



iSaveSpecies—Sustaining Life Summative Evaluation Report

Toledo Zoo

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Executive Summary

The iSaveSpecies project, created by Project Dragonfly at Miami University and a consortium of zoos and aquariums, designed and implemented a socially-networked exhibit system to engage family visitors to zoos and aquariums in inquiry and conservation. The second wave of the iSaveSpecies exhibit stations focused on Sustaining Life, allowing families to conduct research and learn about conservation efforts. Participating zoos incorporated up to three touchscreen-based research and/or action kiosks in an exhibition area.

To support these efforts, the Lifelong Learning Group conducted a summative evaluation to determine the effectiveness of the iSaveSpecies electronic interactive kiosks at engaging families in inquiry, STEM, and conservation actions. The study was designed to answer the question: Do the iSaveSpecies kiosks achieve their desired (collective) outcomes?

Data for this study were collected at four different zoos. This report focuses on the Toledo Zoo; data were collected onsite at the Zoo from adult visitors (N=319) in the Tembo Trail area. Two types of participants were sought—those who used the iSaveSpecies kiosk and those who did not—to complete a questionnaire or an interview.

The study found that visitors who engaged with the iSaveSpecies kiosks reported they used basic science inquiry skills during their zoo visit. Visitors who interacted with a kiosk reported they were more likely to observe a single elephant carefully, make a prediction about an elephant’s behavior, and/or talk with others about what they observed. There were statistically significant positive differences for two inquiry skills, entering data and comparing what they learned.

An essential inquiry skill is the ability to ask questions that lead to investigations. Participants were unlikely to share a question they had about the elephants in response to an open-ended question during an interview. The low number of responses may be due to lack of time at this exhibit or an environment un conducive to pondering a question.

Visitors who interacted with the iSaveSpecies kiosks reported they felt they were more knowledgeable about elephants than visitors who did not interact with the kiosks. Additionally, interviewees reported the kiosk-specific knowledge they gained through conducting their own studies at the Do All Day and Hang Out kiosks. One interviewee, who engaged with the Hang Out kiosk shared, “Elephants like area C because toys are in C.” Another who explored the Do All Day exhibit, learned, “Elephants do a lot of stuff, feeding, object use, dust bathing, and walking.”

Toledo Zoo visitors interacting with the iSaveSpecies poster kiosk were more likely to report they learned something about elephants and shared what they learned with others than visitors who did not use the iSaveSpecies poster kiosk. Specific conservation actions appear to be influenced by the poster kiosks; especially creating and sharing a conservation poster.

However, the majority of those interviewed were unable to articulate anything these experiences introduced or remind them that they might do to help the elephants. Only two interviewees mentioned the need to donate funds, one shared that “fair trade products were mentioned.”

Visitors who complete the poster interactive receive an email prompt at home to view their poster online and with conservation actions they can take, including forwarding the conservation message they created, but data is not currently available to determine the percentage of visitors who took further action at this interactive.

Visitors who engaged with the iSaveSpecies interactive kiosks felt it added value to their zoo visit. Mean scores for those who used the iSaveSpecies kiosks were all well above the midpoint. Respondents indicated the interactives were appealing and fun. The kiosks provided visitors a different way to engage with the animals and an opportunity to participate in an activity they could do with others in their group.

The key outcomes of this study include:

Visitors who interacted with the iSaveSpecies kiosks reported they felt they were more knowledgeable about elephants than visitors who did not interact with the kiosks.

- Visitors who engaged with the iSaveSpecies kiosks reported they used basic science inquiry skills during their zoo visit. Visitors who interacted with a kiosk reported they were more likely to observe a single elephant carefully, make a prediction about an elephant's behavior, and/or talk with others about what they observed. There were statistically significant positive differences for two inquiry skills, entering data and comparing what they learned.
- Visitors who interacted with the iSaveSpecies kiosks felt it added value to their zoo visit.

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Introduction

The iSaveSpecies project, created by Project Dragonfly at Miami University and a consortium of zoos and aquariums, designed and implemented a socially-networked exhibit system to engage family visitors to zoos and aquariums in inquiry and conservation. The inquiry and action tools created by the iSaveSpecies team reside in an evolving library of exhibit interactives, modified by partner institutions to suit the particular needs of their visitors.

The first wave of the iSaveSpecies exhibit stations focused on *Great Apes*, the second wave focused on *Sustaining Life*. Both sets of exhibits allow families to conduct research on animals by joining the work of experienced field conservationists. The second wave of exhibits were placed in five partner institutions during 2015 — Boonshoft Museum, Chicago Zoological Society/Brookfield Zoo (Brookfield Zoo), Cleveland Metroparks Zoo (Cleveland Zoo), Oregon Zoo, and Toledo Zoo. These institutions incorporated up to three touchscreen-based research and/or action kiosks in an exhibition area. By building cross-institutional partnerships committed to sustaining life on our planet, the iSaveSpecies projects believes that the new tools for inquiry and public action will achieve broad national impact.

To support these efforts, a summative evaluation was conducted to determine the effectiveness of the iSaveSpecies electronic interactive kiosks at engaging families in inquiry, STEM, and conservation actions. This study built on the Great Apes Summative Evaluation (Wojton & Heimlich 2015) and a front end evaluation, which focused on visitor interactions in the Tembo Trail (elephant) exhibit. The front-end study found that visitors shared a rudimentary understanding of the elephants; including elephants are herbivores that are endangered due to hunting and poaching. Visitors also shared a low-level, fundamental understanding of data collected by zookeepers about elephants, knowing that zookeepers keep track of elephant habits, health and weight.

While the prior evaluation provided insight into visitor understanding of the animals in the exhibit before the iSaveSpecies exhibits were installed, this study focused on the efficacy of the iSaveSpecies interactive kiosks engaging visitors and delivering their messages, including encouraging visitors to develop inquiry skills, knowledge of pertinent STEM content, and engaging in specific conservation actions.

A summative design utilized questionnaires and interviews to gather data from zoo visitors. Questionnaire data were gathered from two types of visitors: those who used an iSaveSpecies kiosk and those who did not. Interviews were conducted with adult visitors seen interacting with at least one of the iSaveSpecies kiosks.

The overarching evaluation question for this summative evaluation was: Do the iSaveSpecies kiosks achieve their desired (collective) outcomes? To address this larger question, five sub-questions were asked:

1. Did visitors who engaged with the iSaveSpecies inquiry kiosks report they have used basic science inquiry skills during their zoo visit?
2. Did visitors who engaged with the iSaveSpecies interactive kiosks have a better understanding of the STEM content related to the iSave Species kiosks than those who did not engage with the kiosks?

3. Did visitors who engaged with the iSaveSpecies conservation poster kiosk understand elephant conservation efforts?
4. Did visitors who engaged with the iSaveSpecies conservation poster kiosks report involvement in specific conservation actions?
5. Did visitors who engaged with the iSaveSpecies interactive kiosks feel it added value to their zoo visit?

Methods

The audience for this summative evaluation study was adult visitors to the Tembo Trail (elephant) exhibition area within the Toledo Zoo. Two types of participants were sought to better understand the impact of the iSaveSpecies interactives—those who used the iSaveSpecies kiosk and those who did not.

To answer the evaluation questions, two different methods were used: a structured, intercept interview and a questionnaire. Using a continuous ask format, visitors who interacted with one of the iSaveSpecies kiosks were invited to participate in the interview as they finished the interactive. The interviews asked adults to describe what they did at the kiosk (s), and what they gained from the interaction in regards to scientific inquiry and environmental conservation.

The second method was a questionnaire. Since each kiosk had different inquiry goals for participants, separate questionnaires were designed and administered for each of the kiosks. While each questionnaire used the same demographic, conservation, and affect questions; each kiosk questionnaire had different inquiry questions. To better understand the impact of the kiosks, data were collected from those who did and those who did not engage with the kiosk. Visitors were asked to complete the questionnaire after they had passed the iSaveSpecies kiosk. Interview scripts and questionnaires can be found in Appendix A.

All data for the two methods of the study were collected with different groups of visitors. Data gathering was impacted by the uniqueness of the zoo's exhibition area, including the placement of the kiosks within the viewing area.

Data were analyzed collectively. Interview responses were entered into an Excel spreadsheet and coded based on the question and the objectives of the interactive kiosks. During analysis, categories of visitor responses about their knowledge were developed inductively through the coding process (i.e., they emerged from the data itself rather than being prescribed). No demographic information was collected for interviewed visitors.

All questionnaire data were entered into an Excel spreadsheet. Quantitative data were transferred into SPSS for analysis. Open-ended data were coded using coding rubrics developed for this study. Quantitative data were analyzed descriptively and, where appropriate, inferential statistics were used to test specific questions or hypotheses about the data.

Findings

Participants

Visitor participants in this study completed either an interview or a questionnaire. Those who completed interviews are referred to as “interviewees” throughout this report, those who completed questionnaires are referred to as “respondents.” Table 1 illustrates the visitors in each category.

Table 1. Visitor participants by study method

Zoo	Number of Interviewees	Number of Respondents
Toledo	25	294

Every effort was made to gather data for each interactive kiosk. Table 2 itemizes the frequency of visitors interviewed per kiosk. Visitors commented on only one kiosk when interviewed. No demographic information was collected for visitors interviewed.

Table 2. Exit Interviews completed for each interactive kiosk

Interactive Kiosks	Number of Interviewees
What Do Elephants Do All Day?	12
Where Do Elephants Hang Out?	8
Conservation Poster	5

N= 25

Separate questionnaires were designed and administered for each of the kiosks. Table 3 includes a breakdown of questionnaires completed by kiosk. During data collection every effort was made to collect data from a diverse sample; however, data indicate that respondents were likely to be white (90%) females (59%) traveling through the zoo with family (81%). The majority of the respondents (65%) were infrequent visitors, visiting the zoo once or less per year. More than half of the respondents (59%) spent 5 – 15 minutes in the Tembo Trail exhibition. The respondents were unlikely to be zoo members (60%). Appendix B contains tables for each of the demographic questions included in the questionnaire.

Table 3. Questionnaires completed for each interactive kiosk

Interactive Kiosks	Number of Respondents
What Do Elephants Do All Day?	98
Where Do Elephants Hang Out?	98
Conservation Poster	98

N=294

Inquiry Skills

Overall, visitors interacting with the iSaveSpecies kiosks were more likely to report using inquiry skills than those who did not interact with the iSaveSpecies kiosk. Inquiry skills most often used by visitors include observing a single elephant carefully, making prediction about elephant's behavior, and talking with others about what they observed. There were statistically significant positive differences for two inquiry skills, entering data and comparing what they learned. The Do All Day kiosk appears to be most effective at nurturing inquiry skills when compared to the Hang Out and Conservation Poster (Poster) kiosks.

How We Know

Patterns of response were generally consistent across the three kiosks. Those who engaged reported higher mean scores than those who did not with the exception of observing a single elephant carefully at the Hang Out Kiosk, where those who did not interact had a slightly higher mean score than those who interacted. Table 4 contains a list of inquiry skills divided by those who interacted with a kiosk (either on this visit or a prior visit) and those who did not interact with any of the kiosks. Respondents who interacted with the iSaveSpecies poster kiosks reported using inquiry skills more than respondents who did not use the iSaveSpecies kiosks. Inquiry skills most often used by all visitors include:

- Observed a single elephant carefully for more than a few seconds
- Talked with others in my group about what I observed or did

Three other items had slightly to somewhat strong mean scores for those who engaged. One item, "Entered information on a touchscreen or wrote down information about an elephant's behavior on paper" was slightly neutral ($\bar{x} = 3.93$) for those who engaged and strongly negative for those who did not engage with the kiosks ($\bar{x} = 1.71$). Mean scores for those who did interact with the kiosks were more positive on all items. Using a t- test, a statistically significant positive difference was found with the following skills:

- Entered information on a touchscreen or wrote down information about an elephant's behavior on paper ($p=.000$)
- Compared what you learned to what others learned about elephants ($p=.000$)
- Talked with others in my group about what I observed or did ($p=.050$)
- Thought of a question about the elephants behavior ($p=.031$)

Table 4. Respondents' use of inquiry skills, separated by interaction with kiosks

	Interact Mean	No Interact Mean	Mean Difference	t	df	p
Observed a single elephant carefully for more than a few seconds	6.36	6.33	0.03	.207	192	.837
Made a guess or prediction about the elephant's behavior	4.90	4.51	.397	1.582	192	.115
Entered information on a touchscreen or wrote down information about a elephant's behavior on paper	3.93	1.71	2.218	7.384	186	.000***
Compared what you learned to what others learned about elephants	4.42	3.14	1.284	3.889	186	.000***
Thought of a question about the elephants behavior	4.68	4.17	.501	2.164	284	.031*
Talked with others in my group about what I observed or did	5.27	4.82	.451	1.970	281	.050*

N varies from 94-286, depending on statement
n for Interaction ranges from 52-154
n for No Interaction ranges from 42-132

***statistically significant to .001

*statistically significant to .05

Tables 5 - 8 examine the inquiry skills by kiosk. Comparing inquiry skill use among those who interacted with the three kiosks finds that the Do All Day kiosk was more likely to nurture four inquiry skills and the Hang Out kiosk was more likely to nurture two inquiry skills. While the Conservation Poster kiosk appears to be less effective in fostering inquiry skills, this may be due to its design and the desired outcome.

Table 5 illustrates that respondents who interacted with the Poster kiosk were slightly more likely to use inquiry skills than those who did not interact with the kiosk. Two inquiry skills were nurtured by the Poster:

1. Thought of a question about the elephants behavior
2. Talked with others in my group about what I observed or did

In comparing the inquiry skills nurtured by the Poster kiosk with the Do All Day and Hang Out kiosks, the difference is negligible between the three kiosks for the inquiry skill of "Thought of a question about the elephants' behavior." See Table 8. The data suggest the other kiosks are more likely to nurture the skill of talking with others about what was observed.

Table 5. Poster Kiosk Respondents' use of inquiry skills

	Interact Mean	No Interact Mean	Mean Difference	t	df	p
Thought of a question about the elephants behavior	4.65	4.40	.249	.667	92	.506
Talked with others in my group about what I observed or did	4.96	4.60	.366	.921	91	.359

N= 98

n for Interaction ranges from 51-52

n for No Interaction ranges from 42

Respondents who interacted with the Do All Day kiosk were more likely to use inquiry skills than those who did not interact with the kiosk, as illustrated in Table 6. The Do All Day kiosk was designed to cultivate the following inquiry skills:

1. Observed a single elephant carefully for more than a few seconds
2. Made a guess or prediction about the elephant's behavior
3. Entered information on a touchscreen or wrote down information about a elephant's behavior on paper
4. Compared what you learned to what others learned about elephants
5. Thought of a question about the elephants behavior
6. Talked with others in my group about what I observed or did

Using a t- test, a statistically significant positive difference was found between those who did interact and those who did not with the following skills:

- Entered information on a touchscreen or wrote down information about a elephant's behavior on paper (p=.000)
- Compared what you learned to what others learned about elephants (p=.045)

Compared to the Poster and Hang Out kiosks as illustrated in Table 8, the Do All Day kiosk was more effective at fostering the following inquiry skills with those who interacted with it:

- Observed a single elephant carefully for more than a few seconds
- Made a guess or prediction about the elephant's behavior
- Entered information on a touchscreen or wrote down information about a elephant's behavior on paper
- Talked with others in my group about what I observed or did

Table 6. Do All Day Kiosk Respondents' use of inquiry skills

	Interact Mean	No Interact Mean	Mean Difference	t	df	p
Observed a single elephant carefully for more than a few seconds	6.41	6.15	.263	1.171	96	.245
Made a guess or prediction about the elephant's behavior	5.00	4.32	.681	1.867	96	.065
Entered information on a touchscreen or wrote down information about a elephant's behavior on paper	4.33	1.82	2.515	5.753	93	.000***
Compared what you learned to what others learned about elephants	4.37	3.41	.963	2.031	93	.045*
Thought of a question about the elephants behavior	4.59	3.93	.653	1.523	95	.131
Talked with others in my group about what I observed or did	5.47	4.87	.601	1.470	95	.145

N= 98

n for Interaction = 51

n for No Interaction ranges from 44 - 47

***statistically significant to .001

*statistically significant to .05

The Hang Out kiosk supported the same six inquiry skills as the Do All Day kiosk, as illustrated in Table 7. Respondents who interacted with the Hang Out kiosk were more likely to use the majority of the inquiry skills than those who did not interact with the kiosk, except for observing a single elephant carefully for more than a few seconds. Using a t- test, a statistically significant positive difference was found with the following skills:

- Entered information on a touchscreen or wrote down information about an elephant's behavior on paper (p=.000)
- Compared what you learned to what others learned about elephants (p=.001)

In Table 8 the Hang Out kiosk was compared with the Poster and Do All Day kiosks. The Hang Out kiosk was found to be more effective at fostering the following inquiry skills with those who interacted with it:

- Compared what you learned to what others learned about elephants
- Thought of a question about elephant behavior

Table 7. Hang Out Kiosk Respondents' use of inquiry skills

	Interact Mean	No Interact Mean	Mean Difference	T	df	p
Observed a single elephant carefully for more than a few seconds	6.31	6.52	-.215	-1.234	94	.220
Made a guess or prediction about the elephant's behavior	4.81	4.70	.103	.298	94	.767
Entered information on a touchscreen or wrote down information about a elephant's behavior on paper	3.52	1.60	1.915	4.718	91	.000***
Compared what you learned to what others learned about elephants	4.47	2.86	1.606	3.487	91	.001***
Thought of a question about the elephants behavior	4.78	4.20	.580	1.441	93	.153
Talked with others in my group about what I observed or did	5.39	5.00	.392	1.016	91	.312

N= 98

n for Interaction ranges from 50-52

n for No Interaction ranges from 42-44

***statistically significant to .001

Table 8. Respondents who interacted use of inquiry skills by kiosk

	Poster Interact Mean	Do All Day Interact Mean	Hang Out Interact Mean
Observed a single elephant carefully for more than a few seconds	n/a	6.41	6.31
Made a guess or prediction about the elephant's behavior	n/a	5.00	4.81
Entered information on a touchscreen or wrote down information about a elephant's behavior on paper	n/a	4.33	3.52
Compared what you learned to what others learned about elephants	n/a	4.37	4.47
Thought of a question about the elephants behavior	4.65	4.59	4.78
Talked with others in my group about what I observed or did	4.96	5.47	5.39

An essential inquiry skill is the ability to ask questions that lead to investigations. To get a sense of a visitor's ability to do this, interviewees were asked "Based on your viewing in the Tembo Trail area, what questions do you have about the elephants?" and "How could someone investigate this?" The majority of interviewees (14 out of 25) could not think of a question. Respondents might not have found the environment conducive to thinking about a question and/or investigation scenario.

Eleven interviewees formulated questions and these questions were classified as simple or investigable. To determine if a question was simple or investigable, responses to the question and investigation were examined collectively. A question was considered simple if the interviewee suggested a keeper needed to answer the question or the answer could be found on the internet. See Figure 1.

Figure 1. Examples of Simple and Investigable Questions

Examples of Simple Questions	Examples of Investigable Questions
Why do elephants dust bathe? How old are they? What are their names?	What toys do they like to play with? Do they act mad at other elephants?

Of the eleven questions, slightly more than half (six) were found to be investigable. An investigable question posed by one interviewee was “What toys do they like to play with?” He would investigate that by “Hang[ing a] tire and another toy and see what the elephants choose to play with.” Another interviewee wanted to know “Do they act mad at other elephants?” and would investigate this by “pay[ing] really close attention to elephants.”

STEM Content

Respondents who interacted with the iSaveSpecies kiosk reported they felt they understood elephants better, were more knowledgeable about how to study elephants, can investigate elephant behavior through careful observation and might like to study elephants. Additionally, interviewees reported learning kiosk specific STEM content from the Do All Day and Hang Out kiosks.

How We Know

Respondents were asked questions regarding STEM content and asked to rate their agreement on a scale where 1 represents Strongly Disagree and 7 represents Strongly Agree. The data indicates respondents who interacted with an iSaveSpecies kiosk felt they were more knowledgeable about elephants than visitors who did not interact with the kiosks. See Table 9. Analyzing the data with an independent samples t-test, there were statistically significant differences for all four statements:

- I understand elephants better
- I am more knowledgeable about how to study elephants.
- I can investigate elephant behavior through careful observation.
- I might like to study elephants (behavior, personality, etc.)

In addition to learning basic information about elephants, including dust bathing and how long elephants live, interviewed visitors reported what they learned from their study and how it compared to their hypothesis. An interviewee who engaged with the Hang Out kiosk “thought [the elephants] would be in the shade, but they hung out in the sun,” and another shared, “Elephants like

area C because toys are in C.” After exploring the Do All Day exhibit, an interviewee learned, “Elephants eat a lot, walk, and are social.” Another shared, “Elephants do a lot of stuff, feeding, object use, dust bathing, and walking.”

Table 9. Respondents’ feelings regarding STEM content, separated by interaction with kiosks

	Interact Mean	No Interact Mean	Mean Difference	T	df	p
I feel . . .						
I am more knowledgeable about how to study elephants.	4.77	4.16	.610	2.771	185	.006**
I can investigate elephant behavior through careful observation.	5.15	4.65	.492	2.212	184	.028*
I might like to study elephants (behavior, personality, etc.)	4.19	3.71	.485	2.267	280	.024*
I understand elephants better	4.94	4.35	.586	3.083	277	.002**

N= 294

n for No Interaction ranges from 84-129

n for Interaction ranges from 102-155

**statistically significant to .01

*statistically significant to .05

Conservation Efforts

Toledo Zoo visitors interacting with the iSaveSpecies poster kiosk were more likely to report they learned something about elephants and shared what they learned with others than visitors who did not use the iSaveSpecies poster kiosk. Additionally specific conservation actions appear to be influenced by the Poster kiosk; especially creating a conservation poster and sharing it with others.

How We Know

When asked to rate their agreement with conservation-themed statements on a scale where 1 represents Strongly Disagree and 7 represents Strongly Agree, respondents who interacted with the poster kiosk were found significantly more likely to agree that they would share what they learned with others, either at the zoo or via e-mail, as measured by an independent samples t-test. (See Table 10.)

Table 10. Poster Kiosk visitors' knowledge of conservations issues

	Poster Interact Mean	No Poster Interact Mean	Mean Difference	t	df	p
Learned about elephants and conservation issues	4.75	3.79	.964	3.042	92	.003**
Shared what I learned about elephants or conservation issues with others, either at the zoo or via e-mail	4.17	2.45	1.721	4.790	92	.000***

N = 94
n for No Interaction = 42
n for Interaction = 52

Additionally, the majority of visitors who interacted with the poster kiosk had stronger feelings of agreement regarding conservation measures, compared to respondents who did not interact with the poster kiosk. (See Table 11.)

Table 11. All Respondents' feelings regarding conservation measures separated by interaction with the poster kiosk

	Poster Interact Mean	No Poster Interact Mean	Mean Difference	t	df	p
I feel . . .						
I am more aware that elephants need to be protected.	5.60	5.47	.132	.562	280	.574
I can help elephants.	5.00	4.66	.344	1.301	277	.194
I would like to work to help save elephants in the wild	4.31	4.17	.133	.436	279	.663
I visit the Toledo Zoo to learn and/or support conservation.	4.62	4.73	-.112	-.384	281	.701

N ranges from 271-282
n for No Interaction ranges from 227-230
n for Interaction ranges from 52-53

Although the mean ratings for each of the specific conservation actions are neutral trending negative, the actions appear to be influenced by the poster kiosks; all of the conservation action statements were rated higher by those who interacted with the poster than those who did not. See Table 12. Additionally, one of the three statements were found to have a statistically significant difference, as measured by a t-test:

- Create a conservation poster and e-mail it to someone

Table 12. Visitors' likelihood of completing specific conservation actions

	Poster Interact Mean	No Poster Interact Mean	Mean Difference	t	df	p
Create a conservation poster and e-mail it to someone.	3.92	2.53	1.393	4.942	286	.000***
Add \$1 Conservation Today donation to any of your purchases at the Toledo Zoo gift shops to support elephant conservation efforts	3.85	3.78	.065	.198	283	.843
Donate to organizations that support elephant conservation or ask others to do so	3.91	3.58	.326	1.072	284	.285

N ranges from 285-288
n for No Poster ranges from 233-235
n for Poster ranges from 52-53

***statistically significant to .001

Among the 26 interviewees, over half (64% or 16 of those interviewed) were unable to articulate anything these experiences introduced or remind them that they might do to help the elephants. Of the nine interviewees who shared something they might do to help the elephants, three mentioned the need to protect the elephants, two mentioned the need to donate funds, one shared that “fair trade products were mentioned.” The interviewee didn’t “know about them, but may look them up on the internet.” Visitors who complete the poster interactive receive an email prompt at home to view their poster online and with conservation actions they can take, including forwarding the conservation message they created, but data is not currently available to determine the percentage of visitors who took further action at this interactive.

Value Added

Visitors who used the iSaveSpecies kiosks found that the kiosks added value to their visit.

How We Know

Respondents who indicated they interacted with a kiosk were asked to rate their level of agreement with a set of value-added statements, where 1 represents Strongly Disagree and 7 represents Strongly Agree. See Table 13. All statements were found to be above the midpoint, indicating visitors were generally pleased with the kiosks. The interviews found that the majority of respondents indicated they found the interactives were appealing and fun. Respondents appeared to appreciate that the kiosk was an activity they could do with others in their group and provided a different way to engage with the animals.

Table 13. Respondents who interacted with a kiosk feelings regarding value added statements

	Mean	Std. Deviation
The touchscreen interactive was appealing	5.47	1.342
The touchscreen interactive provided an activity I could do with others in my group	5.36	1.534
I had fun with the touchscreen interactive activity.	5.33	1.542
The touchscreen interactive activity provided me a different way to engage with the animals	5.32	1.449
The touchscreen interactive provided me with new information	5.22	1.569
Stopping at the touchscreen interactive was worth my time	5.18	1.511
I will look at elephants differently because of the touchscreen interactive activity	4.80	1.826

N ranges from 132-134

Conclusions

The overarching question for this summative evaluation was:

Do the iSaveSpecies kiosks achieve their desired (collective) outcomes?

To answer this question, five sub-questions were asked to allow for analysis of the impact of iSaveSpecies interactive kiosks on the different outcomes.

- Did visitors who engaged with the iSaveSpecies inquiry kiosks report they have used basic science inquiry skills during their zoo visit?

To some degree. Closed-ended questions indicate the kiosks appear to be effective in promoting basic inquiry skills and increasing visitors' knowledge of elephants. Inquiry skills most often used by visitors include observing a single elephant carefully, making prediction about elephant's behavior, and talking with others about what they observed. There were statistically significant positive differences for two inquiry skills, entering data and comparing what they learned.

An essential inquiry skill is the ability to ask questions that lead to investigations. While responses to a close-ended question indicated respondents were more likely to think about questions they might ask about what they observed, they were less likely to share a question they had about the elephants in response to an open-ended question during an interview. One factor, the high percentage of visitors in this sample who were infrequent zoo visitors, might limit visitor's time with the questionnaire as research indicates that infrequent visitors to a zoo or aquarium try to see as much as possible and spend less time with any individual exhibit. Finally, respondents might not have found the environment conducive to pondering a question and/or investigation scenario.

- Did visitors who engaged with the iSaveSpecies interactive kiosks have a better understanding of the STEM content related to the iSave Species kiosks than those who did not?

Yes, visitors who interacted with the iSaveSpecies kiosks reported they felt they understood elephants better, were more knowledgeable about how to study elephants, can investigate elephant behavior through careful observation and might like to study elephants. Additionally, interviewees reported the results of the studies they conducted at the Do All Day and Hang Out kiosks. One interviewee, who engaged with the Hang Out kiosk shared, “Elephants like area C because toys are in C.” Another who explored the Do All Day exhibit, learned, “Elephants do a lot of stuff, feeding, object use, dust bathing, and walking.”

- Did visitors who engaged with the iSaveSpecies conservation poster kiosk understand elephant conservation efforts?
- Did visitors who engaged with the iSaveSpecies conservation poster kiosks report involvement in specific conservation actions?

To some extent. Toledo Zoo visitors interacting with the iSaveSpecies poster kiosk were more likely to report they learned something about elephants and shared what they learned with others than visitors who did not use the iSaveSpecies poster kiosk. Additionally specific conservation actions appear to be influenced by the Poster kiosk; especially creating a conservation poster and sharing it with others.

However, the majority of those interviewed were unable to articulate anything they these experiences introduced or remind them that they might do to help the elephants. Only two interviewees mentioned the need to donate funds, one shared that “fair trade products were mentioned.” Data to determine the percentage of visitors that took conservation actions at home in response to email prompts provided at the end of completing the interactives is currently unavailable.

- Did visitors who engaged with the iSaveSpecies interactive kiosks feel it added value to their zoo visit?

Yes, mean scores for those who used the iSaveSpecies kiosks were all well above the midpoint. Respondents indicated the interactives were appealing and fun. The kiosks provided visitors a different way to engage with the animals and an opportunity to participate in an activity they could do with others in their group.

Appendix A: Data Collection Instruments

Date:
Number:

Toledo Interview

This zoo has recently installed some new interactive touch screen kiosks in this area and we are trying to better understand who uses these and what visitors might gain from these experiences. I noticed you interacting with one and would like to ask you a few questions about the kiosk and your experience in the Tembo Trail. It will take about five minutes and your participation is voluntary and your responses are completely confidential.

Which exhibit: Poster Do All Day Hang Out

I believe someone in your group explored the interactive touchscreen kiosk? Is that correct? Can you tell me who?

What did you[they] do with it?

What, if anything, did you[they] learn from this interactive touchscreen kiosk?

Talk to me about how this/these experiences [with the kiosks] helped you to understand elephants, or your relationship with elephants?

Based on your experience in Tembo Trail, do you have any questions about elephant's behavior?

How could someone investigate this?

This zoo is committed to helping elephants. Did these experiences introduce you to or remind you of things you might do to help the elephants?



Toledo Zoo Poster Questionnaire Summer 2015

This zoo has recently installed some new touch screen interactive kiosks in this area and we are trying to better understand who uses these kiosks and what visitors might gain from these experiences. The survey will take you about five minutes to complete. Your participation is voluntary and your responses are completely confidential.

During your visit today, about how much time did you spend in the Tembo Trail (Elephant Exhibit)?

- Less than 3 minutes
- 3 – 5 minutes
- 5 – 10 minutes
- 10 – 15 minutes
- 15 + minutes



During your visit today, do you remember seeing this touch screen interactive kiosk?

- Yes No

Did you, or anyone in your group, interact with the touch screen interactive kiosk (push buttons, read information, etc.)?

- Yes No

Who in your group interacted with the touch screen interactive kiosk? Check all that apply.

- Adult Youth

Did you or anyone from your group already interact with this touchscreen interactive kiosk on an earlier visit to this zoo?

- Yes No

To what degree do you believe you did any of the following during your visit to the Tembo Trail (Elephant Exhibit)?

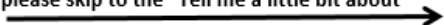
	Definitely Not				Absolutely Yes		
Learned about elephants and conservation issues	1	2	3	4	5	6	7
Shared what I learned about elephants or conservation issues with others, either at the zoo or via e-mail	1	2	3	4	5	6	7
Thought of a question about the elephant's behavior	1	2	3	4	5	6	7
Talked with others in my group about what I observed or did	1	2	3	4	5	6	7

How likely are you to participate in these conservation actions, where 1 represents very unlikely and 7 represents very likely.

	Very Unlikely				Very Likely		
Create a conservation poster and e-mail it to someone.	1	2	3	4	5	6	7
Add \$1 Conservation Today donation to any of your purchases at the Toledo Zoo gift shops to support elephant conservation efforts	1	2	3	4	5	6	7
Donate to organizations that support elephant conservation or ask others to do so	1	2	3	4	5	6	7

We would like to know if that interaction changed the way you feel about science and conservation. Please rate the extent to which you agree with the following statements using a scale from 1 (strongly disagree) to 7 (strongly agree).

I feel . . .	Strongly Disagree				Strongly Agree		
I am more aware that elephants need to be protected	1	2	3	4	5	6	7
I can help elephants	1	2	3	4	5	6	7
I might like to study elephants (behavior, personality, etc.)	1	2	3	4	5	6	7
I understand elephants better	1	2	3	4	5	6	7
I would like to work to help save elephants in the wild	1	2	3	4	5	6	7
I visit this zoo to learn and/or support conservation	1	2	3	4	5	6	7

If you used any of the touchscreen interactive kiosks today, please answer the next question. **If not, please skip to the "Tell me a little bit about yourself" section.** 

We would like to know if the touchscreen interactive kiosks **added value** to your experience at the zoo. Please rate the extent to which you agree with the following statements using a scale from 1 (strongly disagree) to 7 (strongly agree).

	Strongly Disagree			Strongly Agree			
Stopping at the touchscreen interactive was worth my time	1	2	3	4	5	6	7
The touchscreen interactive was appealing	1	2	3	4	5	6	7
The touchscreen interactive provided an activity I could do with others in my group	1	2	3	4	5	6	7
I had fun with the touchscreen interactive activity	1	2	3	4	5	6	7
The touchscreen interactive activity provided me a different way to engage with the animals	1	2	3	4	5	6	7
The touchscreen interactive provided me with new information	1	2	3	4	5	6	7
I will look at elephants differently because of the touchscreen interactive activity	1	2	3	4	5	6	7

Please tell me a little about yourself.

Are you a member of this zoo? Yes No

Are you Male Female

About how often do you visit this zoo? (Select the one best answer)

- Today is my first visit
- I haven't visited for many years
- Once every few years
- About once a year
- 2-4 times per year
- 5+ times per year

Who are you visiting the zoo with today? (Please check all that apply)

- Alone
- Date
- Family
- Friends
- Organized Group (i.e., Scouts, Church, School, etc.)

What is your race/ethnicity? (Please check all that apply)

- African American/Black
- American Indian/Native Alaskan
- Asian/Asian American
- Latino(a) or Hispanic
- Native Hawaiian/Pacific Islander
- White, Non-Hispanic

What are the ages of the adults in your group? (Please check all that apply)

- 19-29
- 30-39
- 40-49
- 50-59
- 60+

What are the ages of the children in your group (if any)? (Please check all that apply)

- Infant – less than 2 years old
- 2 – 4 years old
- 5 – 7 years old
- 8 – 12 years old
- 13 – 17 years old



Toledo Zoo Do All Day Questionnaire Summer 2015

This zoo has recently installed some new touch screen interactive kiosks in this area and we are trying to better understand who uses these kiosks and what visitors might gain from these experiences. The survey will take you about five minutes to complete. Your participation is voluntary and your responses are completely confidential.

During your visit today, about how much time did you spend in the Tembo Trail (Elephant Exhibit)?

- Less than 3 minutes
- 3 – 5 minutes
- 5 – 10 minutes
- 10 – 15 minutes
- 15 + minutes



During your visit today, do you remember seeing this touch screen interactive kiosk?

- Yes
- No

Did you, or anyone in your group, interact with the touch screen interactive kiosk (push buttons, read information, etc.)?

- Yes
- No

Who in your group interacted with the touch screen interactive kiosk?

Check all that apply.

- Adult
- Youth

Did you or anyone from your group already interact with this touchscreen interactive kiosk on an earlier visit to this zoo?

- Yes
- No

Next →

To what degree do you believe you did any of the following during your visit to the Tembo Trail (Elephant Exhibit)?

	Definitely Not							Absolutely Yes
Observed a single elephant carefully for more than a few seconds	1	2	3	4	5	6	7	
Made a guess or prediction about the elephant's behavior	1	2	3	4	5	6	7	
Entered information on a touchscreen or wrote down information about a elephant's behavior on paper	1	2	3	4	5	6	7	
Compared what you learned to what others learned about elephants	1	2	3	4	5	6	7	
Thought of a question about the elephants behavior	1	2	3	4	5	6	7	
Talked with others in my group about what I observed or did	1	2	3	4	5	6	7	

How likely are you to participate in these conservation actions, where 1 represents very unlikely and 7 represents very likely.

	Very Unlikely							Very Likely
Create a conservation poster and e-mail it to someone	1	2	3	4	5	6	7	
Add \$1 Conservation Today donation to any of your purchases at the Toledo Zoo gift shops to support elephant conservation efforts	1	2	3	4	5	6	7	
Donate to organizations that support elephant conservation or ask others to do so	1	2	3	4	5	6	7	

Over →

We would like to know if that interaction changed the way you feel about science and conservation. Please rate the extent to which you agree with the following statements using a scale from 1 (strongly disagree) to 7 (strongly agree).

I feel . . .	Strongly Disagree							Strongly Agree
I am more knowledgeable about how to study elephants	1	2	3	4	5	6	7	
I can investigate elephant behavior through careful observation	1	2	3	4	5	6	7	
I am more aware that elephants need to be protected	1	2	3	4	5	6	7	
I can help elephants	1	2	3	4	5	6	7	
I might like to study elephants (behavior, personality, etc.)	1	2	3	4	5	6	7	
I understand elephants better	1	2	3	4	5	6	7	
I would like to work to help save elephants in the wild	1	2	3	4	5	6	7	
I visit this zoo to learn and/or support conservation	1	2	3	4	5	6	7	

If you used any of the touchscreen interactive kiosks today, please answer the next question. **If not, please skip to the "Tell me a little bit about yourself" section.** →

Next →

We would like to know if the touchscreen interactive kiosks **added value** to your experience at the zoo. Please rate the extent to which you agree with the following statements using a scale from 1 (strongly disagree) to 7 (strongly agree).

	Strongly Disagree			Strongly Agree			
Stopping at the touchscreen interactive was worth my time	1	2	3	4	5	6	7
The touchscreen interactive was appealing	1	2	3	4	5	6	7
The touchscreen interactive provided an activity I could do with others in my group	1	2	3	4	5	6	7
I had fun with the touchscreen interactive activity	1	2	3	4	5	6	7
The touchscreen interactive activity provided me a different way to engage with the animals	1	2	3	4	5	6	7
The touchscreen interactive provided me with new information	1	2	3	4	5	6	7
I will look at elephants differently because of the touchscreen interactive activity	1	2	3	4	5	6	7

Please tell me a little about yourself.

Are you a member of this zoo? Yes No

Are you Male Female

About how often do you visit this zoo? (Select the one best answer)

- Today is my first visit
- I haven't visited for many years
- Once every few years
- About once a year
- 2-4 times per year
- 5+ times per year

Who are you visiting the zoo with today? (Please check all that apply)

- Alone
- Date
- Family
- Friends
- Organized Group (i.e., Scouts, Church, School, etc.)

What is your race/ethnicity? (Please check all that apply)

- African American/Black
- American Indian/Native Alaskan
- Asian/Asian American
- Latino(a) or Hispanic
- Native Hawaiian/Pacific Islander
- White, Non-Hispanic

What are the ages of the adults in your group? (Please check all that apply)

- 19-29
- 30-39
- 40-49
- 50-59
- 60+

What are the ages of the children in your group (if any)? (Please check all that apply)

- Infant – less than 2 years old
- 2 – 4 years old
- 5 – 7 years old
- 8 – 12 years old
- 13 – 17 years old



Toledo Zoo Hang Out Questionnaire Summer 2015

This zoo has recently installed some new touch screen interactive kiosks in this area and we are trying to better understand who uses these kiosks and what visitors might gain from these experiences. The survey will take you about five minutes to complete. Your participation is voluntary and your responses are completely confidential.

During your visit today, about how much time did you spend in the Tembo Trail (Elephant Exhibit)?

- Less than 3 minutes
- 3 – 5 minutes
- 5 – 10 minutes
- 10 – 15 minutes
- 15 + minutes



During your visit today, do you remember seeing this touch screen interactive kiosk?

- Yes
- No

Did you, or anyone in your group, interact with the touch screen interactive kiosk (push buttons, read information, etc.)?

- Yes
- No

Who in your group interacted with the touch screen interactive kiosk?

Check all that apply.

- Adult
- Youth

Did you or anyone from your group already interact with this touchscreen interactive kiosk on an earlier visit to this zoo?

- Yes
- No

Next →

To what degree do you believe you did any of the following during your visit to the Tembo Trail (Elephant Exhibit)?

	Definitely Not							Absolutely Yes
Observed a single elephant carefully for more than a few seconds	1	2	3	4	5	6	7	
Made a guess or prediction about the elephant's behavior	1	2	3	4	5	6	7	
Entered information on a touchscreen or wrote down information about an elephant's behavior on paper	1	2	3	4	5	6	7	
Compared what you learned to what others learned about elephants	1	2	3	4	5	6	7	
Thought of a question about the elephants behavior	1	2	3	4	5	6	7	
Talked with others in my group about what I observed or did	1	2	3	4	5	6	7	

How likely are you to participate in these conservation actions, where 1 represents very unlikely and 7 represents very likely.

	Very Unlikely							Very Likely
Create a conservation poster and e-mail it to someone	1	2	3	4	5	6	7	
Add \$1 Conservation Today donation to any of your purchases at the Toledo Zoo gift shops to support elephant conservation efforts	1	2	3	4	5	6	7	
Donate to organizations that support elephant conservation or ask others to do so	1	2	3	4	5	6	7	

We would like to know if that interaction changed the way you feel about science and conservation. Please rate the extent to which you agree with the following statements using a scale from 1 (strongly disagree) to 7 (strongly agree).

I feel . . .	Strongly Disagree							Strongly Agree
I am more knowledgeable about how to study elephants	1	2	3	4	5	6	7	
I can investigate elephant behavior through careful observation	1	2	3	4	5	6	7	
I am more aware that elephants need to be protected	1	2	3	4	5	6	7	
I can help elephants	1	2	3	4	5	6	7	
I might like to study elephants (behavior, personality, etc.)	1	2	3	4	5	6	7	
I understand elephants better	1	2	3	4	5	6	7	
I would like to work to help save elephants in the wild	1	2	3	4	5	6	7	
I visit this zoo to learn and/or support conservation	1	2	3	4	5	6	7	

If you used any of the touchscreen interactive kiosks today, please answer the next question. **If not, please skip to the "Tell me a little bit about yourself" section.** →

Next →

We would like to know if the touchscreen interactive kiosks **added value** to your experience at the zoo. Please rate the extent to which you agree with the following statements using a scale from 1 (strongly disagree) to 7 (strongly agree).

	Strongly Disagree			Strongly Agree			
Stopping at the touchscreen interactive was worth my time	1	2	3	4	5	6	7
The touchscreen interactive was appealing	1	2	3	4	5	6	7
The touchscreen interactive provided an activity I could do with others in my group	1	2	3	4	5	6	7
I had fun with the touchscreen interactive activity	1	2	3	4	5	6	7
The touchscreen interactive activity provided me a different way to engage with the animals	1	2	3	4	5	6	7
The touchscreen interactive provided me with new information	1	2	3	4	5	6	7
I will look at elephants differently because of the touchscreen interactive activity	1	2	3	4	5	6	7

Please tell me a little about yourself.

Are you a member of this zoo? Yes No

Are you Male Female

About how often do you visit this zoo? (Select the one best answer)

- Today is my first visit
- I haven't visited for many years
- Once every few years
- About once a year
- 2-4 times per year
- 5+ times per year

Who are you visiting the zoo with today? (Please check all that apply)

- Alone
- Date
- Family
- Friends
- Organized Group (i.e., Scouts, Church, School, etc.)

What is your race/ethnicity? (Please check all that apply)

- African American/Black
- American Indian/Native Alaskan
- Asian/Asian American
- Latino(a) or Hispanic
- Native Hawaiian/Pacific Islander
- White, Non-Hispanic

What are the ages of the adults in your group? (Please check all that apply)

- 19-29
- 30-39
- 40-49
- 50-59
- 60+

What are the ages of the children in your group (if any)? (Please check all that apply)

- Infant – less than 2 years old
- 2 – 4 years old
- 5 – 7 years old
- 8 – 12 years old
- 13 – 17 years old

Appendix B: Demographic Tables

Table 14. Amount of time spent with elephants

	Number	%
Less than 3 minutes	10	4
3 – 5 minutes	30	12
5 – 10 minutes	77	30
10 – 15 minutes	74	29
15 + minutes	67	26

N = 258

Table 15. Zoo membership

	Number	%
Yes	113	40
No	173	60

N = 286

Table 16. Visit frequency

	Number	%
Today is my first visit	65	22
I haven't visited for many years	46	16
Once every few years	41	14
About once a year	38	13
2-4 times per year	64	22
5+ times per year	35	12

N = 289

Table 17. Others in respondents' group

	Number	%
Family	239	81
Friends	39	13
Date	36	12
Alone	3	1
Group	2	1

N = 294

Table 18. Ages of adults in respondents' group

	Number	%
18-29	105	36
30-39	107	36
40-49	100	34
50-59	60	20
60+	43	15

N = 294

Table 19. Ages of children in respondents' group

	Number	%
Infant – less than 2 years old	56	19
2 – 4 years old	73	25
5 – 7 years old	60	20
8 – 12 years old	82	28
13 – 17 years old	61	21

N = 294

Table20. Respondents' Gender

	Number	%
Male	118	41
Female	169	59

N = 287

Table 21. Respondents' Race/Ethnicity

	Number	%
African American/Black	11	4
American Indian/Native Alaskan	2	1
Asian/Asian American	8	3
Latino(a) or Hispanic	12	4
Native Hawaiian/Pacific Islander	3	1
White, Non-Hispanic	266	90

N = 294