Why Zoos & Aquariums Matter: Aligning Your Agendas With Those of Your Visitors

Webinar #2

May 2, 2019
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2018 Year in ISE

informalscience.org/year-in-ISE
Today’s Webinar
CAISE is currently supported by the National Science Foundation (NSF) under award no. DRL-1612739, with previous support under DRL-0638981 and DRL-1212803.

Any opinions, findings, and conclusions or recommendations expressed are those of the authors and do not necessarily reflect the views of NSF.
Our Presenters

John Fraser
New Knowledge Organization Ltd.

Joe E. Heimlich
COSI’s Center for Research and Evaluation

Martin Storksdieck
Center for Research on Lifelong STEM Learning at Oregon State University

Moderator: Melissa Ballard, CAISE
Agenda

1. Project Introduction (5 min)
2. Bring & Take Findings (10 min)
3. Do & Take Findings (10 min)
4. Assign & Integrate Findings (10 min)
5. Q & A, Discussion (10 min)
Why Zoos & Aquariums Matter
Wave 3: STEM Matters

Our project asks:
What are the real outcomes of the zoo or aquarium enterprise, both as a visitor destination and as a social actor in society?
Why Zoos & Aquariums Matter

Wave 3: STEM Matters

- New Knowledge Organization Ltd. (NKO)
- COSI’s Center for Research and Evaluation (CRE)
- Oregon State University’s (OSU) Center for Research on Lifelong STEM Learning
- Association of Zoos and Aquariums
- Evaluators: Garibay Group and J. Sickler Consulting

This material is based upon work supported by the National Science Foundation under Grant No. 1612729 & 1612699. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.
WZAM³ | Why Zoos & Aquariums Matter
Wave 3: STEM Matters
WZAM$^3$ | Why Zoos & Aquariums Matter
Wave 3: STEM Matters
WZAM³ | Why Zoos & Aquariums Matter
Wave 3: STEM Matters
Why Zoos & Aquariums Matter
Wave 3: STEM Matters
WZAM³ | Why Zoos & Aquariums Matter
Wave 3: STEM Matters
COSI’s Center for Research & Evaluation
Joe Heimlich
Summer data collection yielded 2,005 questionnaires.

- 661 matched pre/post
- 611 unmatched pre
- 72 unmatched post

Fall data collection yielded 2,223 questionnaires.

- 693 matched pre/post
- 758 unmatched pre
- 79 unmatched post
WZAM$^3$ | Why Zoos & Aquariums Matter
Wave 3: STEM Matters
WZAM³ | Why Zoos & Aquariums Matter
Wave 3: STEM Matters

Parents 61.5%
Friend 10.0%
Adult alone 11.0%
Spouse/partner/date 24.0%
With family 79%
On a date 8.5%
Grands 11.0%
Part of group 1.5%
Trustworthiness

<table>
<thead>
<tr>
<th>Aquariums</th>
<th>Zoos</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.42</td>
<td>6.29</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
</tr>
</tbody>
</table>
WZAM³ | Why Zoos & Aquariums Matter
Wave 3: STEM Matters
WZAM³ | Why Zoos & Aquariums Matter
Wave 3: STEM Matters
### Why Zoos & Aquariums Matter

**Wave 3: STEM Matters**

<table>
<thead>
<tr>
<th>Entry</th>
<th>Exit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time to spend with friends and family</td>
<td>Saw animals / fish</td>
</tr>
<tr>
<td>Do something fun and enjoyable</td>
<td>Relaxed / rejuvenated</td>
</tr>
<tr>
<td>See animals / fish</td>
<td>Learned something new</td>
</tr>
</tbody>
</table>
• Animal habitats
• How institution takes care of its animals
• Conservation efforts of this Z/A
• That As/Zs give money to support and protect species conservation
• Where this Z/A’s animals were born
WZAM³ | Why Zoos & Aquariums Matter
Wave 3: STEM Matters

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Why Zoos & Aquariums Matter
Wave 3: STEM Matters
WZAM³ | Why Zoos & Aquariums Matter
Wave 3: STEM Matters

All About Me

It’s all about ME
Audience Questions
Oregon State University’s Center for Research on Lifelong Learning

Martin Storksdieck
Research Question

What are the entry characteristics of visitors and how do these characteristics play out in terms of behaviors during the Z/A visit?
Study Design

Part 1:
• Characterizing Groups
• Video Tracking Study

Part 2:
• Interpretive In-Situ Experimental Study
Entry Cameras
Entry Camera Analysis

• 150 entry interviews at each zoo or aquarium (N=900)

• Error Estimates for Accuracy:
  • 95% for group size
  • 96% for group type
  • 93% for gender expression
  • 86% for race/ethnicity
  • 85% for age
Entry Camera Findings

• Most groups (67%) in our sample were visiting with children

• **Adult Groups**: Median group size was 2 & median age was 25-34

• **Groups with Children**: Median group size was 3 & median age was 25-34
Entry Camera Findings

- White visitors, female visitors, & some age categories were over-represented in our sample when comparing to US Census data

<table>
<thead>
<tr>
<th></th>
<th>Study Sample</th>
<th>Census Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Race: White</td>
<td>86%</td>
<td>77%</td>
</tr>
<tr>
<td>Gender: Female</td>
<td>55%</td>
<td>51%</td>
</tr>
<tr>
<td>Age: &lt;5</td>
<td>15%</td>
<td>6%</td>
</tr>
<tr>
<td>Age: 5-9</td>
<td>12%</td>
<td>6%</td>
</tr>
<tr>
<td>Age 25-34</td>
<td>27%</td>
<td>6%</td>
</tr>
<tr>
<td>Age 35-44</td>
<td>12%</td>
<td>6%</td>
</tr>
</tbody>
</table>
Tracking Study

• Entry-Exit Interviews:
  • Entry characteristics, plans for visit, & perceived mission of Z/As (pre-)
  • Visit details, behaviors, & decision-making processes (post-)
• Full visit experience with GoPro cameras
## Phase 1 Data

<table>
<thead>
<tr>
<th>Entry Interview (n=62)</th>
<th>Z/A Observations (n=70)</th>
<th>Exit Interviews (n=61)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Group characteristics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Who do they typically visit with</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Motivation for the visit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Plans for the visit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Perceived mission of zoos/aquariums</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Time at exhibits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Time in transit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Time engaged in meaning making talk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Decision-making conversations and behaviors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Remembered visit behaviors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Extent to which group adhered to visit plan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• How decisions were made</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Learning about group members and about self</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Perceived mission of zoos/aquariums</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Entry/Exit Interview
Open-ended Question

<table>
<thead>
<tr>
<th>Code (N=77)</th>
<th>Entry</th>
<th>Exit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td>41.6%</td>
<td>39.0%</td>
</tr>
<tr>
<td></td>
<td>n=32</td>
<td>n=30</td>
</tr>
<tr>
<td>Conservation</td>
<td>40.3%</td>
<td>45.5%</td>
</tr>
<tr>
<td></td>
<td>n=31</td>
<td>n=35</td>
</tr>
<tr>
<td>Direct Encounters &amp; Interactions</td>
<td>6.5%</td>
<td>9%</td>
</tr>
<tr>
<td></td>
<td>n=5</td>
<td>n=7</td>
</tr>
<tr>
<td>Entertainment</td>
<td>5.2%</td>
<td>2.6%</td>
</tr>
<tr>
<td></td>
<td>n=4</td>
<td>n=2</td>
</tr>
<tr>
<td>Multiple, Complex Goals</td>
<td>0%</td>
<td>1%</td>
</tr>
<tr>
<td></td>
<td>n=1</td>
<td>n=1</td>
</tr>
<tr>
<td>No response / I don’t know</td>
<td>6.5%</td>
<td>2.6%</td>
</tr>
<tr>
<td></td>
<td>n=4</td>
<td>n=2</td>
</tr>
</tbody>
</table>
## Entry/Exit Interview Rating Question

Please rate on a scale from 1 to 5 where “1” is “not important” and “5” is “very important.”

<table>
<thead>
<tr>
<th>Objective</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>To provide public with educational experiences</td>
<td>4.8</td>
</tr>
<tr>
<td>To protect critical habitat, endangered, and threatened species</td>
<td>4.7</td>
</tr>
<tr>
<td>To provide public with connections to the natural world</td>
<td>4.7</td>
</tr>
<tr>
<td>To provide public with entertaining and enjoyable experience</td>
<td>4.7</td>
</tr>
<tr>
<td>To provide direct Encounters with nature and wildlife</td>
<td>4.5</td>
</tr>
<tr>
<td>To improve public understanding of science</td>
<td>4.4</td>
</tr>
<tr>
<td>To be leaders in sustaining and protecting the environment</td>
<td>4.4</td>
</tr>
</tbody>
</table>
Entry/Exit Interview Ranking Question

<table>
<thead>
<tr>
<th>Rank which statements you would say are the <em>most</em> important to the mission of zoos/aquariums</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leaders in sustaining and protecting the environment</td>
</tr>
<tr>
<td>Protecting critical habitat, endangered, and threatened species</td>
</tr>
<tr>
<td>Provide public with educational experiences</td>
</tr>
</tbody>
</table>
## Coding Framework

<table>
<thead>
<tr>
<th>Entry Characteristics</th>
<th>Group demographics, visit motivations, plans for the visit, perceptions of the Z/A mission, prior Z/A experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visit Behaviors</td>
<td>Timing at exhibits and in transit, path analysis, decision-making talk &amp; behaviors, meaning-making talk, wayfinding talk &amp; behaviors, intensity of visit</td>
</tr>
<tr>
<td>Exhibit Characteristics</td>
<td>Presence of animals, type of animal exhibit (one species versus mixed), presence of conservation message, level of crowding</td>
</tr>
<tr>
<td>Exit Narrative</td>
<td>Self-reported visit activities and decision-making behaviors, perceptions of Z/A mission</td>
</tr>
</tbody>
</table>
Visitors engage in some meaning-making talk when not at exhibits (e.g., in transit between exhibits, gift shop)

Example: (In transit between exhibits)

Child #1: What does the octopus eat?
Child #2: It eats the squid.
Mother: It does?
Child #1: I think. I don’t know fo sho.
Audience Questions
New Knowledge Organization, Ltd.

John Fraser
Trust Study Design

Screen
- Visited facility
  + Neither love nor loathe facility

Facility
- Zoo
- Aquarium

Framing
- Perception
- Trust
- Perception
- Trust
Sample: “Moderate Middle”
Those without strong bias for or against zoos and aquariums.
# Gap in Trust and Perception

<table>
<thead>
<tr>
<th>The Facility...</th>
<th>Est. Diff (b)</th>
<th>M Perc.</th>
<th>M Trust</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has the space to meet the physical needs of the animals in their care</td>
<td>2.18</td>
<td>4.46</td>
<td>6.71</td>
</tr>
<tr>
<td>Has the facilities to meet the needs of the animals in their care</td>
<td>1.51</td>
<td>5.19</td>
<td>6.73</td>
</tr>
<tr>
<td>Has the expertise to meet the emotional needs of the animals in their care</td>
<td>1.44</td>
<td>4.98</td>
<td>6.48</td>
</tr>
<tr>
<td>Sets standards for itself that far exceeds government regulations for animals in their care</td>
<td>1.14</td>
<td>5.00</td>
<td>6.28</td>
</tr>
<tr>
<td>Shares when certain animals die</td>
<td>1.11</td>
<td>4.13</td>
<td>5.40</td>
</tr>
<tr>
<td>The Facility...</td>
<td>Est. Diff (β)</td>
<td>M Perc.</td>
<td>M Trust</td>
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<td>-----------------</td>
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<td>4.13</td>
<td>5.40</td>
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Dimensions of Trust

Competence
Responsibility to Inform
Interactional Courtesy
Financial Balance
Quality Assurance
Procedural Fairness
Legal Compliance

1. Ethics
2. Wildlife agent & informant / Activator
3. Inform about sustainability
4. Collaborator in conservation
5. Quality attraction
6. Inform about specific animals
7. Quality experience
<table>
<thead>
<tr>
<th>Ethical integrity</th>
<th>Ethics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inform about specific animals</td>
</tr>
<tr>
<td>Conservation agency</td>
<td>Wildlife Agent, Informant, Activator</td>
</tr>
<tr>
<td></td>
<td>Collaborator in conservation</td>
</tr>
<tr>
<td>Transparency</td>
<td>Advise on sustainability practices</td>
</tr>
<tr>
<td></td>
<td>Quality attraction</td>
</tr>
<tr>
<td>Quality</td>
<td>Quality experience</td>
</tr>
</tbody>
</table>
Trust Profiles
STEM Learning Ecology
Topics in the Ecology

- Learning about animals, ecosystems, food web, conservation, global warming, endangered species, technology of tanks, water circulation, chemical balance of sea water
- "Fun" learning: hands on
  - Using magnifying glasses to look at sea urchins
- Learn about biosphere & diversity
- Interactive learning videos at exhibits
- Tours & tours
- The smells and sounds of the puffin exhibit
- Scuba diving: talk from the tanks
- Children learn about different species of fish & environments

- The changing exhibits help us to understand the ever-changing habitats and how it affects us today.
The Project Team
Research Team

New Knowledge Organization Ltd.
- John Fraser
- Joanna Laursen Brucker
- Joseph Dwyer
- Rupanwita Gupta
- Shaun Field
- Kate Flinner
- Kathryn Nock
- John Voiklis

COSI’s Center for Research and Evaluation
- Joe Heimlich
- Mary Ann Wojton
- Elaine Horr
- Justin Meyer
- Preethi Mony

Center for Research on Lifelong STEM Learning
Oregon State University
- Martin Storksdieck
- Kelly Riedinger
- Victoria Bonebrake
- Rachel Bergin
- Nicolette Canzoneri
- Kevin Keys
- Robi Nilson
- John Falk
Project Advisors

- Rich Bergl
- Louise Bradshaw
- Judy Braus
- Kevin Crowley
- Kathayoon Khalil
- Karen Knutson
- Christiane Maertens
- Jennifer Metzler-Fiorino
- Jackie Ogden
- Allison Price
- Danielle Ross
- Amy Rutherford
- David Ucko
- Stephen Uzzo
- Cynthia Vernon
- Rob Vernon
Thank you to our collaborating zoos & aquariums!
<table>
<thead>
<tr>
<th>Zoos &amp; Aquariums</th>
<th>Zoos &amp; Aquariums</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adventure Aquarium</td>
<td>Bronx Zoo</td>
</tr>
<tr>
<td>Africam Safari</td>
<td>Buffalo Zoo</td>
</tr>
<tr>
<td>Akron Zoological Park</td>
<td>Buttonwood Park Zoo</td>
</tr>
<tr>
<td>Aquarium of the Pacific</td>
<td>Cabrillo Marine Aquarium</td>
</tr>
<tr>
<td>Arizona-Sonora Desert Museum</td>
<td>California Science Center</td>
</tr>
<tr>
<td>Birch Aquarium</td>
<td>Center for Aquatic Sciences at Adventure Aquarium</td>
</tr>
<tr>
<td>Birmingham Zoo</td>
<td>Central Park Zoo</td>
</tr>
<tr>
<td>Blank Park Zoo</td>
<td>Chattanooga Zoo</td>
</tr>
<tr>
<td>Boonshoft Museum of Discovery</td>
<td>Cincinnati Zoo &amp; Botanical Garden</td>
</tr>
<tr>
<td>Brevard Zoo</td>
<td>Cleveland Metroparks Zoo</td>
</tr>
</tbody>
</table>
Columbus Zoo and Aquarium
Como Park Zoo and Conservatory
Cosley Zoo
Dallas Zoo
Denver Zoo
Detroit Zoological Society
Endangered Wolf Center
Great Plains Zoo & Delbridge Museum of Natural History
Greensboro Science Center
Henry Vilas Zoo
Hutchinson Zoo
Idaho Falls Zoo
Indianapolis Zoological Society
Jacksonville Zoo and Gardens
John Ball Zoo
John G. Shedd Aquarium
Lake Superior Zoological Society
Lee Richardson Zoo
Lincoln Park Zoo
Living Desert Zoo & Gardens
State Park, NM
Los Angeles Zoo
Louisville Zoo
Maryland Zoo
Mesker Park Zoo & Botanic Garden
Miller Park Zoo
Milwaukee County Zoo
Minnesota Zoo
Monterey Bay Aquarium
Mystic Aquarium
Naples Zoo
Nashville Zoo
National Aquarium
National Aviary
National Mississippi River Museum and Aquarium
New England Aquarium
New York Aquarium
North Carolina Aquarium at Fort Fisher
North Carolina Aquarium at Pine Knoll Shores
North Carolina Aquarium on Roanoke Island
North Carolina Zoo
<table>
<thead>
<tr>
<th>Omaha’s Henry Doorly Zoo</th>
<th>Riverbanks Zoo &amp; Garden</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oregon Coast Aquarium</td>
<td>Riverside Discovery Center</td>
</tr>
<tr>
<td>Oregon Zoo</td>
<td>Roger Williams Park Zoo</td>
</tr>
<tr>
<td>Palm Beach Zoo</td>
<td>Rolling Hills Zoo</td>
</tr>
<tr>
<td>Philadelphia Zoo</td>
<td>San Antonio Zoo</td>
</tr>
<tr>
<td>Phoenix Zoo</td>
<td>San Diego Zoo</td>
</tr>
<tr>
<td>Prospect Park Zoo</td>
<td>San Francisco Zoo and Gardens</td>
</tr>
<tr>
<td>Queens Zoo</td>
<td>Santa Fe College Teaching Zoo</td>
</tr>
<tr>
<td>Racine Zoo</td>
<td>SEA LIFE Aquarium at LEGOLAND California</td>
</tr>
<tr>
<td>Reid Park Zoological Society</td>
<td>Seattle Aquarium</td>
</tr>
</tbody>
</table>
Sedgwick County Zoo
Seneca Park Zoo
Shedd Aquarium
Smithsonian's National Zoo
South Carolina Aquarium
Squam Lakes Natural Science Center
St. Augustine Alligator Farm Zoological Park
St. Louis Zoo
Sunset Zoo
Tennessee Aquarium

The Museum of Life and Sciences
Tracy Aviary
Tulsa Zoo
Utah's Hogle Zoo
Vancouver Aquarium
Virginia Zoo
WNC Nature Center
Woodland Park Zoo
Zoo Atlanta
Zoo Boise
ZooTampa at Lowry Park
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