ASSOCIATION OF
CHILDREN'S
MUSEUMS

Knology

Using Museum Size & Locale to Understand Capacity

December 14, 2017

Both size and location determine how a museum operates, the resources it receives, and the audiences it serves. This report updates the categorization of museums into five size categories on the basis of new data from the 2016 ACM Membership Survey, using a categorization scheme developed in ACM Trends #1.1. This time, we also further examine their distribution by locale. While this Trends Report will provide technical details, this information will lay the foundation understand trends in children's museums in future reports.

In ACM Trends #1.1, we identified proxies for museum size with 2010 data, which helped us group institutions into size categories. These proxies were:

Total Operating Expenses – A comprehensive measure of how a museum allocated funds, including: maintenance, programs, development, advertising, administrative, upkeep, and other factors.

Staff – The number of paid staff (full-time and part-time) hired to keep the museum running.

Building Size – Total interior space, including that used for administrative purposes, storage, public space, and exhibit areas.

Annual Attendance – Onsite and offsite attendance by visitors of all ages.

The 2016 data enabled us to use locale to further understand different types of children's museums. In future reports, we will use both size and locale to organize data on children's museums. We define locale as:

Locale – Distance from urban centers, combined with population of areas served by the museum.

ACM TRENDS:

#1.7

ACM Trends #1.7

The first six Trends reports used data from the ACM 2010 Membership survey, in addition to data from other studies conducted from 2004 to 2012. Now that 2016 data are available, this report updates the museum size taxonomy and examines each size category by locale.

Re-Categorizing Museums by Size

We examined 121 responses to the ACM 2016 Membership Survey, and specifically the four proxies for museum size identified in ACM Trends #1.1:

- Total annual operating expenses;
- Annual visitor attendance;
- Number of paid staff; and
- Building size (square footage).

Response rates varied among these four variables, with attendance (88%) and expenses (91%) somewhat lower than building size (96%) or staff (98%). Only one museum did not provide any of these pieces of information; the rest of our analysis focuses on the 117 museums for which we have data on at least two variables.

Once again, we found that relationships between all size proxies were strong and positive, with correlation coefficients between 0.84 and 0.94. Note that any correlation coefficient greater than 0.70 indicates a strong positive relationship between variables.

As in Trends Report #1.1, we divided each size variable into thirds, generating Small, Medium, and Large categories once more (Table 1).

ACM Trends Reports

The Association of Children's Museums (ACM) is the world's foremost professional member service organization for the children's museum field. We leverage the collective knowledge of children's museums through convening, sharing, and dissemination. ACM has partnered with Knology to create the ACM Trends Reports. Knology is a nonprofit that produces practical social science for a better world.

ACM Trends Reports are commissioned on behalf of our membership to help advance the work of this community. They seek to draw attention to emerging issues and opportunities for elevating the field, and help our members use data to become more accountable to their mission and fiscal responsibilities. A product of collaborative efforts to collect data, the Trends Reports are an effort to support ongoing, accessible dialogue. Our objective is for this approach to be an equitable and inclusive way for museum professionals to contextualize our work and use data to produce effective outcomes.

Table 1. Criteria used to assign size categories.

Size Category	Total Operating Expenses	Building Size	Annual Attendance	Staff
Small	Less than $487,326	Less than 12,000	Less than 50,000	Less than 14
Medium	$487,326 – $2.3 million	12,000 – 44,040	50,000 – 148,667	14 – 41
Large	More than $2.3 million	More than 44,040	More than 148,667	More than 41

Fifty-five museums (47%) were categorized consistently across all variables. There were 62 cases (53%) that spanned multiple sizes based on different variables, and we classified them in a single category if the variables fell within 5% of the category boundaries. Otherwise, we categorized them as Small/Medium or Medium/Large. Four museums had variables that were both Small and Large, and we classified these four as Inconsistent.

With the 2016 data, museums were less evenly distributed among these categories than in 2010 (Figure 1). Once again, there were approximately equal numbers of Small and Large museums, with 27% and 30% of the data set respectively. Small/Medium museums were 21% of the data set, while Medium museums were 10% and Medium/Large were 8%. Inconsistent museums made up only 3% of this data set.
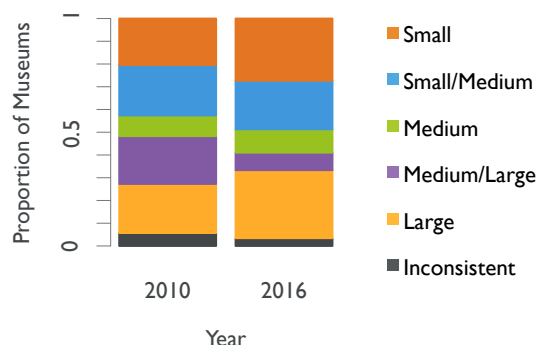

Figure 1. Distribution by museum size, 2010 and 2016.

Museum Size & Locale

The responding museums were concentrated in the Midwest and the eastern US, with several in the South and along the west coast (Figure 2). Most Large museums (yellow) were in or near major metropolitan centers, while museums that were far from other museums were typically Small (orange).

In fact, most museums of any type were found in cities, with two-thirds of the data set and a plurality of every single size category (Table 2). Large museums were found exclusively in cities and suburbs. Meanwhile, museums outside of cities were much more likely to be Small. Less than one-fifth of city museums were Small, while nearly one-third of suburban museums, half of rural museums, and nearly three-quarters of town museums were. Rural and suburban museums were also relatively likely to be Small/Medium, compared to either city or town museums. We suspect these museums may have relatively large space for their expenses, staff, and attendance, given the relative cost of real estate in these areas.

Table 2. Number of museums by size and locale.

Locale type	S	S/M	M	M/L	L	total
City	14	13	10	8	30	75
Suburb	4	4	0	0	5	13
Town	5	1	1	0	0	7
Rural	9	7	1	1	0	18

Note: Inconsistent museums have not been included in this table. ACM defines each location type as follows:

- **City**: Territory inside an urbanized area (population 50,000+) and inside a principal city. City population range 50,000-250,000+.
- **Suburb**: Territory outside a principal city and inside an urbanized area (population 50,000+). Suburb population range 50,000-250,000+.
- **Town**: Territory inside an urban cluster that is less than 10 miles to more than 35 miles from an urbanized area (population 50,000+).
- **Rural**: Census-defined rural territory that is less than 5 miles to more than 25 miles from an urbanized area (population 50,000+), as well as a rural territory that is less than 2.5 miles to more than 10 miles from an urban cluster (population 25,000-50,000).
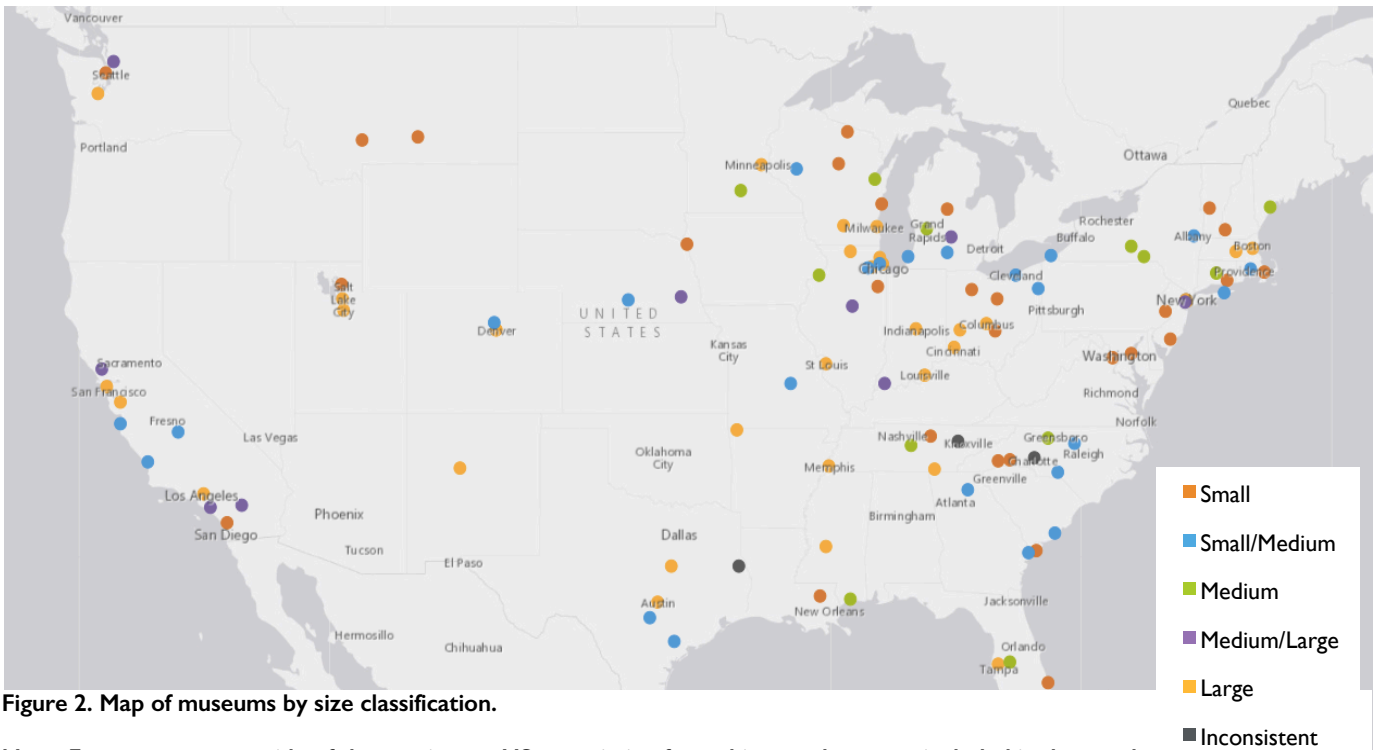

Figure 2. Map of museums by size classification.

Note: Four museums outside of the contiguous US are missing from this map, but were included in data analys... are located in Alaska, Australia, Canada, and the US Virgin Islands.

About This Research

In 2016, the Association of Children's Museums (ACM) and Knology (formerly New Knowledge Organization) partnered to advance understanding about the roles children's museums play in their communities and beyond. NewKnowledge identified critical questions that aligned with ACM research goals and reviewed responses to over 100 survey studies of ACM members since 2004. This process allowed us to identify data for exploring what children's museums have accomplished to date and what they can accomplish in the future. Here we explain the technical analytical approach, so the categorization of children's museums will be clear and future trends reports will be accurate.

This report re-confirms the strong correlations found in ACM Trends #1.1. Correlation coefficients for each pair of variables indicated strong, positive, and statistically significant relationships in 2016 (Figure 1).

Despite these strong relationships, we continue to use all four variables for the reasons outlined in Trends #1.1: not only is each likely to resonate differently with children's museum professionals, but some museums reported values for only some of the variables. This redundancy allowed us to retain all but four museums in the data set, indicating these categories are useful and accurate.

We recalculated the 33rd and 67th percentiles for these variables to update the boundaries of the *Small*, *Medium*, and *Large* categories. Using discriminant function analysis (DFA), we trained an algorithm that accurately classifies museums into size categories using four proxy variables (Operating Expenses, Staff, Building Size, and Annual Attendance) identified in ACM Trends #1.1. We will later retrain the model with the larger data set (both 2010 and 2016 data sets) in order to further improve accuracy.

Of the 62 museums that spanned multiple categories, only 4 were classified as Inconsistent – that is, they spanned both Small and Large categories. The algorithm was unable to categorize these anomalies but had no errors otherwise; we designed it to correctly classify borderline cases (i.e. museums with values near the cut-off for at least one of the four proxies).

Using this algorithm, we found that the 2016 data represented 117 children's museums. Of these, 32 were Small, 25 were Small/Medium, 12 were Medium, 9 were Medium/Large, 35 were Large, and 4 were Inconsistent.

We then examined the relationship between size and locale, observing that the majority of museums are in cities, and that city museums are much less likely to be Small than museums in other types of geographies. This new information on locale further builds our capacity to understand how children's museums work and opportunities for growth.

References

Roberts, S.-J., LaMarca, N., & Fraser, J. (2017). ACM Trends #1.1. Measuring museum size. (Knology Publication #NPO.145.284.01) New York: Knology.