



Supporting Preschoolers' Motor Development in Virtual Environments: Listening to Teachers' Voices

W. Catherine Cheung¹ · Michaelene M. Ostrosky¹

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Abstract

Going down a slide, dancing to music, and pushing someone on a tire swing are more than simply “play activities” or a means to staying physically fit. Engagement in motor play provides important opportunities for preschoolers to develop a variety of skills, including gross motor, social, communication, and cognitive skills. However, during the past several years, since the identification of the COVID-19 virus, no guidelines have been available to ensure that gross motor content is addressed while simultaneously meeting the educational needs of preschoolers with and without disabilities during virtual learning. The purpose of this study was to understand the benefits and challenges that 26 preschool teachers faced as they attempted to embed motor play into their curriculum during virtual learning. All teachers worked in inclusive preschool settings and interviews were conducted between March–June 2021. Constant comparative analysis and emergent coding were used to interpret the data. Findings revealed that school readiness skills were the primary focus of virtual learning. Teachers indicated that motor play can help expand students' pre-academic skills, be fun and motivating for children, and help students be more focused and attentive. Some logistical barriers (e.g., technology, limited physical spaces, limited resources) need to be addressed in order to successfully teach motor play in a virtual format. Study findings suggest policies and guidelines need to be established to provide young children with high quality and accessible virtual instruction. Implications for research and practice are discussed.

Keywords Preschooler · Motor · Virtual · Teachers

Introduction

The preschool years are a critical time period to teach children (aged 3–5) school readiness skills such as taking turns, learning concepts (i.e., big, small, in front of, behind), following directions, and working together. Among school readiness skills, motor development is the foundation for many other areas of growth and development (i.e., cognition, social interaction, and physical well-being; Payne & Issacs, 2016; USDHHS, 2016). Engagement in gross motor play provides important opportunities for preschoolers to

develop pre-reading and pre-math skills, verbal fluency, and an understanding of spatial, temporal, and sequential concepts, which are all related to later academic performance (Iverson, 2010; Piek et al., 2008). Additionally, motor play can stimulate changes in neural growth and synaptic transmission in the regions of the brain that alter thinking, decision making, working memory, and behavior, which are linked to executive functioning (Kopp, 2012). Executive functioning skills (i.e., self-control, time management, organizational strategies) are crucial components of children's adaptive behavior (Gilotty et al., 2002), and serve as the cornerstone for developing numerous other behaviors across the lifespan (Sasser et al., 2015).

Given that physical activity has an enormous impact on development, the World Health Organization (WHO, 2019) suggest that preschoolers should be engaged in at least 180 min (3 h) of daily physical activity with no more than one-hour of sedentary screen time. Likewise, the Division for Early Childhood's Recommended Practices (DEC, 2014) note that educators need to provide opportunities for

✉ W. Catherine Cheung
wcheung3@illinois.edu

Michaelene M. Ostrosky
ostrosky@illinois.edu

¹ Department of Special Education, University of Illinois
Urbana-Champaign, 288 Education, 1310 South Sixth Street,
Champaign, IL 61820, USA

physical activity as this is critical for children's development and health-related physical fitness. Under the best of circumstances, it can be challenging for educators and family members to help children meet these guidelines, and unfortunately, with the COVID-19 pandemic, opportunities for preschoolers to meet physical activity recommendations decreased tremendously due to the closure of schools, parks, and organized sports, as well as social distancing requirements. Prior to the pandemic, many preschoolers engaged in extensive motor play at school, as well as through organized sports, games (i.e., tag, Hide and Seek), and dance, and by regularly spending time on playgrounds and at the park. Guan and colleagues (2020) surveyed 97 parents of young children in March 2020 and found that 94% of participants said that their children's use of play and sport facilities had decreased, while 81% reported that their children's sedentary screen time increased during the pandemic. Increased screen time by preschoolers can lead to attention problems (Tamana et al., 2019), and without ample opportunities for motor play, preschoolers may experience a negative impact on other developmental domains as well (i.e., cognition, social interaction).

Most preschool teachers were not prepared for the sudden shift to deliver instruction virtually as a result of the COVID-19 pandemic (Jalongo, 2021). Teachers struggled to implement virtual learning opportunities to address children's social emotional, physical, and cognitive development. In particular, it can be difficult to provide individual support virtually to children with motor delays or disabilities, especially those who require intentional and planned support from teachers and parents to participate in motor play (Green et al., 2009; Logan et al., 2011). While teachers' knowledge impacts how and what content students have access to, there are no guidelines for effective online motor programs to ensure that the content meets the educational and age-appropriate needs of preschoolers with and without disabilities in virtual environments.

Research studies on how early childhood educators have been impacted by the pandemic or how they have adapted to provide remote instruction are limited (e.g., D'Isanto & D'Elia 2021; Safi et al., 2020). Yet, understanding teachers' perceptions of the barriers and challenges faced while implementing virtual learning with preschoolers with and without disabilities is critical. However, no studies have been conducted to explore teachers' perceptions related to motor learning in online settings during the COVID-19 pandemic. Gathering such information can help us better prepare for future environmental events such as blizzards, tornadoes, and hurricanes. This exploratory study adds to our knowledge base on effective practices to support preschoolers' motor learning when taught in a virtual format. Three research questions guided this investigation: (1) What

are preschool teachers' perceptions of the most important things to focus on with students who are learning virtually? (2) What are some benefits of implementing motor play during virtual teaching? and (3) What are some challenges to implementing motor play virtually? We hypothesized that preschool teachers valued embedding motor play during virtual learning. We also hypothesized that preschool teachers would have challenges with implementing motor play in a virtual environment.

Methods

Participants

To be included in this interview study, participants had to be preschool teachers with at least one student with a disability in their inclusive classroom. All 26 female participants taught virtually during 2021 school year, and the majority of them were White ($n=21$; 80.77%). Most participants ($n=11$) were between 36 and 55 years of age and the majority had earned master's degrees ($n=14$; 53.84%). The majority of teachers ($n=17$) taught in public preschool settings, and the average amount of time that they taught preschool was approximately 11 years (range 1–30). More than half of the participants ($n=18$; 69.23%) reported having no professional training on motor curricula (see Table 1 for additional demographic information). Pseudonyms are used when reporting the findings.

Recruitment

To recruit participants, the authors shared a flyer through social media and on websites. If individuals were interested in the study, they contacted a member of the research team. The researchers shared information about the study and if an individual met the inclusionary criteria and agreed to participate, then they completed the consent form and scheduled an interview. Each participant received a \$30 gift card after they completed the interview and member check.

Procedures

This study was approved by the University Institutional Review Board. Data were collected via a demographic questionnaire and a semi-structured interview protocol. Participants chose the date and time of their individual interview. All interviews were conducted through Zoom between March-June 2021. Extant literature has suggested that in-person, phone and Zoom interviews generate similar results (Gray et al., 2020).

Table 1 Participant Demographics

	% (N=26)
Gender	
Female	100% (26)
Race	
White or Caucasian	80.77% (21)
Black or African American	15.38% (4)
Asian or Pacific Islander	3.85% (1)
Educational background	
Associate degree	7.69% (2)
Specialist credential	7.69% (2)
Bachelor's degree	26.92% (7)
18 master level credits	3.85% (1)
Master's degree	53.85% (14)
Preschool setting	
Public school	65.38% (17)
Private school	3.85% (1)
Head Start	23.08% (6)
No response	7.69% (2)
Teaching experience (years)	
1–5	26.92% (7)
6–10	23.08% (6)
11–15	3.84% (1)
16–20	11.54% (3)
21–25	11.54% (3)
26–30	11.54% (3)
No response	11.54% (3)
Professional training on motor curricula	
Yes	30.77% (8)
No	69.23% (18)

Semi-structured interviews were conducted by a trained interviewer. At the beginning of each interview, the interviewer introduced herself, shared the purpose of the study, explained the consent form, and asked participants if they had any questions. Interviews were audio recorded and auto transcribed within Zoom. On average, interviews lasted 40 min (range 21–64 min). After each interview, the interviewer emailed a 1–2 page summary to each participant for them to check, thereby ensuring the accuracy of the content (i.e., member check). None of the participants made any changes to their summary. To ensure the accuracy of each transcript, a graduate student listened to the recordings while they read each transcript and made corrections prior to data analysis.

Data Collection

Demographic Questionnaire

The researcher-developed demographic questionnaire included 12 items and took approximately 5 min to complete. It focused on the following participant information: age, gender, race, level of education, types of preschool

settings, preschool teaching experience, and previous professional development on motor curricula.

Interview Protocol

The interview protocol was developed by the authors utilizing extant literature about motor play (e.g., Aronson-Ensign et al., 2018; Cheung, Ostrosky et al., 2022). The protocol was pilot tested with a teacher who had taught in an inclusive preschool program. Based on the pilot, revisions were made to the protocol (e.g., changes in the order of questions asked). Sample questions included: *What do you feel is the most important thing to focus on with students who are learning virtually?* *What are some of the benefits of embedding motor play into virtual sessions?* and *What are some of the challenges of embedding motor play into virtual sessions?*

Researcher Identity

Both authors have had extensive experience working with preschoolers in inclusive settings and partnering with families. Their familiarity with the experiences of preschool teachers was a strength in conducting this study and analyzing the data. Also, the first author is a former physical therapist and the authors helped write a motor curriculum; these characteristics highlight their strong interests and knowledge related to early motor development and physical activities. Finally, the interviewer was a special education graduate student and preschool teacher. Her teaching experiences helped establish rapport with participants during the interview process.

Data Analysis

To analyze the transcripts, the authors used constant comparative analysis (Glaser & Strauss, 1967) and emergent coding (Patton, 2002). First, to familiarize themselves with the entire data set, the authors individually read each transcript multiple times (Tesch, 1990) to orient themselves to the raw data. Second, they each coded three interviews using a line-by-line approach to generating initial codes. Each piece of data (i.e., a line of the transcript was the unit of analysis) was coded and annotated with a phrase (Creswell, 2013). A line could have multiple codes if more than one concept was present. Each new piece of data was compared with the previously coded data to see if the data reflected a new idea or could be categorized under an existing code. Then, the researchers met to compare codes and resolve any differences. The researchers created an initial codebook at this stage. With the initial codebook, the researchers returned to the transcripts and independently coded another

three interviews using a line-by-line approach. As codes developed, the researchers compared their codes, looking for redundancy for as Kiger and Varpio (2020) note, codes should be sufficiently well-defined and demarcated such that one code does not overlap with other codes and all codes should fit logically within the larger coding framework. Each time the researchers met to compare codes they resolved any differences until agreement was reached (consensus coding).

Using a refined codebook, the researchers returned to the remaining transcripts and independently coded the data. At this stage there were 81 initial codes; codes were then refined and combined (e.g., “academic,” “social emotional,” “readiness to learn,” and “literacy” were combined into a larger category of “school readiness skills”). This combining of codes into categories then resulted in the development of themes that represented content of broader significance (Braun & Clarke, 2006). Themes do not simply emerge from the data (Varpio et al., 2017) rather than are constructed by the researcher through analyzing, combining, and comparing how codes relate to one another.

The researchers then met and reviewed the potential themes using a two-level analytical process (Braun & Clarke, 2006). In the first level of analysis, we looked at coded data placed within each theme to ensure proper fit. In the second level of analysis, we re-read the entire data set to re-examine themes. In the end, 11 categories were organized into three main themes (e.g., priorities when teaching preschoolers virtually, benefits of embedding motor play in virtual environments, challenges of embedding motor play in virtual environments).

Results

Teachers who participated in this exploratory study discussed their priorities when teaching preschoolers virtually, the benefits of addressing motor play in virtual learning environments, and challenges to embedding motor play during virtual learning. Each of these topics, which answer the three research questions posed earlier, is discussed in the following sections along with relevant teacher quotes.

Priorities When Teaching Preschoolers Virtually

When asked about their priorities as they taught preschoolers virtually, participants shared three major areas of focus. These themes of school readiness skills, interacting with parents, and relationships with students are discussed next.

School Readiness Skills

Almost half of participants ($n=11$) reported that school readiness skills were their primary focus during virtual instruction. School readiness skills include five domains: (1) physical health and motor development, (2) cognition and general knowledge, (3) approaches to learning, (4) language development, and (5) socioemotional development (Duncan et al., 2007; National Education Goals Panel, 1997). Seven participants shared how they merged different domains into their curricula. For example, LeeAnn mentioned that she would select activities that address different developmental domains such as language and cognition. She said, “I’m always incorporating literacy, letter awareness into the greeting, where I have them work on spelling somebody’s name, or just to get that initial letter awareness like concepts, spelling their name.” Likewise, Amy focused on combining literacy and fine motor and stated, “I try to get them to write as much as I can or, use their fingers, play-dough cutting, tearing.”

Some participants ($n=4$) reported that socioemotional development was their priority during virtual schooling. For example, MaryBeth said, “Social emotional is a little different [this year], we’re working on interpersonal skills and learning how to read people and understand ... those are normal preschool things but even more so now, navigating through strong feelings and how to deal with those strong feelings and how to react when someone else is expressing a strong feeling.”

Interacting with Parents

When asked about their priorities as they taught preschoolers virtually, the second major area of focus for participants ($n=6$) was to communicate and build relationships with the parents of their preschool students. Parent support was mentioned as being important in virtual environments, especially for young children and students with disabilities. For example, Caroline stated, “I think the parent buy-in is the biggest piece that goes unseen [virtual]. So, getting parents to understand that this is important and here’s why. But keep it in terms that they understand.” Similarly, Mary reported that it was important to explain the meaning of the activities to parents using understandable terms. She said, “I always like to explain why I was doing the activity behind it because I think that helps parents a little bit more; not like super complex terms but just like ‘Hey, this works on one-to-one counting skills or something like that.’” In particular, some teachers discussed the importance of educating parents about motor play. For instance, MaryEllen said, “The biggest thing that we’re focusing on is developing those interactions [with parents]. Because we’ve had a

lot of parents saying, ‘Why doesn’t it look like the other grades?’ and ‘...I just want them to know their letters and stuff.’ We’re like ‘Oh we’re getting them their letters; all the assignments are through interactions and through play. It’s exactly what we would be doing in the classroom only they’re with you.’”

Relationships with Students

The third priority area for participants as they taught preschoolers virtually had to do with interacting with students. This was highlighted by Christina when she shared, “I think the most [important] was actually knowing that the kids were online, and they were talking to me, and they were interacting with me.” Similarly, Kate said, “I wanted to get more of the kids’ responses and stuff. It was harder to pull up your bag of tricks to get the responses to different goals they had, like to do a sorting goal virtually was very hard. And I guess what I wanted to push more was their interactions [and] stuff.” Susan, a new teacher, believed that building trust with students was the most important task for her during virtual schooling. She stated, “Although they never met me, they still felt that I was someone who knew them and felt safe, like coming to, and so that was a new one for me to build a relationship that way.”

Benefits of Embedding Motor Play in Virtual Environments

The second research question addressed in this exploratory study focused on the benefits of motor play during virtual learning; this theme was constructed with four categories under it. Almost all participants ($n=25$; 96%) reported that they embedded motor play during virtual learning and that they believed this was beneficial to preschoolers. Only one participant shared that motor play was pushed aside during the pandemic because there were too many other needs to focus on within her classroom. Teachers stated that some benefits of embedding motor play into virtual learning were that the activities were fun and motivating for students, they helped students focus, they provided students with opportunities to release excess energy, and they helped enhance students’ pre-academic skills. Each benefit is discussed next, along with representative teacher quotes.

Fun and Motivating

Most teachers reported that embedding motor play into virtual learning activities was fun and motivating for students as these activities helped them participate as a group and feel part of the class. For instance, Waiyang stated, “It was just fun, like waking up in the morning and the first thing we did

was dancing. It was a pure joy. It was genuine interaction, even though we were through a screen.” Similarly, Marie said, “When we would do it as Zoom, as a group, they could see each other on there. They would just laugh. Especially, when we do our goofy things, they thought that was funny. I thought it was funny too.” Additionally, teachers shared that motor play motivated preschoolers to participate as a group. Kate noted, “They [preschoolers] had fun with it, and I felt like it got them to do something instead of just looking at the screen. I got them to interact with each other.” Finally, Eva mentioned, “The motor activities motivate the children. And it gives the parents the opportunity to say, ‘We’re going to do this first, and then we’re going to do this.’”

Helped Students Focus

Participants also reported that motor play helped students have a longer attention span, especially when they sat in front of the screen for an extended period of time without moving. For example, Ariana said, “I feel like it really calmed them [students] to be able to move.” Similarly, MaryBeth stated, “Getting your wiggles out and things like that before you want kids to sit and focus.” Dana believed that motor play helped student re-focus. She shared, “Some of that sensory stuff [in the Hello song], I think it definitely helps them attend. I don’t know if you would notice it immediately, but I think over time it really helps that brain with the focusing and switching it up a little.” In addition to increased focus, participants believed that motor play provided opportunities for students to regulate their emotions. Caroline stated, “If you’ve got an angry kid and you drum with them, they can get that anger out. Showing families that just 20 minutes of activity can bring your kid back to being in the state that is manageable. So, it helps them regulate their emotions...and it strengthens them.”

Opportunities to Release Excess Energy

Participants also shared their concerns about some preschoolers not moving much during the pandemic, and they saw motor play as a way to provide opportunities for children to release excess energy. For example, Malia said, “Just getting them to move intentionally with either interactive songs or books or games, because they might just be laying, sitting. Just providing the opportunity is important.” Also, Mary stated, “If they’ve been cooped up inside, it gives them a nice chance to get moving which then hopefully helps them regulate their energy for the rest of the school day.” In addition to releasing energy, participants also mentioned that preschoolers enjoyed motor activities. Susan said, “It gets their energy out and I love how excited they get...”

Enhanced Pre-Academic Skills

Participants reported that embedding motor skills in virtual schooling also helped students learn new skills. Susan stated “We count to 100, like exercise videos. Although I don’t expect them to count to 100, they still love singing along. We will do four of them in a row. We literally counted to 400.” Similarly, Mary said, “Singing *Head, Shoulders, Knees, and Toes* is a motor thing. They’re moving their body, but it’s also working on following directions and identifying body parts and things like that.”

Challenges of Embedding Motor Play in Virtual Learning

Although participants realized that there are many benefits to embedding motor play in virtual learning, almost all participants experienced challenges with implementing motor activities in a virtual environment. These challenges were constructed into 4 categories: (1) difficulty getting students engaged, (2) difficulty re-focusing children, (3) parental support needed, and (4) logistical issues.

Difficulty Getting Students Engaged

Most participants reported that motivating children to stand up and engage in motor play was very challenging, especially through Zoom. For example, MaryBeth stated, “They might not be fully engaged with it...they [students] want us to stand next to them or hold their hands. So, I think us [teachers] not doing that...they’re at home, obviously they respond different when parents or their family members are there.” Similarly, Cecilia said, “In the Zoom classroom, some kids were so shy, they didn’t want to move in front of the camera...the hardest part is just engaging, getting them wanting to do it, because I have one kid that would sit for every activity.” Likewise, when Caroline was reflecting on her problems with getting students engaged, she shared, “There’s at least one student every week, and it’s a different student from week to week, who will just sit there and watch it like it’s a show. Instead of getting up and doing it.” Because of the difficulty in getting some students engaged on Zoom, Chole sent home activities to encourage students’ participation. She stated, “It’s kind of hard for me to individualize something for them. I’ve sent the activities home, but you don’t know how much of it they’re doing, if they are doing [it].”

Difficulty Re-Focusing Children

While some teachers discussed their struggles with engaging children in motor play over Zoom, other teachers noted

how challenging it was to get students to calm down and re-focus after engaging in virtual motor activities. For example, Mary said, “I tried to do it [motor learning] during circle time, I couldn’t bring them back in because I wasn’t physically with them, and I couldn’t get them back together.” Similarly, Paige reported that she struggled to keep students focused and stay in front of the screen. She said, “Once they got out of that contained area, it was very hard to keep their attention. So, they were running out of the room, the parents were doing a lot of chasing for those that had the motor abilities.”

Parental Support Needed

Almost all teachers reported that parental support was very important when engaging children in virtual schooling. Waiyang summed this sentiment up succinctly when she said, “Without parents’ support, it wouldn’t be successful, 80% of the time.” However, as teachers partnered with parents, some difficult issues arose. For instance, participants shared that it was a lot to ask some parents to support their children in the ways that teachers expected. MaryEllen said, “Parents aren’t the teacher. You [parent] did a movement that’s not what I was looking for, but you moved, you did it. So, kind of getting used to...I have to give up control. It’s really hard [for the parents] because they’re not a teacher, they’re their parents and they didn’t go to school to be a teacher. I did. So, of course, they’re not going to see what I want to see because that’s not their job. So, I think that’s the biggest challenge.” Additionally, some parents did more than teachers asked, which Penelope highlighted in this quote, “Mom made everything...it’s going to be difficult to transition [the child]. I told the mom of the girl with Down syndrome, ‘What I want you to do is get her used to doing this and walk away. And she needs to sit and do it by herself because she’s not going to have everybody sitting on top of her.’”

While some parents might have been perceived as doing “too much,” participants also noted that it was difficult to engage in motor activities when the parents were not present to support their children. MaryBeth reported feeling frustrated when a parent walked away after they turned on their child’s device. She said, “Parents would turn everything on, but kind of not be there to help their kids. So, we’re touching our head, some of them might just be staring at us and not knowing what to do and we would verbally tell them or show them the visual. If they had the adult there to support them, it may be a little bit different. Model it right there versus me being on the screen and you not really, really seeing me.”

Logistical Issues

The majority of teachers reported that some logistical barriers needed to be resolved in order to embed motor play into virtual learning. These barriers included limited physical spaces, limited resources, and technology issues.

Many teachers reported that there was not enough physical space available in some families' homes for motor activities and this caused them to worry about safety. For example, Penelope said, "You're dealing with obstacles like tables, chairs that they could get hurt on. I don't think that parents would have appreciated them run[ning] around for a while and we'll get back on in 15 minutes." In addition to physical space, Nancy reported that noise was another concern. She said, "Physical space and noise, because there's often either music or singing or other things associated with those types of things for preschool. We had conflicting times with the elementary kids. If they had siblings, it was tricky. So, we've got little preschoolers with headphones, and they're plugged in. [While] they get up to dance, they pull their cord out."

Most teachers also reported that motor-related resources were not sufficient to support teachers in implementing motor play. For instance, Jenny said, "We sent home a ton of materials with them [students], but we didn't really send home any gross motor type materials." Some teachers tried to find motor materials on their own. For example, Mary said, "With virtual, I couldn't just say 'Hey let's go outside and practice jumping or balancing.' I was trying to think of things that were common in households, that you can use for motor stuff, but who knows what you actually have at home." Without sufficient support from schools, some teachers struggled to embed motor skills into virtual learning. For example, Kendall said, "In the virtual setting, I don't even know how, besides our Zoom session that we did, I don't know how we could do that in another way. It had to be structured because that's the setting that we were in. [We] really couldn't do [motor] play."

Most teachers described how unstable internet signals and the placement of devices affected the quality of teaching and learning. For example, Caroline reported that unstable images on the screen may confuse children and make it difficult for them to follow directions from teachers. She said, "If I get up and start dancing around. [While] I'm doing it, you have this weird effect on Zoom where sometimes the camera doesn't go the same speed as you so you're like all faded and I can understand that would be a little engaging to just sit and watch." Furthermore, because of the placement of the camera, some teachers could only see a small area of a child's room. Malia said, "[Because of the] camera they're kind of confined to the chair at the table or if they're lying on a bed, a lot of them have a tablet, and so they're moving

or they're laying or [engaging in] very unstructured movement, all over the place." This made it difficult to conduct semi-structured motor activities during virtual learning.

Discussion

It is important to effectively embed school readiness skills into motor play for preschoolers when providing instruction in a virtual environment. The purpose of this study was to understand teachers' perceptions of virtual teaching, as well as the benefits and the challenges they faced while implementing motor play with preschoolers with and without disabilities. There are three main findings that are worthy of further discussion.

First, for participants in the current study, school readiness skills appeared to be the priority area of focus during virtual learning. Teachers believed that embedding motor play in virtual learning helped enhance students' pre-academic skills and that it was a fun and motivating way to help students focus. These findings align with one of teachers' major responsibilities, which is implementing strength-based, motor activities that provide opportunities to address children's social emotional, physical, and cognitive development (i.e., school readiness skills; Thornton et al., 2020). Additionally, preschool teachers who participated in this study believed that motor play was more than just play and being physically fit. This finding is consistent with previous research (Cameron et al., 2016; Sparrow et al., 2005; van der Fels et al., 2015; Westendorp et al., 2011), which showed that motor play provides bi-directional and reciprocal associations between motor, social, and cognitive development for preschool age children. In addition to supporting previous research, this finding is encouraging because what teachers believe significantly impacts what students learn (Ward et al., 2008). In the current study, almost all teachers reported that they attempted to embed motor play into their virtual curriculum, but they were challenged to implement some activities effectively. In fact, even during in-person learning, teachers reported that they lacked sufficient knowledge to implement motor play in inclusive preschool settings and that they wanted more training in this area (Cheung, Ostrosky et al., 2022; Gehris et al., 2015; Hughes et al., 2010). Not surprisingly, it is even more challenging to embed motor play virtually, and it can be especially difficult to engage children with disabilities and create active learning opportunities within virtual environments. Pre-service training and in-service professional development can support future and current teachers in obtaining the needed knowledge and skills to implement motor play within inclusive classrooms in a virtual format.

The second topic worthy of discussion centers on the critical roles that parents play in supporting virtual learning. When preschoolers and teachers are engaged in face-to-face instruction, preschoolers are more likely to understand teachers' body language and tone of voice (Driscoll et al., 2012; Johnston et al., 2014; Wingo et al., 2016). However, in virtual learning environments, teachers often depend on parents to convey these more subtle messages to their children. In this study, teachers described some of the difficulties they encountered in partnering with parents who questioned why their children needed to engage in motor play, and some parents who modeled movements that were different from what teachers expected. Indeed, researchers have reported that both parents and teachers were not well prepared to support virtual learning (Irer, 2021). For example, Garbe and colleagues (2020) conducted a survey with 122 parents to investigate their experiences with virtual learning. Parents reported that they felt overwhelmed and encountered difficulties trying to balance employment demands, meet their children's needs, and acquire the needed content knowledge to support their children. In fact, research shows that in 64% of families, both parents worked outside the home during the COVID-19 pandemic (Groshen, 2020). Even though many parents worked from home, it is not surprising that they struggled to simultaneously provide support for their children during virtual learning (Garbe et al., 2020). Also, many parents felt that they lacked the knowledge and skills to assist their children with academics in a virtual format (Garbe et al., 2020). Parents' understanding about how to integrate motor play into the preschool curriculum is important, as this knowledge can impact their attitudes toward engaging their children in motor activities (Mertala, 2020). Thus, there is a need for strong parent-teacher communication so educators can explain the role of motor play in children's development, especially since the majority of teachers in the current study expressed a desire for parent support when implementing motor activities. Notably, parent-teacher relationships are important to support student success in both in-person and virtual learning environments.

For early childhood teachers, face-to-face social interactions and hands-on experiences during motor play are the cornerstone of instruction. It has been extraordinarily difficult for early childhood teachers to shift to virtual environments while they are deeply rooted in the traditions of face-to-face, hands-on, and experiential learning (Ford et al., 2021). As a result, understanding both teachers' and parents' perceptions of barriers to partnering with each other in support of motor play during virtual learning is needed. In particular, professional training programs should provide ideas of strategies that teachers can use to partner with parents in virtual environments.

The third topic worthy of discussion focuses on the logistical barriers that need to be overcome in order to teach motor play virtually. Findings from the current study showcase how virtual learning can exacerbate disparities between groups of individuals. For example, many teachers and parents had little to no experience with using technology for learning. Also, many rural families and underserved families may not have access to high-speed internet services (Rideout & Katz, 2016). By providing devices and data plans from school districts, more families may be able to access virtual learning. However, research has shown that during the pandemic many families did not know how to put on their camera or turn on online platforms (e.g., Zoom, Google Meets, etc.; Cheung, Aleman-Tovar et al., 2022), aspects of virtual learning that are critical when engaging in motor activities. Besides access to devices, it may be helpful to have initial in-person visits if there are no prevailing health concerns, to troubleshoot technical issues such as camera position, adequacy of internet speed, compatibility of hardware (e.g., headphones) and software, assurance of direct and stable internet connections (Cheung, Aleman-Tovar et al., 2022; Lerman et al., 2020), and access to sufficient space for children to safely engage in motor play. Notably, such visits should be individualized to meet each family's needs (Fraser et al., 2017).

A few participants in the current study were frustrated that they did not have access to resources for motor play from their schools (Cheung, Ostrosky et al., 2022). Teachers may consider how families can adapt common household materials (i.e., socks, dish towels, buckets) for motor activities and embed motor play into naturally occurring daily routines, ideas that are described by Cheung, Ostrosky and colleagues (2022). When such adaptations are shared, students can participate in motor play during virtual learning as well as in the home after school.

Limitations

Despite providing initial insights about embedding motor play into virtual environments for preschoolers, there are a few limitations to this study that need to be discussed. First, the racial diversity of the participants was limited. Teachers from diverse backgrounds may have unique experiences and face different challenges when implementing virtual learning. Second, all participants in the current study were female, which may increase the potential for gender bias. Third, the findings from this exploratory study are based on one interview with each teacher. Their experiences embedding motor play in virtual environments may have changed over time, and such changes were not captured given the design of this study. Additional data would be helpful in

identifying new barriers and challenges with motor play and assist in the development of guidelines for providing high quality, accessible virtual learning for preschoolers.

Directions for Future Research

There are several directions for future research that emerged from this study. First, it is important to explore if specific teacher demographics (e.g., teachers who taught in different types of preschool settings, teachers' educational background) impact their characterization and perceptions of embedding motor play during virtual learning. Second, in the current study, we did not identify any patterns between teachers who participated in professional development on motor curricula and teachers who did not receive such training. There may be differences in teacher perceptions based on prior experiences and knowledge. Third, exploring parents' perspectives on supporting their preschoolers' motor development during virtual learning is important. These data, combined with those from the current study, might provide guidance on a more wholistic approach to supporting motor play during virtual schooling.

Implications for Practice

Given that some families have limited digital literacy skills, school districts should consider providing initial training, possibly in the form of in-person visits, to address logistical barriers such as setting up cameras, using headphones and arranging the environment to safely allow for gross motor movement. Such solutions may help address some of the barriers highlighted in this study.

Conclusion

This article provides a starting point for conducting more research focused on implementing motor play in virtual preschool environments. Pre-service and professional development training should be offered to support educators in addressing motor play that enhances children's social emotional, cognitive, and communication skills in virtual environments. Such training would help prepare current and future preschool teachers to transition to virtual schooling if events such as a pandemic occur in the future. Even though nothing can replace face-to-face instruction, it is important for teachers to be ready to deliver their curriculum in virtual settings during unexpected school closures such as snow days, hurricanes, or tornadoes. Understanding the benefits

and challenges to such instruction is a beginning point in moving forward.

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