STEAM
STREAM into Online Play Groups
How Children Adapt to Play in a Rapidly Digitized World

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Abstract
The purpose of this article is to explore the relationship between technology integration and play from a whole child perspective, specifically through online play groups. As play continues to decline and vanish from our schools completely, the author believes we must reexamine the countless benefits of play across STREAM education. With current digital advancements, children will adapt to online play and continue to develop their creative and analytical skills. The author suggests that with continued support from parents and educators, children who are encouraged to have a say in what and how they learn can use online play to build a solid STREAM foundation.

Key Words: online, play, play group, STREAM, technology, toys

Introduction
Due to the ease of accessing technology, devices such as television, tablets, and online games have become increasingly present for today's youth. Access to the ever-expanding digital frontier is changing the way in which children play, incorporating several different modes, and creating multimodal forms of play. As Kress states, "multimodality can tell us what modes are used" as we question "how does it work" (2010, p. 1). The multimodal nature of play in the

digital world has led to increasing opportunities for children to engage in meaningfully integrated play across the subjects of STREAM (Science, Technology, Reading, Engineering, the Arts, and Mathematics). Furthermore, children naturally build upon their modes, drawing from familiarity while mixing content, material, and cultural awareness to create their comfort of expression. For example, as children create a dance to music, bring in toys to spin and swing as the beat continues, and sing with all their might, they are participating in multimodal play. Although multiple dominant discourses situate children's interactions with technology as dangerous, when examining what children do with technology, those dominant assumptions become complicated and are often challenged and disrupted in the literature (Gottschalk, 2019). By observing what children do with technology and media in their play, evidence suggests that they often build upon stories and create their own spin-offs with malleable characters and plot points as they incorporate media and technology into their imaginative play. In a study about "Princess Players," Wohlwend (2011) discusses how children use toys as text: "toys associated with children's popular animated films or television programs encourage children to play and replay familiar scripts and character roles" (p. 79), which create limitless opportunities and elevate social boundaries based on children's beloved media characters. As children play, they put their favorite characters above all others and even recite statements made from media as factual. This type of behavior can be described as children displaying media authoritarianism, when children give power to media for the simple fact that it is media and holds power. Toys encourage play, construction, and dialogue long after the media element has ended. Children have opportunities to interweave digital and non-digital modes to create their own authentic play and literary journeys. Furthermore, digital integration with play presents opportunities for children to utilize scientific inquiry, engage with engineering concepts, and build logical mathematical understandings through explorations and investigations. Therefore, the purpose of this paper is to explore the relationship between technology integration and play from a whole child perspective, specifically through online play groups. As a result, when children have the opportunity to play online with friends, they are able to utilize their imagination and creativity, creating the occasion to embark upon explorations that involve STREAM content through digital, imaginative play.

A Changing World
Within this new digital frontier, toys based on children's favorite movies and television series are important artifacts that can be used to support learning and build interest in topics through the integration of technology and media. Similar to a favorite stuffed animal that comforts a child at bedtime, children have developed a deep connection to these characters and stories that become part of their daily lives. Technological tools and resources, including online play groups, can be used to support learning and build relationships and connections among children. For instance, when a child makes a new friend who exists only in their cyber world because they share similar interests in toys and media, it showcases the limitless potential of technological advances with regards to children's play.

Adding to our already technology-driven culture, our country entered into a pandemic and forced schools to move to remote instruction, which required children to rely on computers and tablets

for daily educational instruction. State mandates kept playgrounds closed and limited social gatherings, forcing online classes to be the only social outlet for children. In turn, a new approach to play emerged, online play groups, where children meet with friends through online platforms sharing their toys, discussing the plot of their favorite television shows, participating in multi-house scavenger hunts, and so forth. Sometimes these play groups meet when children staying online after class, when the majority of others have logged off, including their teacher. Other times, parents coordinate with one another to set up specific times when children could meet to chat, share, and just be kids. These new digital play groups open a whole new "playground" for imaginative play, "providing a natural, social context for experts and novices to interact" (Stone & Stone, 2015, p. 13). The only difference is that it is solely online.

Children learn technology skills, how to navigate the internet and share their screen; they learn to engage patiently as one person speaks, perhaps making adjustments to their own toys, yet listening to the speaker's story; they learn how to connect and play together even though they are miles apart, creating bonds, sharing jokes, and looking forward to these online play groups as much as if they were physically together.

Moving into Digital Landscapes
Not only has there been an increase in our media use from a young age, but the types of technological devices that we have at our fingertips is wider and continues to grow and adapt (Marsh et al., 2016). Children have access to televisions, smart phones, and tablets, as well as toys that interact across several of these networks. These "smart toys" connect electronically to electronic devices and/or the internet (Marsh, 2017). The digital and physical realms of play become connected through the "Internet of Toys" crossing virtual and physical-world boundaries (Marsh, 2017). Children are able to seamlessly move from non-digital to digital realities expanding their previous content knowledge and background.

Children have powerful imaginations, thus enabling them to move across realities in their imaginative play, whether through digital or non-digital play. Many toys, such as certain small, colorful building-block sets have digital, interactive features. Once a child tediously builds their block set, they scan a QR code and are able to watch their newly built toy come to life. Children can then choose to interact with the app and let the digital stories and characters guide their physical play demonstrating "converged play, in which traditional play with toys converges with newer forms of digital play" (Marsh, 2017, p. 2). These scenarios provide opportunities for children's spatial reasoning, engineering concepts, and even number concepts as they follow instructions, construct their sets, and try new formats. Then they are integrated with computer coding as they bring their objects to life.

Through these new domains of play and digital toys, new classifications of play are developing to help identify and explain the nature of children's play. Current literature has suggested, "that it is not so much the types of play that have changed as a result of new digital contexts as the nature of play" that has changed (Marsh et al., 2016, pp. 1-2.). A revised framework of Hughes' (2006) taxonomy of play was adopted and reviewed by Marsh et al. (2016) to include their

digital adaptation. The sixteen play types are included along with Hughes' definition and the researchers' adapted definition for digital play. This is a helpful tool to show the changing ways in *how* children play, unchanging the *types* of play they demonstrate across digital and non-digital realities.

Table 1

Play Types	Adapted Definition from Marsh et al.
Symbolic Play	Occurs when children use a virtual object to stand for another object, e.g., an avatar's shoe becomes a wand.
Rough and Tumble Play	Occurs when avatars that represent users in a digital environment touch each other playfully, e.g., bumping each other.
Socio-Dramatic Play	The enactment of real-life scenarios in a digital environment that are based on personal experiences, e.g., playing house, shopping.
Social Play	Play in a digital context during which rules for social interaction are constructed and employed.
Creative Play	Play that enables children to explore, develop ideas and make things in a digital context.
Communication Play	Play using words, songs, rhymes, poetry, etc. in a digital context. Can include text messages, multimodal communication, and so on.
Dramatic Play	Play in a digital context that dramatizes events in which children have not directly participated, e.g., TV shows.
Locomotor Play	Virtual locomotor play involves movement in a digital context, e.g., child may play hide and seek with others in a virtual world.
Deep Play	Play in digital contexts in which children encounter risky experiences or feel as though they have to fight for survival.
Exploratory Play	Play in a digital context in which children explore objects, spaces, etc. through the senses in order to find out information or explore possibilities.
Fantasy Play	Play in a digital context in which children can take on roles that would not occur in real life, e.g., be a superhero.
Imaginative Play	Play in a digital context in which children pretend that things are otherwise.
Mastery Play	Play in digital contexts in which children attempt to gain control of environments, e.g., creating a virtual world.
Object Play	Play in which children explore virtual objects through vision and touch through the screen or mouse; or play with the virtual objects.
Role Play	Play in a digital context in which children might take on a role beyond the personal or domestic roles associated with socio-dramatic play.

Recapitulative Play	Play in a digital context in which children might explore history, rituals and myths and play in ways that resonate with the activities of our human ancestors.

Marsh et al. (2016)

Using the adapted digital play definitions, it is evident that the digital landscape is impacting the types of play taking place when for example, children manipulate blocks on a screen, work together with an online partner to build a city, or maneuver a camera to record a newly created science experiment to then share with friends and family through online streaming. Furthermore, "Mediated actions are made meaningful when they are categorized as social practices (e.g., chatting, clicking a link, scrolling, browsing) within the local network of practices valued in a particular context" (Wohlwend & Kargin, 2013, p. 3). Children's minds do not stop inventing, creating, and imagining when they move online; their thinking adapts to the new online environment.

Wohlwend and Kargin's (2013) study observing children in an afterschool program who were interested in playing online games and creating their own virtual worlds, showed the power of *affinity groups*—people who share the same play interests with similar goals and common materials (Fernie et al., 1995). Children participated in several online games, were seated in the same room, and often used their avatars to communicate. They were novice gamers and learned how to collaborate with one another to develop strategies, build creations, and play successfully in these virtual worlds. Expanding on the concept of "flickering" (Wohlwend, 2017) when children move in and out of real versus imagined digital landscapes, the ease of movement between realities is increasingly important to gauge a child's digital literacy between multimodal play and different realities.

Into Non-Digital and Digital Play
With rapid technological advances and the early introduction of media, children's exposure to and experience across content areas (e.g., science, math, literacy) are constantly changing. Children's knowledge of utilizing technology is tested at a young age and in many cases, children are surpassing their grandparents' tech-knowledge with their know-how of making devices function almost effortlessly. Favorite cartoons and characters come to life during children's creative games and imaginative play propelling their bonds with other children over similar interests.

Millennials have experienced first-hand the shift from computers only in public places and computer labs that had no internet connection to multiple devices in households that stream movies and games through Wi-Fi. With the change in access and normalcy of media and technology, comes changes in schools as well as children's development and background knowledge creating a "natural bond between today's children and technology" (Plowman & McPake, 2013, p. 28), which effects their learning, language, and play. With these transformations, positive outcomes arise as students with low or no writing abilities include themselves in productive play using dialogue from movies or a tablet to "read" a story.

Collaboration among children supports students struggling with ideas to participate through the sharing of stories and dialogue (Husbye et al., 2012). Groups are formed through shared interests surrounding favorite characters or while peers exert themselves as leaders to show others how a device is worked allowing "children to deliberately and thoughtfully take up roles that interest them" (Wohlwend, 2013, p.38). Robots and coding are becoming part of children's everyday education, demonstrating an understanding in the shift of technology, and showcasing the broad opportunities children have to explore integrated engineering topics.

Of course, "technology and media should not replace activities such as creative play, real-life exploration, physical activity, outdoor experiences, conversation, and social interaction that are important for children's development" (NAEYC & FRC, 2012, p. 5), but rather become integrated into children's play. Children need the freedom to explore and discover using the familiarity of loved characters and stories drawing upon "literacies and their own identities as multimodal literacy users and media producers" (Wohlwend, 2013, p.23). However, schools' rules often create barriers to what (if any) type of media is allowed in classrooms. These "power relations in educational discourses make some materials and meanings unavailable…to say that popular media play themes are developmentally inappropriate, that children should be writing and not playing in school" (Wohlwend, 2013, pp.1-2). Although this type of mentality is present in many schools, children still find a way around the rules through their "hidden play." Playing a character from a show or movie, using characters to recreate stories, taking inanimate objects to use as props to reenact their favorite media, creating drawings of media characters, and pretending a cardboard box is a computer are examples of ways in which children go around the acceptable classroom and school discourse in order to bring their interests into their play. It is with this incorporation of media that unity is created among students, clubs are formed, and children choose friends based on their commonality. The nexus of practice with media familiarity and technology knowledge instills a sense of belonging and enables children to "just know how to do" certain behaviors, movements, and dialogue pertaining to their joint play (Wohlwend, 2013). Regardless of the rules in place, students find ways to play cooperatively on the playground with baby dolls that become princesses, using sticks as weapons, and mimicking dialogue from their favorite movies all while staying under the teacher's radar (Wohlwend, 2013).

As play continues to decline and vanish from our schools completely, leading to behavioral problems and children who lack the knowledge and desire to create, explore, and imagine, we must reexamine the true benefits of play across STREAM, socio-emotional, and cultural development among children. Removing adult views and biases from approaches meant to enrich the whole child are needed to fully understand that not all learning should or can be tested by a standardized instrument. We need to put ownership back into our children's hands, allowing them to have a say in *what* and *how* they learn.

Online Play Groups
"Play is often talked about as if it were a relief from serious learning. But for children, play is serious learning. Play is really the work of childhood." -Fred Rogers

Adapting to our current situation and current technological advances, we must honor children's desires to advance their forms of play because it is after all, their true work. In doing so, we must not only acknowledge—but also encourage—online play groups as an appropriate way to meet with friends, share stories and toys, and develop meaningful relationships with peers. We need to "value the practices that play uniquely provides: improvising with new technologies and practices, inventing new uses for materials, and imagining new contexts, spaces, and possibilities" (Wohlwend, 2011, p. 127).

Children who play with small, colorful building-block sets through online meeting platforms are able to enhance a multifaceted learning experience. If they want to share previous builds, they must figure out how to move their creation without destruction and if that occurs, how to fix it quickly to present to others. Once they have their set ready to share, they use their technology skills to figure out the camera angle and the background lighting so their creation can be seen fully. After children share their builds, they converse using insider knowledge about the set itself or specific media franchise the set is modeled after. These discussions can then lead to further inquiry regarding specific sets or shows, directing children to take on further research by perusing the internet together, all while figuring out technological aspects of sharing a screen and reasoning with one another as one child guides and one child observes. After much observation and research, children may decide they want to build a set they recently saw. They build alongside one another, sometimes asking what color will be used, or asking for advice on what piece would fit nicely, building upon their social and spatial skills. After the building, children play with their creations, although miles apart, interacting with their toy artifacts and one another through the screen. It is then decided a background is needed. Children jointly agree on colorful artwork and create two distinct backgrounds for their playsets. Sound effects can be heard, as well as voice pitch changes as different character figures move back and forth in front of the camera to talk with their online counterpart. It is as if the screen does not matter. The children are together, and they are engrossed in playing, establishing a solid STREAM foundation, as elements of technology, literacy, engineering, art, and even math are present in their play. Instances of play groups like the one stated above are becoming children's "new normal" in regard to their peer interaction and play. A seamless integration of technology and media with play can be accomplished when "the use of technology and media becomes routine and transparent—when the focus of a child or educator is on the activity or exploration itself and not on the technology or media being used" (NAEYC & FRC, 2012, p. 8). The new technologies, media, and "Internet Toys" available to a vast array of children coupled with the importance of play and STREAM education, gives strong justification on where future opportunities are headed and how we can continue to expand on children's science, technology, reading, engineering, art, and math development through online multimodal play.

Children's creativity will continue to expand and grow with the changing eras of new toys—it is up to educators, parents, and researchers to grant children the opportunity to play without rigid restrictions and inspire imagination through all modes of play. Through this adult support, children find safe spaces to "just be kids," building on their development of lifelong friendships

through shared commonalities, igniting their desire to perform science experiments, play with technology, read about a favorite character, engineer with blocks and gadgets, create unique artwork, and compute mathematical equations—all in the name of play.

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