital play among same-gender dyads as well as with different pretense-focused apps may illuminate whether children's digital interactions and theme-focused digital productions were unique to the pairings under study, the app utilized for play, or the characters children selected for digital play.

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