

# **Dioramas as a Place for Play and Early Science Learning: Exploring Teachers' Perspectives and Experiences**

## **Abstract**

In this qualitative study, we explore teachers' perspectives and experiences with play and learning at dioramas as few studies on this topic exist. In a time when play is disappearing from classrooms (Nicolopoulou, 2010), scholars advocate for a return to play-based learning (Miller & Almon, 2009). Using grounded theory (Charmaz, 2006), we inquired: 1) How do teachers describe the ways in which children play and learn with dioramas during their classes?, 2) What do teachers perceive as the affordances and opportunities that dioramas provide for children's play and learning?, and 3) What strategies and pedagogical decisions do teachers make to promote play and learning at diorama? We interviewed ten early childhood educators who teach at a large, urban museum. Nearly 30 unique examples of play and learning with dioramas were provided, nine referenced by multiple teachers. Findings suggest that play and learning at or inspired by dioramas looks different across classes and contexts, but is perceived as vital in sparking imagination and creativity for young children when integrated into experiences and affords unique opportunities. This study highlights how dioramas can be integral in play-based science learning—making museums that are not traditionally designed for children into places for play.

## **The Problem**

Play is disappearing from classrooms in the United States at an alarming pace (Nicolopoulou, 2010; Miller & Almon, 2009; Zosh et al., 2013). This trend coincides with numerous educational policy shifts to emphasize academic instruction and standardized assessment in formal schooling. Yet, considerable research suggests the advantages, importance, and contribution of play in young children's learning (UNICEF, 2018; Hirsh-Pasek & Golinkoff, 2008; Zosh et al., 2017) and development (Akman & Ozgul, 2015; Whitebread et al., 2017), demonstrating the benefits of play in early childhood education. In fact, play is often considered a vehicle or strategy for children's learning, development (Bergen, 2009; UNICEF, 2018), and sensemaking (Shine and Acosta, 2000). Thus, scholars advocate for a return to play-based experiences in learning settings (Miller & Almon, 2009; Wineberg & Chicquette, 2009; Nicolopoulou, 2010; Reuter & Leuchter, 2019).

Play is an important medium through which young children make sense of the world (Samuelsson & Carlsson, 2008; Shine and Acosta, 2000; Hadani & Rood, 2018). Attributes of play have been described by theorists in distinct and varying ways. For instance, while Vygotsky focused on types of play for young children in relation to cognitive skill development including imaginary, sensorimotor, and games that have rules and structure (Akman & Ozgul, 2015). Montessori's method of playful learning concentrated on self-selected activities that provided children with an element of freedom as well as guidance from teachers (Lillard, 2013). Playful learning has also served as an umbrella that groups free play, guided play, and games together, ranging from physical and board games, pretend play, role play, and play with objects (Zosh et al., 2017, 2013). Play, particularly imaginative play and role play, is particularly useful for young children's science learning in that it promotes and extends characteristics such as curiosity and

wonder, resulting in “more authentic science learning” (Fleer, 2019). A comprehensive review of 150 empirical studies finds play effective in STEM education through the development of specific skills like spatial reasoning, practices including constructing explanations, deeper conceptual learning, and links to counterfactual reasoning (Hadani & Rood, 2018). Thus, the addition of guided play into curricula for early learners can provide an option besides didactic instruction and an intrinsic connection between play and learning, where adults may initiate the play but children guide it—a type of play often seen in young learners’ free exploration in museum exhibitions (Weisberg et al., 2015).

In this qualitative study, we explore teachers’ experiences and perspectives of play and learning at and with dioramas in their early childhood classes at a museum. We see dioramas as holding great potential for inspiring creativity, curiosity and excitement about learning science, especially when integrating play, for young children. A universal vehicle for learning such as play (Drewes, 2005) has great potential for providing broader access to the development of scientific literacy. Thus, by engaging teachers in conversations about their perspectives and experiences we hoped to learn how teachers facilitate play and early learning in places not traditionally designed for young children, like museums.

## **Study Design**

*Research context and study setting.* This study was conducted at a museum in a large, urban setting with a plentitude of natural habitat dioramas. Participants were teachers of early childhood classes at the museum, each of whom had at least six years of experience in education. Participants taught classes for 2-8 year-olds together with their parents or caregivers. Participants had a variety of educational and science backgrounds prior to working at the museum.

*Methods and data.* We used qualitative methods to explore the following questions: 1) How do teachers describe the ways in which children play and learn with dioramas during their classes?, 2) What do teachers perceive as the affordances and opportunities that dioramas provide for children’s play and learning?, and 3) What strategies and pedagogical decisions do teachers make to promote play and learning at dioramas? We conducted semi-structured interviews with ten early childhood educators at the museum to learn about their perspectives and experiences with play and early learning at dioramas. In addition, we collected teacher artifacts and program documents, such as lesson plans and photos, and research memos generated throughout the study, which were also used as an analytic tool (Creswell, 2013). To provide additional context for dioramas that teachers discussed in their interviews, we conducted background research using the Museum’s digital archives, annual reports, and related resources.

## **Findings and Analysis**

*Analysis.* We used a constructivist grounded theory approach to help guide our learning and make sense of the data (Charmaz, 2006). In our analysis of teacher interviews, using the data analysis tool Dedoose (SocioCultural Research Consultants, LLC, 2018), we applied initial and focused coding techniques to identify themes that surfaced naturally in the data (Charmaz, 2006). Examples of codes that we applied during analysis include “type of play,” and “diorama - view, role, purpose.” Following coding, we engaged in memo writing as an analytic tool. Participating teachers engaged in a member check to strengthen trustworthiness and validity.

*Findings.* Teachers described nearly 30 unique examples of play and learning with dioramas from their class experiences, as well as 9 examples that were referenced by multiple teachers. In addition, they shared strategies and approaches for facilitating play-based experiences at and with dioramas, and the roles that adults and children played in generating play. Each example of play highlighted how dioramas are multidimensional, and how they can be integrated into activities and lessons. In our analysis, it became apparent that the examples that teachers described characterized distinct types of play-based activities. Coding helped us to construct an organization in which to explore particular examples of play-based activities at or inspired by dioramas, outlining eight categories based on the descriptions that teachers provided. For instance, examples of categories of play-based experiences include ‘role play and acting out the story,’ ‘playing games using dioramas to explore a science content,’ and ‘free play.’ This outline is not exhaustive but based only on the examples that teachers shared during interviews. Play-based activities can fall into multiple categories, and there were overlaps across categories. For instance, role play is an example that surfaced in multiple categories as teachers used it to have learners act out a story depicted in a diorama. Teachers also described role play where learners acted as scientists on an expedition, where they dressed with expedition vests and were armed with tools, like flashlights) in others. We describe categories of play-based activities highlighted by early childhood educators to serve as a catalyst for other educators in their facilitation of science learning that can be inspired by or that use dioramas.

Our analysis revealed that teachers also identified dozens of affordances of dioramas for early learning. One major finding is that teachers’ perceptions of the affordances of dioramas for play and early learning seemed to inform or connect with the pedagogical approaches and strategies that they used. Frequently, teachers also connected affordances to characteristics or features of the dioramas and how they can be leveraged to inspire and motivate play and learning. Seven distinct types of affordances became clear through the interviews with teachers in that dioramas offer the opportunity to: 1) tell a story; 2) spark student imagination; 3) harness awe, wonder, and curiosity; 4) observe animals in natural habitats; 5) create social and emotional connections to develop empathy and make memories; 6) develop a sense of place within the museum; and 7) teach a variety of phenomena with flexible approaches. Amongst the seven types, teachers perceived one of the more powerful affordances of dioramas for children’s play and learning is that they ‘tell a story.’ All 10 teachers described how dioramas offer the chance to engage children in storytelling, creating, imagining, or pretending, and provide opportunities to connect to scientific phenomena.

It is evident that teachers perceive that dioramas provide extensive benefits for play and early learning, however not all play physically takes place at dioramas and some activities are designed for the classroom. Teachers’ examples highlight the multidimensionality of dioramas and how they can be layered into activities and lessons. They can be forefronted as both the scene of the story and the play space, as we see with role playing a predator-prey game at a particular diorama; or providing inspiration for role playing lionesses in a hunting activity in the classroom. It also became apparent how teaching approaches and strategies allowed for the same diorama to be used in play in different ways. Teachers’ examples show how play and learning at and inspired by dioramas is contextual, situated, and place-based. We also recognize that these are examples set in a particular context—in classes in a large natural history museum in a complex, urban setting—which has its own affordances and limitations.

## **Implications: Contribution to the teaching and learning of science**

Faced with the alarming reality of play disappearing from early childhood classrooms (Nicolopoulou, 2010) as more emphasis is placed on academic instruction and standardized assessment, there is a need for more widespread understanding of the value of play and play-based experiences in early science learning. As there is very little in the literature on dioramas and play in early learning, this study provides insights into how teachers can facilitate play in places traditionally designed for adults. Learning how teachers integrate dioramas into play-based learning experiences and the approaches or strategies they use, this study also sheds light on teachers' perceptions of what their students take away from these experiences. Our research highlights how dioramas can be an integral part of early childhood science learning—making museums that are not traditionally designed for children into places for play.

## **Contribution to interests of NARST members**

Science and play are not frequently associated, yet there is significant opportunity to learn and engage with science through the use of play—especially in early childhood and in informal learning environments. Dioramas may be static in design, but can come to life when creative educators consider the scientific phenomena depicted and engage learners in games, role play, and art associated with them. NARST members interested in informal science learning, early childhood or elementary science education, teacher perspectives, and play in science learning would gain new insight from this presentation. This builds on literature on play for science learning by describing affordances of play in museums, in particular. Considering play as “children’s ‘work’ ... the vehicle through which children acquire knowledge and skills” (UNICEF, 2018, p. 10), it is a critical entrypoint to start to develop scientific literacy. Children around the world and from all walks of life engage in play as part of childhood and as a way to learn about the world around them (Drewes, 2005). With a theme of unity and inclusion for global scientific literacy, we believe this study is of particular interest to the NARST community as it offers insight into strategies and opportunities to increase access to science education that can reach even the youngest members of our global community.

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