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Playing with Print? An Investigation of Literacy Indicators in Children's Museums

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Playing with Print? An Investigation of Literacy Indicators in Children's Museums

Museums are important educational environments with considerable learning potential (Akamca, Yildirim, & Ellez, 2017). They can offer literacy-rich surroundings with opportunities for visitors to interact with text in a variety of ways for diverse purposes. Examining the environment's potential for reading and writing provides insight into how the museum is meeting its mission as a cultural and educational institution, particularly for museums geared towards children as visitors. "A children's museum is defined as an institution committed to serving the needs and interests of children by providing exhibits and programs that stimulate curiosity and motivate learning" (Association of Children's Museums [ACM], 2012, p. 1). In this study, ten American children's museums in eight states were evaluated using the Museum Inventory of Literacy Indicators. Considering a museum visit in terms of its contribution to young visitors' literacy acquisition may result in more comprehensive educational encounters for its patrons (Giles, 2020a).

Children's Museums

Museums are both social and cultural establishments recognized as preeminent institutions for learning (Leinhardt et al., 2002). Andre et al. (2017) define museums as public, informal learning environments that include various objects, exhibits (live and/or simulated), and programs. Museums often focus on one or more area resulting in their categorization by type as science museums and centers, history and archaeology museums, art museums, and children's museums. Semper's (1990) description of a museum as "an educational country fair'' (p. 50) with numerous exciting things to explore and discover through touch and inquiry is particularly accurate in reference to children's museums.

Children's museums are institutions committed to serving the needs and interests of children by providing exhibits and educational programming that stimulate curiosity and motivate learning (ACM,2012). Unlike experiences in typically adult-oriented museums or traditional classrooms, children's museums are designed to meet the specific needs of young learners by emphasizing the process of learning through hands-on interaction.

As one of the fastest growing cultural industries in the world, children's museums have expanded exponentially in the past twenty years. Between 2011-2013, the AAM witnessed a 135 percent jump in membership among children's museums (Parker, 2013). Serving museum members in the United States and countries across the globe, the Association of Children's Museums (ACM) is an international nonprofit professional service organization representing and advocating for the children's museum field. Currently, ACM serves over 400 museums, businesses, educational organizations, and individuals.

Many children's museums are in major travel and tourism destinations with each one reflecting their diverse communities. Children's museums offer unique and shared experiences not found in traditional museums or other popular destinations. Children's museums are places where youngsters learn through play and exploration in environments specifically designed for them. Knowledge gained in museums goes beyond learning about the contents of the exhibits to the development of cognitive, affective, and linguistic skills such as verbal expression, observation skills, and making associations (Synodi, 2014; Hackett, 2014).

Generally, learning in museums and other non-school-based environments is referred to as informal or free-choice learning and is distinctly different from most learning that occurs in classrooms (Falk and Dierking, 2000). Learning in informal spaces is fluid, sporadic, social, and participant driven— characteristics that contrast the highly structured, formal school experience

(NRC, 2009). Unlike school, the museum setting is voluntary, open-ended, nonlinear, hands-on, and entertaining. There are no requirements, no prerequisites, no exams, no grades, and social interaction is often an important component (Ucko, 1985). Children's museums promote learning through play and exploration alongside adults. Greatly influenced by Michael Spock's leadership at The Children's Museum in Boston in the 1960s, the modern children's museum recognizes the power of play in getting children to better understand new concepts and different ways of thinking.

Learning through Play

According to Semper (1990), museums teach individuals to play because play is the basis of exploration, observations, discovery, and experimentation. Children's museums create playful, interactive learning experiences where all children can increase their knowledge and understanding of the world with the caring adults in their lives (ACM, n.d.). An interactive learning process that occurs between children, knowledgeable others, and a prepared environment is increasingly seen as essential to children gaining knowledge and understanding in a museum context (e.g. Cheng et al. 2011; Falk & Storksdieck, 2005).

Puchner et al. (2001) found that most of the learning happening at the Please Touch Museum in Philadelphia, PA is simple cause and effect learning. For instance, children learn what happens when they push a button or flick a switch. Information learning most often occurred in exhibits modeling real-world environments such as riding a city bus, shopping in a grocery store and preparing food in a kitchen. This type of learning required active participation by other children or adults and largely resulted from conversations accompanying the action. It is this scaffolded interaction with knowledgeable others that makes children's museum experiences

dialogical as well as hands-on (Henderson & Atencio, 2007) with abundant potential for language learning.

Literacy-Enriched Play

One noted and significant benefit of play is its contribution to children's acquisition of language. Aspects of play that have been identified as contributing to language development include the inherent social interaction, the volume of language production, children's high level of engagement, and opportunities to practice forming symbolic relationships (Weisberg et al., 2013). There is also evidence that pretend play with literacy materials is related to higher performance on academic tasks, such as reading (Christie & Enz, 1992; Pelligrini & Galda, 1993).

The inclusion of literacy-related props in children's play is a recommended practice in early childhood classrooms (Love et al., 2007) as a means of promoting the use of text for authentic and relevant purposes free of pressure and predetermined expectations. For example, labeling props and the actions that accompany them prompts children to use these words in verbally communicating their thoughts and ideas during play (Bodrova & Leong, 2003). Similarly, posted directions for completing a task or signs identifying where items are located serve dual purposes by encouraging children's independence in interacting with materials while also increasing their exposure to print. The presence of environmental print that serves a specific function, such as signs or directions, provides early opportunities for children to make sense of their surroundings through print (Kassow, 2006). Having paper, self-adhesive notes, index cards, clip boards, and a variety of writing materials readily on-hand encourages children's spontaneous use of print to record observations and communicate their understandings, while helping internalize the purpose of writing and the functions of printed language (Tunks & Giles, 2007;

Giles, 2020b). Language, both oral and written, helps children deeply engage in the act of learning. The presence of materials to facilitate language, thus, enhances their learning and literacy skills.

Significance and Purpose

While children's museums can have great educational value, this value is not automatic but results from intentional planning (Vexler, 2000). To create museum environments that are more conducive to children's learning, there is a growing desire for museum professionals and researchers in museum education to know more about children's learning in museums (Andre et al., 2017). The first step toward investigating the impact of visiting children's museums on the development of literacy skills is to assess the environmental components that exist in a museum that are known to support children's literacy learning. The purpose of this study was to evaluate the quality and quantity of literacy indicators present in children's museums. In view of the high level of emphasis on literacy learning today, findings of this study should be of interest to curators and education coordinators at science centers, museums, and related institutions as well as parents and teachers. Considering a museum visit in terms of its contribution to young children's literacy acquisition may encourage a new perspective in imagining museum exhibits that result in greater educational opportunities for visitors.

Methodology

Participants

All museums (n= 10) in this study were members of the Association of Children's Museums (ACM), an international nonprofit professional service organization representing and advocating for the children's museum field (ACM, n.d.). ACM has over 400 museums, businesses, educational organizations, and individual members worldwide.

Three museums were in Louisiana, and one each was in Alabama, Florida, Kentucky, Mississippi, New York, Ohio, and Tennessee. All ten museums share the ACM vision of a world that honors all children and respects the diverse ways in which they learn and develop.

Instrument

The Museum Inventory of Literacy Indicators (MILI) was adapted from the Inventory of Literacy Indicators (McMahon et al., 1996) for use in a museum rather than classroom setting (Giles, 2020). The MILI contains 19 items distributed across four areas. These areas are Books and Other Reading Materials (6); Writing Materials (7); Signs, Labels, and Directions (4); and Print Integration (2). Content and face validity for the MILI was determined by a panel of three experts knowledgeable in the fields of reading and early childhood education. The results of their assessment suggest that the MILI is sufficiently reliable and valid for research purposes.

The Museum Inventory of Literacy Indicators (MILI) is scored using a 6-point rating scale. Quality ratings range from Not Present (0) to Excellent (5), and quantity ratings range from None Apparent (0) to Abundant (5). Area scores are obtained by averaging the rating of the individual items. Total quality and quantity scores are obtained by summing the area averages, and the highest possible score is 20.

Data Collection and Analysis

Each museum was visited one time over a 6-month period, and each visit lasted approximately 1.5 hours. In the present study, the author/researcher completed the MILI at each location. The presence of literacy indicators was recorded on the Museum Inventory of Literacy Indicators (MILI). Individual item scores in each area were divided by the number of items to obtain an area average ranging from 0-5. The four area averages were then summed to obtain the total quality and quantity score for each of the ten museum sites.

Findings

As shown in Table 1, area averages for quality ranged from 6.00 to 15.99 while area averages for quantity ranged from 6.00 to 15.74. The largest difference between quality and quantity at a museum was 2.29. Two museums had a score of 10 or higher for both quality and quantity. There were consistently high scores (2.0+) for both quality and quantity in the area of Signs, Directions and Labels and low scores (< 2.0) for Writing Materials.

Table 1

MILI Area Averages and Total Scores

	Books and Other Reading Materials		Writing Materials		Signs, Directions, and Labels		Print Integration		TOTAL	
	Quality	Quantity	Quality	Quantity	Quality	Quantity	Quality	Quantity	Quality	Quantity
1	2.57	2.57	1.67	1.67	2.00	2.00	4.00	4.00	10.24	10.24
2	1.57	1.57	0.43	0.43	3.50	3.50	2.00	2.33	7.50	7.83
3	3.67	2.67	1.00	0.58	3.25	2.25	2.00	1.50	9.92	7.00
4	5.00	5.00	0.71	1.00	3.25	3.75	1.00	2.00	9.96	11.75
5	4.57	4.57	1.67	1.67	4.50	4.25	5.00	5.00	15.99	15.74
6	1.00	1.00	0.57	0.57	2.50	2.25	2.00	1.50	6.07	5.32
7	2.29	2.29	2.00	1.71	4.00	4.00	3.00	1.00	11.29	9.00
8	2.86	2.86	0.14	0.14	3.00	3.00	0.00	0.00	6.00	6.00
9	1.57	1.43	0.29	0.29	4.25	4.25	0.67	0.67	6.78	6.78
10	1.43	1.26	0.71	0.43	2.75	2.75	3.00	3.33	7.89	7.77

Discussion

Overall, there was little variation between a museum's quality and quantity scores, indicating that while items may be limited in some cases those present were of value. With only three museums scoring 10 or higher out of a possible score of 20 for total quantity and quality of literacy indicators, even the most literacy-rich museums visited have much room for improvement.

Examination of individual museum scores revealed that all but one (#5) seemed to concentrate its literacy efforts in a single area rather than considering the potential for facilitating literacy acquisition in multiple ways. Not surprisingly, the area of Signs, Directions and Labels was strong across museums. Most museum sites had appropriate signage labeling key objects and items along with text and/or pictures that provided instructions and located materials. There were, however, fewer observations of posted notices, announcements, or calendars intended for use by children.

Scores for Books and Other Reading Materials were higher than those for Writing Materials. Books, both fiction and nonfiction, reflecting many interests and different developmental levels were usually present in at least one location. Most museums had a library-like area or designated space for reading. While observed at multiple sites, it was less common to see books displayed in a variety of ways and/or locations throughout the museum, such as in the art area. There was a notable absence of literature props, such as pictures, puppets, costumes or figurines paired with books. The use of literature props is recommended for actively involving preschool and kindergarten children in retelling story events (Soundy, 1993) and has been found to have a positive effect on children's use of descriptive language (Stadler & Ward, 2010). Several museums provided puppets, puppet theaters, costumes, and/or stages, but these items were never accompanied by related literature or written scripts. Similarly, there were no magazines appropriate for children present in any of the museums. The most common writing materials observed were a variety of paper and writing instruments, particularly crayons and markers. These items, however, were often associated with an art activity as opposed to an opportunity for communicating in print. Several museums offered letter stamps, but these were no picture dictionaries, word lists or word banks present in any museum. Some museums had

chalkboards, and one museum had digital screen for children to display messages. While two locations posed questions on a message board with a way for children to respond, the sign-up sheets and/or comment cards present appeared to be intended for use by adults rather than children. Generally low scores for Writing Materials and Print Integration seem to indicate no expectation for children to communicate thoughts and ideas in print as a natural occurrence of their time spent interacting in the environment.

Implications

Museums have the potential for engaging visitors with print in a variety of ways: as part of the actual exhibit, to provide information about the artifacts and activities in the exhibit, and to give direction on how to appropriately engage with the exhibit and navigate through the museum (Yasukawa et al., 2013). All of these purposes are reflected in the museums' scores for Signs, Directions, and Labels, which includes labeling key areas or objects and posting notices. Although signs and labels are routinely considered for their value in facilitating organization and promoting orderly behavior, they also provide relevant and functional reading practice while serving as print models for children's writing. Considering the valuable contribution signs and labels can make to children's literacy learning may influence the number that are present throughout the museum as well as their size and placement.

Neuman and Roskos (1990) found that labeling key objects in a preschool classroom resulted in children's frequent use of the labels as a reference for writing during play while Tunks and Giles (2007) noted the positive influence of environmental print on children's writing. Similarly, labeling items, increasing the amount of print, and providing writing materials could increase writing activity in children's museums.

Increasing opportunities for written expression during children's museum visits could deepen children's conceptual understanding while strengthening their knowledge about print and literacy skills. Some of the museums with the highest presence of print (as measured by scores in the areas of Books and Other Reading Materials along with Signs, Directions and Labels), had the lowest rating for writing materials, thus, preventing children's spontaneous inclusion of print from their surroundings in written messages created as they discover, learn, and play. Due to the inter-related nature of the categories, it seems apparent that comprehensive consideration of literacy indicators in the environment could result in a significant increase of children's involvement in literacy events.

Children have many authentic opportunities to practice reading and writing in children's museums, but this will only occur if adults are intentional in creating environments that encourage literacy activities. Children must be provided with meaningful written materials that can lead to literacy learning. The most obvious of these is books, but integrated print materials and materials for recording language are equally important. The rooftop gardening area available at one of the children's museum visited in this study provides an excellent opportunity for labeling plants, hanging posters about gardening, and encouraging children to record plant care activities as well as reading and writing stories about plants, flowers, and gardening (Hachey & Butler, 2009).

Herz (2017) acknowledges the need for children's museums to invest in research investigating their impact on children's learning to ensure that objective and goals are being achieved. While this study provides insight into the need for more comprehensive consideration of literacy indicators in the museum environment, there is also a need for research investigating children's specific use of these materials. Further, it is recommended that research be conducted

to investigate adults' attention to the print-related materials in museum environments and there scaffolding of children's attempts at reading and writing. As Puchner et al. (2001) discovered, active adult participation is often necessary to extend children's learning to higher levels. Thus, research examining when and how adults model literacy activities would be useful in supporting this practice.

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