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# A Study of Story Stones in Informal Learning Environments

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A Study of Story Stones  
in  
Informal Learning Environments

By  
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# A Study of Story Stones in Informal Learning Environments

By Nina Berch

## Abstract

This paper aims to provide context for the use of an open-ended tool called Story Stones for engaging young students in creative discussion. Story Stones are a collection of palm-sized rocks with transposed images attached. Student ages within this discussion range between two and seven years old, accompanied by adult caregivers in the Sugar Hill Children's Museum of Art and Storytelling in Harlem, New York and Not Just Art childhood enrichment center in Oyster Bay, New York. The method of observation and analysis consisted of presenting Story Stones in an open-ended, hands-on invitation to visitors of the museum and enrichment center. Through observations of children's interactions with Story Stones, several relevant domains presented themselves, including the Reggio Emilia approach to education and the Theory of Loose Parts. Sharing Story Stones or sharing ideas inspired by Story Stones is a communal experience, a kinesthetic experience, an aesthetic experience that will make an imprint on children and their caregivers.

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## Introduction

Children embody and identify with self-chosen characters. By entering into experiences with an open mind, without pre-set structures and pre-determined ideas, they are able to tell a story in their own way and with their own interpretations.

The poem *No Way. The Hundred is there* by Louise Maliguzzi captures the essentials of learning with joy and choice:

*No way. The hundred is there.*

The child/ is made of one hundred./ The child has/ a hundred languages/ a hundred hands/ a hundred thoughts/ a hundred ways of thinking/ of playing, of speaking./ A hundred always a hundred/ ways of listening/ of marveling of loving/ a hundred joys/ for singing and understanding/ a hundred worlds/ to discover/ a hundred worlds/ to invent/ a hundred worlds/ to dream./ The child has / a hundred languages/ (and a hundred hundred hundred more)/ but they steal ninety-nine./ The school and the culture/ separate the head from the body./ They tell the child:/ to think without hands/ to do without head/ to listen and not to speak/ to understand without joy/ to love and marvel/ only at Easter and Christmas./ They tell the child:/ to discover the world already there/ and of the hundred/ they steal ninety-nine./ They tell the child:/ that work and play/ reality and fantasy/ science and imagination/ sky and earth/ reason and dream/ are things/ that do not belong together./ And thus they tell the child/ that the hundred is not there./ The child says:/ No way. The hundred is there.

—*Loris Maliguzzi, founder Reggio Emilia preschools*

## Rationale

This is a study of the types of interaction a Story Stone provocation could activate in an informal learning environment between children and their adult caregivers. The goal in creating this project is to share an idea of a physical tool (i.e. Story Stones) and discuss the usefulness of this tool. This tool supports building various literacy skills for young children and their families, specifically oral storytelling and visual literacy skills, which build expressive and receptive language development. The main reason for this research is to provide support for children and their caregivers by entering into the world of objects through a Reggio Emilia inspired method. In this approach to teaching and learning, each learning experience requires meaning making through open-ended activities in which an exchange of ideas and flexible thinking is ever present.

Story Stones are open-ended, so much so, that every child brings different ideas, prior knowledge and creative thinking abilities to the table for an infinite amount of storytelling and sharing opportunities that benefits all. In the following pages there will be a discussion of direct observation and a review of literature about multiple corresponding theories attached to using and interacting with Story Stones. Foundational theories include: Reggio Emilia approach to education, the theory of loose parts, integrated curricula, aesthetic experience, learning with objects in informal learning environments, dialogue and adult facilitation, learning with nature, children's cognitive and language development, and visual inquiry.

## Age Group Description

According to Wood (1997), for three, four and five year olds, pencils and paper tasks may yield the least amount of evidence of learning because they learn best through play, by listening to stories read to them, by acting out stories they've heard and make up themselves, by manipulating materials. Activities such as matching and classifying occur naturally and are best supported multiple opportunities and materials for counting, measuring and comparing objects (NAEYC, 2009). Large muscle movement and gross motor activity is how much learning is transmitted. Teachers as facilitators of learning are most successful when they ask questions that lead children toward the next stage of "cognitive exploration and understanding" (Wood, 1997).

Language development may be expansive at these ages with the acquisition of vocabulary and usage of newly acquired vocabulary. Reading and listening to stories read by adults is a significant source of new vocabulary for these ages (Wood, 1997). Fantasy is persistent in play, yet behavior is quite literal in that 3-5 year olds often believe in one way of doing things; their way. Over time, the ability to mentally and symbolically represent physical objects, actions, and events increases to being able to think ahead and anticipate results by making a plan before taking action. (NAEYC, 2009).

Repetition is both developmentally appropriate and important in that it maximizes learning and promotes confidence in demonstrating what has been learned (Wood, 1997). Open-ended play and hands-on manipulation of

materials inherently encompasses repetition. Hands-on experience with diverse objects is both stimulating and effective in encouraging these ages to learn by exploring and activating their senses for memorable learning.

However, when there are any changes or differences in the sensitivity of an individual's temperament, by gaining experience and developmental maturity, the same environmental stimulus does not elicit the same reactions for all; the stimulus elicits a reaction natural to the individual (Rothbart, et al, 1998). As with any age, children expand their understanding through social interaction in Vygotsky's zone of proximal development in which they are able to participate in more advanced problem solving than they are able to achieve independently, and in so doing they practice skills that they internalize to continue to advance what they can do independently (Tudge, et al, 1989).

## Methodology

As objects for hands-on play and learning, Story Stones are accessible because of their flexibility; they carry both aesthetic and kinesthetic appeal. Story Stones are the size of a child's hand because if a child needs two hands to lift the stone, attention will dwindle and engagement will suffer. The rocks were collected and donated from various nature settings like private gardens, beaches, and rivers. Because of the origins of the rocks, they all shared a smooth texture from having been tumbled and battered by external forces prior to their resurrection as Story Stones. The smooth texture helps

these rocks be easy to hold and manipulate as well as soothing on the skin and the eyes.

They were cleaned with soap and water, laid to dry and then fitted with clipped paper images that were glued on with mod podge for the shiny finish. Images included those that were relevant to the age and backgrounds of the audience of children and families that attended the institutions (the research sites) as well as the culture of the communities in which they reside. These institutions were Sugar Hill Children's Museum of Art & Storytelling in Harlem, NY and Not Just Art, a privately owned art and science enrichment center on Long Island, NY. For Sugar Hill, the images were of well-known people and artists from the Harlem Renaissance shown in iconic poses and outfits with the intention of provoking conversation between children and caregivers by looking closely.

The next images that were used to make more Story Stones were figures taken from the main exhibit displayed in the gallery next to the art studio where art making and hands-on storytelling experiences took place. The exhibit was called *The Pollen Catchers' Color Mixing Machine* (2014-2015) by Saya Woolfalk and included pastel colored figures that resembled humans who possessed added features of nature such as geometric and organic shapes, feathers, clouds, colorful complexions and dreamlike accessories. These images invited the viewer to interpret the visuals in their own way with infinite possibilities for storytelling. Isolating only the figures from their original backgrounds, these images became abstract reproductions

of the larger than life mural exhibit that children became immersed in upon entrance to the gallery.

The images for Story Stones used in the studio of Not Just Art, included the abstracted figures of *The Pollen Catchers' Color Mixing Machine*, triangles in the colors of the rainbow, Red/Orange/Yellow/Green/Blue/Violet , as options for exploring a geometric shape, along with images of different animals with both colorful and monochromatic palettes. A number of animal images were white or black silhouettes that were easily recognizable by both adults and children.

Children were given rocks with transposed images with which to tell their own stories. These rocks are provided with no limits on creativity for the purpose of finding meaning in the conversations that will occur. The Story Stones were laid out on a table as an invitation to explore in any way a child or an adult may want. This invitation was meant for children to explore individually or with other children, as well as with their adult caregiver for intergenerational exploration and discussion. The presentation was deliberately open-ended with one simple question posed to the table: "What story can you make?"

# Literature Review

## REGGIO EMILIA APPROACH TO EDUCATION

Story Stones are inspired by a fluid philosophy in which children are offered time and respect from adult facilitators to discover learning in their own ways, at their own pace, and on their own terms. The Reggio Emilia Approach originated in the Italian town of Reggio Emilia out of a movement towards progressive and cooperative early childhood education after World War II by psychologist Loris Malaguzzi. A few of the fundamental principles of this approach include:

- the belief that children are capable of constructing their own learning,
- children form an understanding of themselves and their place in the world through their interactions with others,
- children are capable communicators and collaborators of shared experience,
- the environment is the third teacher so authentic materials are paramount,
- the adult is a mentor and guide to child leaders,
- there is a strong emphasis on documenting to make children's thoughts visible as learning aides for children, an assessment/curricular design tools for teachers/adult facilitators.

## THEORY OF LOOSE PARTS

The theory of loose parts is the bedrock of this research project. This theory has shown that when children interact with loose parts, “they enter a world of ‘what if’ that promotes the type of thinking that leads to problem solving and theoretical reasoning” (Beloglovsky, 2015). The theorist behind Loose Parts, Simon Nicholson (1972) defines the theory as the following: “In any environment, both the degree of inventiveness and creativity, and the possibility of discovery, are directly proportional to the number and kind of variables in it” (p. 6).

What is fascinating about loose parts is the truth behind a child’s enhanced ability to “think imaginatively and see solutions,” which naturally adds excitement and elements of adventure to children’s play (Beloglovsky, 2015). Nicholson (1972) explains that when variables in the environment are interactive, able to be manipulated, the distinction between education and recreation disappears. When children can hold, combine, remove, line up, and redirect loose parts, (or materials) in almost endless ways, conversations and active engagement are encouraged by the inherent presence of collaboration and cooperation (Beloglovsky, 2015).

The beauty of loose parts is in the allure of the natural yet purposefully captivating selection of objects that children can manipulate in open-ended play. Carter (2008) posits the work of a teacher, caregiver or museum professional is almost handled for them in the sheer fact that children are drawn to loose parts because they offer countless options for pursuing

different learning domains in active and open-ended ways. There are indeed more ways to interact with objects than to be solely contemplated (as happens in many formal learning environments where hands-on practices are discouraged rather than supported). Objects that are as open-ended and transformative as loose parts, give children the power to use internal resources, prior experiences and creative thinking in many ways and for self directed purposes. Nicholson (1972) poses the question in favor of loose parts, stating first how artists and scientists are allowed to experiment, invent, and discover things, so why shouldn't everybody else - especially in early childhood - be allowed to flex their creativity and inventiveness?

## INTEGRATED CURRICULUM

The magic of learning through art and play is supportive in that “children do not need always to distinguish learning by subject area” (NAEYC, 2009). By integrating curricula, the human brain seeks to create meaningful connections when confronted with new information and experiences. When children are given the chance to study topics that cross subject areas they gain a deeper understanding of how to apply concepts in and over different contexts. “An integrated curriculum in which children use knowledge or skills from one area in another subject area can extend their knowledge of the connections across disciplines” (NAEYC, 2009).

A truly integrated curriculum will not distinguish between disciplines (math, science, language arts...) Art and project-based learning is a natural

approach to integrating sciences, math, and literacy into everyday learning experiences. Story Stones inherently integrate subject areas in that they provoke and promote creative thinking, early math and science thinking, and language development.

## AESTHETIC EXPERIENCE

John Dewey, a philosopher and practitioner of constructivism in progressive education wrote *Art as Experience* in which he probes the very meaning of experience, accentuating the differences between acquiring experience and *having an experience*:

“Oftimes, however, the experience had is inchoate. Things are experienced but not in such a way that they are composed into *an* experience...In contrast with such experience, we have *an* experience when the material experienced runs its course to fulfillment. Then and then only is it integrated within and demarcated in the general stream of experience from other experiences ” (Dewey, 1934)

There is a difference between experiences and *having an experience*. Things that are experienced can be mundane and fall into the recesses of our mind as less-than-memorable, yet can shape our knowledge of the world through repeated exposure to gain familiarity. While we experience an environment repeatedly over time and at a constant rate, and can even collect experiences by collecting specific things, to have *an* experience, requires our direct and conscious involvement (Berch & Gamliel, 2015).

In *Experience and Education*, Dewey discusses the developmental importance of positive and negative experiences, but differentiates in *Art as Experience* that apart from memorable experience there exists also aesthetic experience (1934). Aesthetic experiences are active as well as responsive. This means there is a certain dialogue that is prompted at the start of an experience and must be continued within ourselves while “doing the experiencing.” Social dialogue may occur and will contribute further to the aesthetic qualities of the experience.

Furthermore, Dewey states,

“The [a]esthetic or undergoing phase of experience is receptive. It involves surrender. But adequate yielding of the self is possible only through a controlled activity that may well be intense... To steep ourselves in a subject-matter we have first to plunge into it. When we are only passive to a scene, it overwhelms us and, for lack of answering activity, we do not perceive that which bears us down” (Dewey, 1934).

Aesthetic experience is the culmination of our ability to perceive art, beauty and nature, and to discuss our experience with it to produce knowledge or understanding about our experience. It is not simply to see the art, but to be moved and therefore engaged by it that makes it memorable. “Cultivating an aesthetic sense enhances the ability to see, explore, appreciate, and find joy in the beauty of the world” (Carter, 2008). Of course,

these experiences are not confined to the experience of art, but can also occur in science and nature.

“As humans we see many things but actually look at few.

Looking is active seeing. It is a long, quiet process. We should help the small child to develop her looking. She can become absorbed in the appearance of an object such as a stone... [certain images can] excite her to see, but do not education her to look” (Thomson, 1994).

Museums and other informal learning spaces strive in their design to provide aesthetic stimuli to create an experience that is visually captivating, engaging, and memorable for visitors.

#### LEARNING WITH OBJECTS IN INFORMAL LEARNING ENVIRONMENTS

In *The Constructivist Museum*, George E. Hein notes a challenge that museums regularly face. Hein asks, “How can we accommodate this diverse audience and facilitate their learning from our objects on their voluntary, short visits?” (1995). The constructivist museum that Hein discusses focuses on the individual learner and seeks to allow the visitor to generate their own understanding of the content, instead of allowing the content to dictate the way the visitor must learn (1995). In such a museum, isolating learners from their individualized learning processes is condemned and as a remedy, there is an emphasis on the social aspect of learning and on the importance of building on prior knowledge and the previous experience already present in the mind of the visitor. “In order to make meaning for our experience, we need

to be able to connect it with what we already know” (1995) (Berch & Gamliel, 2015).

In *Family Connections: Family Conversations in Informal Learning Environments*, Kelly Riedinger defines informal learning environments as “venues for learning opportunities that are outside of the formal classroom context” (Riedinger, 2012). These venues include all institutions that offer informal educational and cultural experiences in art, history, science and many other disciplines. Museums are most valuable in their potential to provide opportunities for learning experiences that support the social, cognitive and emotional development of young children (Smithsonian, 2012). This opportunity for support allows families to be active in children’s expanding knowledge in the content areas of science, history, and art. Informal learning environments allow space for children’s differing interests and these contexts are inherently able to offer unique opportunities to engage in experiential learning (Riedinger, 2012).

Riedinger states that in these contexts, “families co-construct knowledge and collaboratively make sense of exhibit and program content... The voluntary and free-choice nature of informal learning environments may influence children’s motivation and interest in learning” (Riedinger, 2012). Access to such opportunities as handling objects, is found to encourage active learning and develops thinking and communicating through language prompts (Smithsonian, 2012). Parents and adult caregivers automatically provide these meaningful and equitable informal learning experiences each

time they bring children to these environments. Children find value in what they are experiencing when they engage authentically with dialogue. This authenticity of active engagement facilitates meaning for them in these informal learning environments (Smithsonian, 2012).

## DIALOGUE AND ADULT FACILITATION

High levels of exploratory behavior among children occur when adults pose open-ended questions directing children's attention to certain concepts and details:

“Experiences that were frequently recalled by young children as among their favorites were ones where open-ended discussion was used to direct children to look closely... and contribute their thoughts about what they saw, how the elements were put together, and what meaning they ascribed...” (Smithsonian, 2012).

With all that informal learning environments have to offer, the levels of parental/caregiver engagement, facilitation and hands-on participation are what drive a meaningful experience for children. The roles adults play in guiding children's learning are undeniably important, in their ability to “provide spontaneous, casual explanations in response to questions from children and in so doing help shape what children know” (Smithsonian, 2012).

Observation, imitation and repetition of actions and words are adult guided skills that automatically support learning for young children. Adults are conduits of sharing basic information, so while interacting with objects in

simple ways, they are using objects to explore topics in more depth than a child left alone. While working together with children to solve problems that arise from interacting with objects, children and adults are able to learn from each other (Smithsonian, 2012). Across cultural contexts, the inherent space for sociability within informal learning environments allows all of the people in a child's life, like parents, teachers, peers, and siblings, to mediate children's learning experiences through methods of social facilitation (Zimmerman, 2013). With this social facilitation, adults guide children through talk and gesture through modeling and find that shared meaning making happens, which then leads to children's learning (Berch & Gamliel, 2015).

Two processes of this social facilitation that occur when families participate with children have been coined "guided participation: 1) Bridging understandings through words or gestures; 2) Structuring participation within activities that allow children to engage or observe conversations, routines, and playful experiences" (Zimmerman, et al, 2013).

Conversation can be used to formulate and then rehearse ideas about objects and concepts that are presented informally, ultimately supporting learning. Conversations may help to make individual "object-manipulation experiences" part of a more unified understanding through social engagement that supports transfer of knowledge to different contexts (Jant, et al, 2014). Conversation provides a way for making connections to previous experiences and helps children remember more of what they experience (Berch & Gamliel, 2015).

Experiential learning and all facets that support having *an* experience, as Dewey explains it:

“Learning from direct experiences with objects and learning through conversations with others are intertwined. What children take away from their experiences is determined by a combination of what they do and what they talk about. Although children can learn a great deal on their own, conversations with [adult caregivers], siblings or peers, also greatly influence the content, retention, recall, and transfer of what they learn” (Jant, et al, 2014).

The open-ended questions that adult caregivers ask include “Wh-questions: What, Why, Where and How,” to guide children’s understanding and build meaningful knowledge based on their focused attention to noticeable details found in questions and conversation. When children respond to these questions, with gesture or spoken response, evidence of learning will occur.

## LEARNING WITH NATURE

Stephen Kellert, a professor of Social Ecology at Yale University's School of Forestry and Environmental Studies has authored a number of books, including *Birthright: People and Nature in the Modern World* in which he states, “much of what we value and cherish as distinctively human- our capacity to care, reason, love, create, find beauty, and know happiness- continues to be contingent on our diverse ties to nature” (2012). Nature in any

form or amount of exposure, nurtures the adventurer, scientist and artist in all of us, adding to the sense of excitement in children when they talk about what they discover and experience (Berch & Gamliel, 2015).

Immersion and exposure to nature has innumerable benefits for children and education. There are lessons in beauty and stillness that expose us to life and growth promoting curiosity and exploration (Ward, 2014). With adults as guides, children can learn about being gentle and respecting living things and the environment through imaginative play and close observation of natural items to create stories and play within a special place.

“All senses become engaged when children interact with the natural world. For young children, getting up close and personal with the environment is a great place to start deepening their knowledge of nature and learning about the world at large. Nature is the antidote to the fast-paced, stressful world in which many young children live. Equally important, it encourages an appreciation of the natural world on which we depend... The primary benefit is that children become better observers and feel more connected to the outdoors” (Ward, 2014).

Experience with and exploration in nature promotes mental and emotional well-being demonstrating concepts and skills relating to improved self-image and understanding as well as social skills (Swank, et al, 2015). Children’s self-esteem, happiness, ability to show empathy and critical thinking skills are enhanced through encounters with nature on both levels of

individual silent engagement and through social collaboration with others within a natural environment (Swank, et al, 2015).

There is an inherent attraction that humans have to nature, referred to as “biophilia,” explained in *The Origins of Aesthetic and Spiritual Values in Children’s Experience of Nature* by Gretel Van Wieren and Stephen R. Kellert in understanding how the “evolution of aesthetic, spiritual, and other basic values of nature have advanced people’s physical and mental health and well-being” (2013). The tendency of biophilia adapts intellectual and cognitive development to include a sense of order and harmony and instills a sense of meaning and purpose solidifying “a heightened sense of personal and collective identity and self-worth” (Weiren, et al, 2013).

## CHILDREN’S COGNITIVE & LANGUAGE DEVELOPMENT

For the purposes of this project, the most pertinent domains of child development include cognition and language. Stephen Kellert offers the sentiment that “nature as symbol is used to facilitate language and speech... the extraordinary information richness and diversity of the natural world to the intellectual processes of labeling, naming, distinguishing, identifying, and classifying, [are] all basic to the development of language and communication” (Birthright, 2012). Children continually adapt by forming new understandings and ways of interacting with every new experience, forming cognitive frameworks by reinforcing their newly adapted understanding of a concept with continuous practice. Cognitive development is cumulative,

children accrue understanding with each new experience, which allows them to grow from what was learned during a previous experience (Singer, et al, 1997).

In a holistic view of childhood and learning as opposed to traditional or clinical views, all developmental milestones will be accomplished with the continuous opportunity of spontaneous exploration and play throughout childhood. “Right up to the ages of six and seven the gift of spontaneous creation is still flourishing and, if it is well grounded, it should provide inspiration throughout adulthood. The child needs to be allowed the freedom to develop this free-flowing spontaneity without being trapped [in an adult world]” (Thomson, et al, 1994).

This “free-flowing spontaneity” fuels the necessary intrinsic motivation and desire to keep exploring, to continue to learn and grow and feeds a “creative mobility” that is often lost as we mature into adulthood. Offering learning opportunities that are appealing will boost a child’s disposition or inclination towards using acquired knowledge and skills as well as the delineated subject areas of science, and math. “Learning goes from the hand to the head, not the other way around” (Wood, 1997). The child will develop intrinsic motivation for learning and pursue personal curiosities throughout a life of loving to learn. Genuine experiences of storytelling, observation and socialization positively affect their cognitive and language development (NAEYC, 2009). At the opposite end, excessive drilling and militant practice of already mastered skills threaten children’s motivation to use the skills they

have acquired as well as growing to venture out of curricular comfort zones into less known learning territory. Developing desire to use skills along with developing the skills themselves is crucial to children's growth.

In general, children select, elicit, and interpret particular reactions from the environment that are in agreement with their prior experience and knowledge, making Story Stones with familiar images (in this case, from museum gallery artwork) ripe objects for manipulating within one's environment (Weinfield, et al, 1999). Children assume inanimate objects to have anthropomorphized qualities and attribute other symbolic characteristics to one-dimensional materials perpetuating creativity in imaginative play. (Thomson, et al, 1994). Developing a superficial emotional connection with anthropomorphized objects affords children the freedom and creative space to expand their play and therefore their learning. In later age ranges of 7 and older, "...growing and developing youths... with tangible adult tasks ahead of them are [primarily] concerned with what they appear to be in the eyes of others as compared with what they feel they are, and internalize the question of how to connect the roles and skills cultivated earlier with the occupational prototypes of the day" (Erikson, 1966). Every individual is born with a set of traits of which they are programmed to use as a preliminary lens of experiencing the world. Given this set of traits, the environment of the child is where experience and knowledge are formed.

The benefits of such objects as Story Stones are undeniable in the developmental value of acquiring and rehearsing knowledge and skills

including language and creative thinking. Children are able to develop new social strategies and participate with others with flexibility when the ability to represent thoughts and feelings verbally grows. “Ideas and experiences can be shared, feelings can be explained, or words can be used to encourage or hurt others” (NAEYC, 2009).

The value of expanding children’s vocabulary can be demonstrated in their moments of expressive language use in storytelling. Children grow exponentially when they are confident and able to use their expanding vocabulary, cultivated through language development over time and through varied avenues of practice.

## VISUAL INQUIRY

Using Story Stones as a tool for assessing through observation is aligned with the concept of visual inquiry as discussed by Rika Burnham in the *Journal of Aesthetic Education* (2005). Visual inquiry is a tool for looking closely for learning, and welcomes spontaneity and creativity, just like Story Stones. Replacing “museum visitors” with “children,” this visual inquiry technique is analogous to looking closely, thinking creatively and divergently with Story Stones.

Children focus intently on the images and/or visual characteristics of the stones and both individual children as well as a group of children reach towards a collective sense of the images they personally select as a whole. “...What might look like a conversation is in fact a series of observations, an investigation of sorts. It begins with an open-ended invitation for thoughts and

observations” (the open-ended provocation of Story Stones). “Participants articulate what they are seeing and how they are making sense of what they see” (storytelling, asking questions, recognizing and discussing familiar images...).” Such a facilitated discussion differs from a lecture, which constructs experience for the listener” (Burnham, 2005). When a visual inquiry investigation comes to an end in a museum gallery, “the participants cluster around the works of art, still wanting to continue the experience of discovery, the instructors know that their students have understood that engagement with a work of art is a beginning, not an end...” (Burnham, 2005). Continuing or returning to a work of art in a museum is consistent with children continuing to manipulate the physical Story Stones and the ever-generating stories. The pleasure in discovery and creative license keeps children engaged and interested in coming back for more interaction, conversation and storytelling.

A teacher or caregiver, much like a museum instructor, must understandably have a secure sense of the range of the images’ possible combinations and interpretations by the children. “The [teacher]’s questions and remarks should be open-ended. With truly open questions, we encourage and honor participation in the unfolding [storytelling], and unexpected comments expands the group’s awareness of what is possible. Leading questions, however - questions with predetermined answers - do not, in the end, lead anywhere. As instructors, we should think of ourselves as being part of the group, learning alongside everyone else. Being flexible and using

skills of facilitation by guiding, not prescribing. The direction of [children's] exploration preserves the authenticity of the visual inquiry experience (Burnham, 2005).

## Research Findings & Analysis

Story Stones proved to be simultaneously mysterious, grounding, interesting and attention grabbing for children and caregivers. Children interacted with the Story Stones in several intriguing ways that will now be analyzed.

Story Stone images that included artwork from the museum galleries and images that were generally never before encountered by the children and parents were consistently the most provocative in that they elicited lively and energetic responses from both children and adults. Immediate reactions such as surprise and self-satisfaction were shared through squeals and smiles when a child connected a Story Stone image to the gallery artwork, proving the Story Stone interaction a successful strategy of linking galleries with a separated and often isolated art making area within a museum.

In the case of the Harlem Renaissance figure images, children seemed uninterested. In trying to start conversation about the people images they were looking at, I was not successful in generating curiosity or new ideas with the children... Their attention was not held. The parents and caregivers stopped to look at each one and guess the names of the historically

prominent figures, but then moved on to other activities just as the children had. This observation led to the addition of the images of gallery artwork, which held ample attention and therefore produced more child and adult caregiver interaction.

By transposing these abstracted images on hand-sized rocks for interactive purposes, they instantly became characters in stories generated by children and proved to become a valuable tool in connecting children's experience with the mural exhibit. By providing this rich and open-ended opportunity for storytelling and subsequent art making within the gallery-adjacent art studio, children were simultaneously thinking about art on view and their own inclinations to create.

The children talked a lot about the characteristics of the rocks as well as the images attached to them, allowing them the chance to fulfill their natural tendencies of experimenting with those characteristics: shape, color, weight. Because younger children are just beginning to grasp "hierarchical relationships," they may not understand that as they classify the rocks there may be more than one classification that a rock may fit into (NAEYC, 2009). There were 3-5 year old children steadfast in their decision to group a rock that is of a dark color in the "dark colors" pile without being able to acknowledge that the colors of the image on the rock are quite light and bright. Eliciting the reasoning behind the decisions for how the child classifies the Story Stones and how they use the images is how progress in

classification as well as further proof of creative thinking, language use and problem solving are measured.

Story Stone images and the stones themselves are often ascribed household and industrious roles as seen in the various environments of children, helping them parallel their play with their perceived world view.

As outlined in Beloglovsky's *Loose Parts: Inspiring Play in Young Children* (2015), loose parts are categorized as the following:

- Captivating
- Open-ended
- Mobile
- Promote active learning
- Deepen critical thinking
- Promote divergent and creative thinking
- Support developmental domains such as physical and social emotional development
- Are developmentally inclusive
- Promote a wide range of play such as functional, constructive and symbolic play
- Are sustainable and economically feasible and finally
- Support the curriculum in math, physical science, dramatic symbolic play, language and literacy, art, sensory exploration and movement and music.

In observations of children and caregivers interacting with Story Stones, I found truth in connection with each and every one of Beloglovsky's designated categories and explanations of loose parts play.

The stones are initially *captivating* in their mere presence within the walls of a museum and art studio space. They are entities that come from the earth, the outdoors, and are therefore unexpected when walking into a building. The fire of natural curiosity is stoked as people near the collection of stones that seem to be huddled together in a new and unknown environment waiting for a turn to enter someone else's imagined world.

Once the collection of rocks or basket filled with stones has captivated a visitor(s), the *mobility* of the individual stones allow for endless possibilities of *open-ended* play and interaction. The possibility of multiple outcomes with no specific directions prescribed to the play disallows a single or predicted result (p. 4). Children easily and eagerly transported stones of their choosing between containers and activity stations for different uses over the six months of observation of Story Stone interactions in the Sugar Hill Children's Museum of Art and Storytelling informal setting.

Because "Jean Piaget's developmental theory emphasized the need for children to actively manipulate their environments, to experiment, and to interact with materials in order to learn," Story Stones and other loose parts effortlessly *promote active learning* by encouraging children to manipulate them, in turn manipulating their environment (p. 6). Children were observed to

actively choose how many stones to transport, to where the stones would be transported and for what reasons.

The Story Stones stimulated children to think of using them in different ways with a range of attributed meaning and possible uses, demonstrating higher order thinking. Story Stones were seen to *deepen critical thinking* in children's investigations of the rocks and images, analyzing their personal ideas that were (sometimes) in contest with others' ideas, beliefs, actions and questions (p. 6-7). Some rocks were sorted and classified according to natural coloring, some according to image type or color palette (also *functional play*); some were used to encircle someone sitting on the floor or in the nature play center of the studio symbolizing an enclosure of sorts (also *constructive play*); some were used as physical objects to symbolize parts of a story coming to life through performance (also *dramatic and symbolic play*)... All are acts of *divergent and creative thinking* in the reincarnated uses and meanings of rocks found outside, somewhere else in the world.

"Play with loose parts [has been found to increase] children's collaboration, negotiation skills, risk taking, conflict resolution, communication, and problem solving" as evidenced by the social nature of which children can play and use loose parts (p. 9). Story Stones give opportunity for *physical and social-emotional development* by promoting confidence in children's abilities to use their bodies, develop fine motor skills and support a sense of belonging in the social context. They also encourage willingness to take risks and show passion for what a child enjoys doing. Especially in circumstances involving

multiple aged children, the younger children were able to feel comfortable asserting their physical and verbal opinions amongst the older children. The older children seized opportunities to practice sharing their ideas and opinions in *developmentally inclusive* ways. They also held space for the younger, diverse children to interact equally as often as well as with equal value.

Story Stones as loose parts *are sustainable and economically feasible* in that they are free, and encourage acts of reusing, renewing and recycling (p. 15) while they also provide *support of the curriculum* in subject areas that include *Math, Physical Science, Dramatic and Symbolic Play, Language and Literacy, Sensory Exploration and Movement and Music*. Sorting, classifying, combining, separating and recognizing one-to-one correspondence are the early math concepts that are accessible through interaction with the Story Stones (p. 16).

With Story Stones, physical properties of the “non-living” world are presented to children with the invitation to investigate and think about their own ideas and explanations of the *physical sciences* (p. 16). Children of all ages showed genuine curiosity for where the stones came from, how they were made, and looked closely with magnifying glasses and jeweler’s loupes.

Story Stones as objects to manipulate over and over again demonstrate great potential for *sensory exploration* and *art* play which is exactly how children make sense of the world and get to know themselves within the world. Tactile qualities such as smooth, rough, spongy, spikey, wet, soft, etc, all nurture sensory play with the ability to elicit differing reactions and

interactions between the object - the Story Stones - and the manipulator - the child(ren) (p. 18). Story Stones as loose parts offer children the invitation to “draw, sculpt, collage, explore and extend their ideas” (p. 17-18). *Movement and music* is one area in which Story Stones may be able to play a small part, possibly that of a percussion instrument.

“Loose parts promote language development when children use them as props to engage in rich conversations and storytelling with peers and adults” (p. 17). All aspects of language systems (phonological, syntactic, semantic, and pragmatic) are incorporated into children’s play, laying a perfect foundation, quite literally, for constant conversation between “players” - the children or child and adult - to richly converse. “To have had stories of any sort in childhood- and here I mean oral stories, those told or read... puts a person into a basic recognition of and familiarity with the legitimate reality of story per se. It is something given with life, with speech and communication, and not something later that comes with learning and literature (Hillman, p. 43). Children who exercise and play with language and creating ideas perpetuates the true value and meaning of storytelling throughout their lives, allowing well-rounded and perhaps artistic views of life and the world in which they live.

For children who require multiple entry points and varied ways of approaching a concept or task, aesthetic and audibly appealing literature and oral storytelling invites them in and they are more than happy to stay and

learn. Opportunities for creative expression are integral for making meaningful connections to one's life and experiences.

## Limitations

The innate limitations of using Story Stones, however, became apparent in the amount and type of images attached to the stones that are made available. The historical figures of the harlem renaissance were unknown to the children and to many of their adult caregivers, which stunted their interactions with the Story Stones. These images gave the viewers the sense of taking part in a guessing game in which they were unsuccessful in guessing correctly the identities of figures. The images proved to be less open-ended and therefore less constructive with which to interact.

Once the images of real people were supplemented by the images of gallery artwork, the people became more anonymous and viewers made less attempts at guessing who or what they were famous for and simply used them as characters in their storytelling.

## Conclusion

Children are in the action of self and world exploration and constructing their understanding of self and the world. They are able to see details and try many ways of doing things with what they encounter (Carter, 2008). This is the magic of how children learn and how *much* they learn.

“...Story is a kind of melodic line that has a built-in need for a response so when the story brings out questions, it has started a melody which has to be continued by the hearer in some way, either through the response of a question or some other reflection of what the story may have for him. But the story in some way elicits a response” (Lewis, 1979).

When a child hears a story, from parents or teachers, there is a “physical intimacy” that becomes part of the story. The child’s interaction with the storyteller is an important part of the process because it is not just the story that makes an imprint on the child, but the communal experience of hearing it from a familiar adult. “If he hears it in school again it’s a communal experience: other children reacting and interacting, even their restlessness and the interruptions, the asking of questions, is important” (Lewis, 1979). Sharing Story Stones or sharing ideas inspired by Story Stones is a communal experience, a kinesthetic experience, an aesthetic experience that will make an imprint on children and their caregivers.

## Recommendations

In the following section, I will be using the AMNH as an example of an institution to explain ways in which one can use story stones during a museum experience. Any natural history, or science institution will serve well as informal settings of learning with Story Stones. Children are attracted on an instinctual level to interact with natural materials from the Earth so in thinking about museum objects available to study, the Hall of Minerals and Gems at the American Museum of Natural History can become a primary destination. This environment is valuable and conducive to exploring the visual and spiritual beauty of the Earth's natural materials that hold great mystery in children's eyes and hands, thus providing rich and informal invitations for discovery learning.

Urban populations grow and experience the natural world in different ways than outside city limits so every opportunity for visitors, young and old, to place hands on natural objects is amply beneficial. Because experiences with nature are diverse, hands-on experiences with natural objects are valuable because they provide flexibility in the learning experience. This informs an urge to connect the exhibit of Minerals and Gems with the outdoors and natural environments from which these specimens originated for the youngest visitors of AMNH and is an underlying reason for creating and using Story Stones in a museum setting.

Informal learning environments continue to strive to reflect Kellert's *Articulation of Aesthetic and Spiritual Values*: in the Hall of Minerals and

Gems at AMNH, visitors may find opportunities for exploration and experience of beauty, pattern and order, wonder and discovery, opportunities for solace and peacefulness, opportunities to find commonality and connection, opportunities to feel happiness and closeness with nature, feeling a power greater than one's self and possibility for divine presence and mystery (2013).

The Hall of Minerals and Gems at AMNH has Dewey's aesthetic qualities that are integral for creating a memorable experience for visitors. Visitors can use information they learn about the objects in the Hall and create their own Story Stones. These can include images they choose to create a "picture story" of how the minerals and gems came to be, or how they they came to live in the American Museum of Natural History. A "gallery activity" such as this links the untouchable and invaluable museum artifacts with the natural objects that visitors can collect and transform themselves.

Another option for creating Story Stones i to use images from children's literature, and objects and landscapes found in children's home environments. In a small group setting, placing Story Stones in a bag and retrieving one stone per child and in succession of one another, will make for a rewarding, child-led storytime. Drawing curved and straight line fragments on small stones is an invitation for children to piece the fragments together. Creating shapes and symbols by fitting the line fragments together is a gateway activity to patterning, handwriting and early reading skills through symbol recognition.

## Personal Reflection

I was attracted to teaching through my lifelong attachment to art. When I first started teaching, I led art classes for children and their caregivers, and quickly came to the realization that art, in all of its forms, helps the processes of learning in general. One of my preferred forms of creative expression that is used for meaning making is children's literature; as both an art form and cornerstone of education. My love of children's literature grew out of teaching art from story to children. This was one of my favorite types of classes to teach and quickly influenced how I taught every subsequent lesson. Children's literature became a passion of mine because it is a universal conduit of learning for both children and their caregivers.

It was my disinclination towards the direction our education system has taken since I was a student in elementary school that led me to Bank Street College in pursuit of an alternate route into education and working with children and other lifelong learners. I have been able to rediscover my interest in the Reggio Emilia approach through working at Sugar Hill Children's Museum of Art and Storytelling. Because discovery based learning theory is part of the foundation of my personal teaching practices, I wanted to combine storytelling aspects of children's literature, learning visual literacy with pictures, object study and museum-based informal learning into a multi-layered conversation for all types of adult caregivers.

Over time and throughout my most recent experiences of providing meaningful creative learning experiences in children's museums, I was able

to better define for myself what I am truly interested in investigating further. Storytelling, rocks, stones, pebbles, crystals, gems, were my inspiration. Personally, when I hold a palm-sized, smooth stone, I spend a few extra seconds rolling it around in my hands and warming it up if it has a chill inside of it. I have rock collections, crystal collections, pet rocks, and have used rocks and pebbles in art making with children. There is often a sense of satisfaction that both my student artists and I share because we have captured and harnessed a solid piece of mother nature to draw inspiration from and enhance an otherwise lovely, but much less vibrational piece of art to share with the world.

Writing a children's book from the perspective and personal experience of these natural objects that live in a museum was an original possibility for my Integrated Masters Project because objects and artifacts have unique origins and valuable personal histories to consider when learning about them in a museum. A storybook like this would add the element of story in the context of science, providing rich opportunity for inquiry-based learning experiences outside of a museum, in a classroom, homeschool, or other learning settings. With inspiration from the Hall of Minerals and Gems at AMNH, each stone has its own origin, past and personal history, and can be used as an opportunity for storytelling. Instead of focusing on an abstract idea for a children's storybook as my Integrated Masters Project, I decided to see what would happen if kids were given rocks with transposed images with which to tell their own stories.

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