



iSaveSpecies—Great Apes Summative Evaluation Report

Pittsburgh Zoo & PPG Aquarium

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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 first wave of the iSaveSpecies exhibit stations focused on *Great Apes*, allowing families to conduct research on captive ape populations and to help save wild apes by joining the work of experienced field conservationists. Participating zoos have incorporated three touchscreen-based research and action kiosks in or near their ape/bonobo/orangutan exhibits.

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 Pittsburgh Zoo & PPG Aquarium; data were collected onsite at the Zoo from adult visitors (N= 304) in the gorilla viewing 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 inquiry kiosks reported they used basic science inquiry skills during their zoo visit. Visitors who interacted with a kiosk reported they were more likely to talk with others in their group about what they observed or did, listen to different calls animals make, and discover that they are similar to an animal than those who did not engage with a kiosk.

However, an essential inquiry skill is the ability to ask questions that lead to investigations, and respondents were less likely to share a question about the gorillas in response to an open-ended follow-up question. Additionally, when asked how they would investigate their question, those who responded favored finding the answer on the internet or asking a zoo employee, rather than observing the gorilla. The low number of responses, the high number of simple/uninvestigable questions, and the visitors' passive investigation techniques may be due to several factors including a lack of time or an environment un conducive to writing a question and/or investigation.

Visitors who interacted with the iSaveSpecies kiosks reported they felt more knowledgeable about how to study gorillas, might like to study gorillas, and felt they could help gorillas than visitors who did not interact with the kiosks. Visitors who interacted with the Hoot! kiosk were able to share the meaning of different gorilla sounds and those who interacted with the Which Are You kiosk were able to share that gorillas have different personalities and they are similar to humans.

Pittsburgh Zoo visitors who interacted with the iSaveSpecies poster kiosk were more likely to report they understood great ape conservation efforts than visitors who did not use the poster kiosk. Additionally, these visitors were more likely to report having created a conservation poster and e-mailed it to someone. However, the mean scores were fairly neutral; with the mean scores for the majority of statements rated at the midpoint or slightly above.

Visitors who engaged with the iSaveSpecies interactive kiosks feel it added value to their zoo visit. Mean scores for those who used the iSaveSpecies kiosks were all well above the midpoint. Respondents indicated they had fun, found a different way to engage with the animals, and received

new information from the kiosk. The kiosks provided visitors 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 felt it added value to their zoo visit.
- Visitors who interacted with the iSaveSpecies kiosks felt more knowledgeable about how to study gorillas, and felt they could help gorillas more 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 talk with others in their group about what they observed or did, listen to different calls animals make, and discover that they are similar to an animal more than those who did not engage with a kiosk.
- Visitors who interacted with the iSaveSpecies poster kiosk understood great ape conservation efforts more than visitors who did not use the poster kiosk.

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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. iSaveSpecies inquiry and action tools 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*, allowing families to conduct research on captive ape populations and to help save wild apes by joining the work of experienced field conservationists. Six partner institutions — Cleveland Metroparks Zoo (Cleveland Zoo), Columbus Zoo & Aquarium (Columbus Zoo), Pittsburgh Zoo & PPG Aquarium (Pittsburgh Zoo), Riverbanks Zoo and Garden, The Santa Barbara Zoo, and Zoo Atlanta — have participated in this project, incorporating three touchscreen-based research and action kiosks in or near their ape/bonobo/orangutan exhibits. 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 a prior evaluation of the kiosks, the Great Apes Kiosk Evaluation, which focused on visitor interactions with the interactive kiosks. That study found that the level of engagement with the iSaveSpecies interactives was high at most sites and visitors who engaged with the interactives spent up to three minutes longer in a viewing area. Additionally, visitors who interacted with the kiosk were likely to understand the “what?” message, but they were less likely to understand the “why?” message.

While the prior evaluation provided insight into visitor interaction with the kiosks, 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 zoo 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?
3. Did visitors who engaged with the iSaveSpecies conservation poster kiosk understand great ape 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 Pittsburgh Zoo gorilla viewing area. 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 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 animal viewing 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 number of visitors in each group.

Table 1. Visitor participants by study method

Zoo	Number of Interviewees	Number of Respondents
Pittsburgh	25	279

Every effort was made to gather data for each interactive kiosk; however, since the Hoot Like a Gorilla kiosk was only available for this study at the Pittsburgh Zoo, an effort was made to interview visitors who had interacted with this exhibit. While many of the visitors commented on only one kiosk, several visitors commented on more than one. Table 2 itemizes the frequency of visitors interviewed per kiosk. No demographic information was collected for visitors interviewed.

Table 2. Exit Interviews completed for each interactive kiosk

Interactive Kiosks	Number of Interviewees
Which Gorilla Are You?	6
Hoot Like a Gorilla	21
Conservation Poster	10

N=25

Separate questionnaires were designed and administered for each of the kiosks. Table 3 has a breakdown of questionnaires completed by kiosk. Data indicate that respondents were likely to be white (90%) females (63%) traveling through the zoo with family (65%). One quarter of the respondents was frequent visitors, visiting two or more times each year, another quarter were first time visitors. The remaining respondents (50%) were infrequent zoo visitors. Almost half of the respondents (47%) spent 5 – 15 minutes with the gorillas. The respondents were unlikely to be zoo members (83%). 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
Which Gorilla Are You?	86
Hoot Like a Gorilla	95
Conservation Poster	98

N=279

Inquiry Skills

Visitors interacting with the iSaveSpecies kiosks used inquiry skills more often than those who did not interact with the iSaveSpecies kiosk during their visit to the gorilla area at the Pittsburgh Zoo. Skills most often used by those who interacted with the kiosks were listening to different calls animals make, talking with others in their group about what they observed or did, asking questions about what they observed, and discovering that they are similar to an animal.

How We Know

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. Inquiry skills most often used by visitors include:

- Talking with others in my group about what I observed or did
- Asking questions about what I observed
- Discovering that I am similar to an animal
- Comparing myself to an animal

Questionnaire respondents who interacted with the iSaveSpecies kiosks were more likely to report using inquiry skills than respondents who did not use the iSaveSpecies kiosks. Using a Mann-Whitney U test, statistically significant differences were found with the following skills:

- Listening to different calls animals make
- Talking with others in their group about what they observed or did
- Asking questions about what they observed
- Discovering that they are similar to an animal

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

Inquiry Skills	Interact Frequency (%) n=152	No Interact Frequency (%) n=127	Z	p
Talked with others in my group about what I observed or did	116 (76%)	77 (61%)	-2.821	.005**
Asked questions about what I observed	60 (40%)	32 (25%)	-2.522	.012*
Discovered that I am similar to an animal	58 (38%)	33 (26%)	-2.156	.031*
Compared myself to an animal	54 (36%)	37 (29%)	-1.583	.113
Listened to different calls animals make	39 (26%)	13 (10%)	-3.288	.001***
Participated in research by answering questions	29 (19%)	22 (17%)	-0.377	.706
Compared research results with others	18 (12%)	8 (6%)	-1.132	.258

***statistically significant to .001

**statistically significant to .01

*statistically significant to .05

All kiosks appear equally effective at encouraging the use of specific inquiry skills, additional analysis revealed that inquiry skills were reported consistently among the kiosks. Table 5 includes the complete analysis.

Regarding skills visitors felt they had not engaged in, the issue may be a matter of question semantics. Respondents may have not asked questions about what they observed or they may have felt that they needed to ask a question of a zookeeper or a docent. Those who did not indicate they recorded information about an animal's behavior may not have realized that answering the questions while interacting with the kiosk was recording information.

Table 5. Respondent's use of inquiry skills, separated by interaction with each kiosk

Inquiry Skills	Poster		Hoot!		Which Are You	
	No Interact n=47	Interact N=51	No Interact n=38	Interact n=57	No Interact N=42	Interact N=44
Talked with others in my group about what I observed or did	33 (70%)	42 (82%)	24 (63%)	42 (74%)	20 (48%)	32 (73%)
Asked questions about what I observed	11 (23%)	25 (49%)	11 (29%)	23 (40%)	10 (24%)	12 (27%)
Compared research results with others			8 (21%)	18 (32%)		
Compared myself to an animal			22 (58%)	35 (61%)	14 (33%)	19 (43%)
Discovered that I am similar to an animal			17 (45%)	37 (65%)	15 (36%)	21 (48%)
Participated in research by answering questions					22 (52%)	29 (66%)
Listened to different calls animals make			13 (34%)	39 (68%)		

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, questionnaire respondents and interviewees were asked "Based on your viewing in the primate area, what questions do you have about the gorillas?" and "How could someone investigate this?" Less than one third of visitors completing questionnaires (86 of 279) and interviews (7 of 25) shared a question and 52 visitors who completed questionnaires and 7 visitors interviewed shared how they would investigate this question. These low numbers may be due to the visitor's inability to articulate a question or formulate an investigation about gorillas when they are focused on closed-ended questions or lack time because other members of their party desire to move to another exhibit. Additionally, respondents might not have found the environment conducive to writing a question and/or investigation scenario.

To determine if a question were investigable, responses to the question and investigation were examined collectively. In addition to the original categories of simple/uninvestigable and investigable; two additional question themes emerged, animal contentment and conservation. A question was considered investigable if the visitor proposed to investigate their question by observing the gorillas. For example, two respondents may both have written "What do the gorillas eat?" as their question. If the respondent followed up with an investigation that included watching the gorilla eat, the question was classified as investigable. If the visitor shared they would investigate by asking someone, the question was classified as simple/uninvestigable.

The majority of the questions were considered simple or uninvestigable (70 or 75%). To better understand visitor's interest, the simple questions were further coded into four categories: behavior, age, environment, and personal. Although the majority of those who answered this question (both questionnaire and interview) shared only one question, a few guests wrote several. Simple/uninvestigable questions were most likely about the gorillas age (21), behavior patterns (23), personal information (23), and their natural environment (5). Personal questions included those who asked questions about specific gorillas, such as "What is the baby's name?", "Who is its mother?" and "Are all the babies born here?" Visitors also asked behavior-related questions, including: "How do they sleep?" and "Do they make a lot of noise all the time?"

There were ten investigable questions, including: "How do they take care of their young?" which would be investigated by "watching the adults with their children" and "When do they sleep?"

which would be investigated by “watching them.” Additionally, there were nine questions that focused on the gorilla’s contentment, including “Are they happy?” and “Is turning their back a sign of stress?”

STEM Content

Visitors who interacted with the iSaveSpecies kiosks reported they felt more knowledgeable about how to study gorillas, might like to study gorillas, and felt they could help gorillas than visitors who did not interact with the kiosks.

How We Know

On a scale where 1 represents Strongly Disagree and 7 represents Strongly Agree, questionnaire respondents who interacted with an iSaveSpecies kiosk were more likely to agree with statements that they were more knowledgeable about how to study gorillas, might like to study gorillas, and felt they could help gorillas. See Table 6. Analyzing the data with an independent samples t-test, statistically significant differences were found with the following statements:

- I am more knowledgeable about how to study gorillas
- I understand gorillas better
- I might like to study gorillas (behavior, personality, etc.)
- I can help gorillas.

The statement with the highest mean score for both groups (above 5.0) was “I am more aware that gorillas need to be protected,” indicating the majority of the visitors had an understanding that the gorillas need to be protected that they gained from their zoo visit or other sources.

Table 6. Respondents’ feelings regarding STEM content, separated by interaction with kiosks

I feel . . .	No Interaction Mean	Interaction Mean	Mean Difference	t	df	p
I am more knowledgeable about how to study gorillas	3.75	4.64	0.889	4.929	253	0.000***
I understand gorillas better	4.19	4.78	0.593	2.971	243	.003**
I might like to study gorillas (behavior, personality, etc.)	3.78	4.36	0.575	2.676	247	.008**
I can help gorillas.	4.22	4.73	0.501	2.523	245	.012*
I would like to work to help save gorillas in the wild	3.97	4.38	0.404	1.911	247	.057
I visit the Pittsburgh Zoo to learn and/or support conservation.	4.53	4.89	0.368	1.803	247	.073
I can investigate gorilla behavior through careful observation.	4.53	4.85	0.317	1.807	250	.072
I am more aware that gorillas need to be protected.	5.03	5.13	0.091	0.477	250	.634

N=279

n for No Interaction ranges from 114-118

n for Interaction ranges from 131-137

***statistically significant to .001

**statistically significant to .01

*statistically significant to .05

Interviewed visitors who explored the Hoot! Kiosk reported a better understanding of gorilla communication; they listened to the animals sounds and then read what those sounds meant. Visitors learned a belch meant the gorilla was comfortable, a grunt sound stops young gorillas from doing “something bad” and a scream sounds an alarm. One visitor shared, “Next time they make a noise, I have an idea of what they are saying.” Interviewees who explored the Which Are You kiosk shared that they learned that have “different personalities, human tendencies. They aren’t all the same,” and they are “just like we are.”

Conservation Efforts

Pittsburgh Zoo visitors interacting with the iSaveSpecies poster kiosk were more likely to report they understood great ape conservation efforts than visitors who did not use the iSaveSpecies poster kiosk. Visitors who engaged with the iSaveSpecies conservation poster kiosks were more likely to report they created a conservation poster and e-mailed it to someone than those who did not engage.

How We Know

Statistically significant differences were found between respondents who interacted with the iSaveSpecies poster kiosk and those who did not, using a Mann-Whitney U test, for the following statements:

Learned about an animal or conservation issue

- Shared what I learned with others

Table 7 illustrates visitors’ knowledge of conservation issues by interaction with the poster kiosk. The poster kiosk appeared to raise visitor awareness of gorilla behavior and habitat. Interviewees interacting with the poster stated the kiosk helped them “learn about where they live and what they eat.” Another visitor shared the kiosk “Makes people stop and look at it, the habitat,” adding it “Helps me understand the animal’s habitat.”

Table 7. Visitors’ knowledge of conservation issues separated by interaction with kiosks

	No Poster Frequency (%)	Poster Frequency (%)	Z	P
	N=228	N=51		
Learned about an animal or conservation issue	35 (15%)	45 (88%)	-11.074	.000***
Shared what I learned with others	19 (8%)	38 (75%)	-11.555	.000***

***statistically significant to 0.001

Respondents were asked to rate their level of agreement with a set of conservation-themed statements, where 1 represents Strongly Disagree and 7 represents Strongly Agree. (See table 8.) Data were analyzed for two groups, those who interacted with the Poster kiosk on this visit or a prior visit and those who did not interact with the Poster kiosk. Questionnaire respondents interacting with the iSaveSpecies poster kiosk were more likely to agree with statements that they understood gorillas better, can help gorillas, and might like to study gorillas. Statistically significant differences using a t-test revealed the differences between the two groups for the statement, I understand gorillas better, to be statistically significant at the .05 level.

The statement with the highest mean score for both groups (above 5.0) was “I am more aware that gorillas need to be protected,” indicating visitors understand that the gorillas need to be protected, either from this or prior zoo visits, or from messages received outside the zoo.

Table 8. Respondents’ feelings regarding conservation measures separated by interaction with the poster kiosk

I feel . . .	No Poster Mean	Poster Mean	Mean Difference	t	df	p
I understand gorillas better	4.41	4.93	0.524	1.997	243	.047*
I can help gorillas.	4.41	4.88	0.471	1.775	245	.077
I might like to study gorillas (behavior, personality, etc.)	4.03	4.37	0.34	1.219	247	.224
I would like to work to help save gorillas in the wild	4.14	4.4	0.258	.934	247	.351
I am more aware that gorillas need to be protected.	5.05	5.24	0.191	.778	250	.437
I visit the Pittsburgh Zoo to learn and/or support conservation.	4.69	4.84	0.153	.576	247	.565

N=279

n for No Poster ranges from 201-206

n for Poster ranges from 42-46

*statistically significant to .05

Specific conservation action statement means were found to be closer to the midpoint (4) than the general conservation statements. While a statistically significant difference was found between visitors who engaged with the iSaveSpecies conservation poster kiosk and those who did not create a conservation poster and e-mail it to someone, the overall means for both groups were below the midpoint. Cell phone recycling was the highest rated specific conservation measure among all visitors: those who interacted with the poster kiosk and those who did not— possibly because visitors receive this message multiple times from multiple sources or the zoo directed visitors to this action.

Table 9. Visitors’ likelihood of completing specific conservation actions

	No Poster Mean	Poster Mean	Mean Difference	t	Df	p
Create a conservation poster and e-mail it to someone.	2.64	3.38	0.733	2.482	258	.014*
Recycle my cellphone or tell friends or family they should recycle.	4.7	5.19	0.491	1.499	257	.135
Donate to this zoo for gorilla conservation or ask others to do so.	3.84	4.06	0.218	.783	258	.435
Donate to organizations that support gorilla conservation or ask others to do so.	3.88	4.04	0.166	.571	256	.569

N=279

n for No Poster ranges from 211-212

n for Poster ranges from 47 - 48

*statistically significant to .05

Value Added

Visitors who used the iSaveSpecies kiosks found that the kiosks added value to their visit. Visitors found Hoot! especially helpful in allaying the fears young children may have with gorillas.

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 10. All statements were found to be above neutral, indicating visitors were generally pleased with the kiosks. The interviews found that the majority of interviewees were with family groups (21 of 25) and respondents appeared to appreciate that the kiosk was an activity they could do with others in their group.

Table 10. Respondents who interacted with a kiosk feelings regarding value added statements

	Mean
The touchscreen interactive provided an activity I could do with others in my group	5.58
I had fun with the touchscreen interactive activity.	5.57
The touchscreen interactive activity provided me a different way to engage with the animals	5.56
The touchscreen interactive provided me with new information	5.55
The touchscreen interactive was appealing	5.49
Stopping at the touchscreen interactive was worth my time	5.37
I will look at gorillas differently because of the touchscreen interactive activity	5.21

N ranges from 100 - 104

Respondents also indicated they had fun, found a different way to engage with the animals, and received new information from the kiosk. Additionally, two interviewees had positive experiences with their young daughters and the Hoot! kiosk; one shared her daughter “didn’t want to go by the gorillas. After Hoot!, hearing the sounds, she didn’t seem to be as afraid—she went to the window and looked for them.” Another mother with a young daughter said, “when my daughter hears a sound in a box its less intimidating than the actual gorilla.”

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 gorillas. Visitors who interacted with a kiosk were more likely to talk with others in their group about what they observed or did, listen to different calls animals make, and discover that they are similar to an animal than those who did not engage.

However, an essential inquiry skill is the ability to ask questions that lead to investigations. While responses to a close-ended question indicated respondents asked questions about what they observed, they were less likely to share a question about the gorillas in response

to an open-ended follow-up question on the questionnaire. Additionally, when asked how they would investigate their question, those who responded favored finding the answer on the internet or asking a zoo employee, rather than observing the gorilla. The low number of responses, the high number of simple/uninvestigable questions, and the visitors' passive investigation techniques may be due to several factors including a lack of time or an environment un conducive to writing a question and/or investigation. This study found a high percentage of first time and infrequent zoo visitors. Research indicates that new and infrequent visitors to a museum or zoo try to see as much as possible, spending less time with any individual exhibit, this might explain visitors lack of time to complete this question.

Did visitors who engaged with the iSaveSpecies interactive kiosks have a better understanding of the STEM content related to the iSave Species kiosks?

Yes, visitors who interacted with the iSaveSpecies kiosks reported they felt more knowledgeable about how to study gorillas, might like to study gorillas, and felt they could help gorillas than visitors who did not interact with the kiosks. Visitors who interacted with the Hoot! kiosk were able to share the meaning of different gorilla sounds and those who interacted with the Which Are You kiosk were able to share that gorillas have different personalities and they are similar to humans.

Did visitors who engaged with the iSaveSpecies conservation poster kiosk understand great ape conservation efforts? and Did visitors who engaged with the iSaveSpecies conservation poster kiosks report involvement in specific conservation actions?

To some extent. Pittsburgh Zoo visitors who interacted with the iSaveSpecies poster kiosk were more likely to report they understood great ape conservation efforts than visitors who did not use the poster kiosk. Additionally, these visitors were more likely to report having created a conservation poster and e-mailed it to someone. However, the mean scores were fairly neutral; with the mean scores for the majority of statements rated at the midpoint or slightly above.

Additionally, research indicates visitors come to zoos and other informal learning spaces holding a set of prior knowledge, the conservation knowledge and beliefs regarding gorillas need to be protected and recycling cell phones shared by respondents may have been informed by their current zoo visit, a print source, website, or visit to their cell phone store.

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 they had fun, found a different way to engage with the animals, and received new information from the kiosk. The kiosks provided visitors on opportunity to participate in an activity they could do with others in their group.

Appendix A: Data Collection Instrument Samples

Pittsburgh Zoo Interview

This zoo has recently installed some new interactive kiosks in this area and we are trying to better understand who uses these and what visitors might gain from these experiences. May I ask you a few questions about your experience in the gorilla area. It will take about ten minutes and your participation is voluntary and your responses are completely confidential.

Begin by showing visitor screen shot cards and asking the following questions for each of the 3 kiosks (A, B, C).

A	1. During your visit today, do you remember seeing this exhibit? Y N 2. Did you, or anyone in your group, interact with the exhibit (push buttons, read information, etc)? Y N If yes, what did you do?
3. If yes to question 2, who in your group interacted with the exhibit.	
4. What did you learn, if anything, from this exhibit?	
B	1. During your visit today, do you remember seeing this exhibit? Y N 2. Did you, or anyone in your group, interact with the exhibit (push buttons, read information, etc)? Y N If yes, what did you do?
3. If yes to question 2, who in your group interacted with the exhibit.	
4. What did you learn, if anything, from this exhibit?	
C	1. During your visit today, do you remember seeing this exhibit? Y N 2. Did you, or anyone in your group, interact with the exhibit (push buttons, read information, etc)? Y N If yes, what did you do?
3. If yes to question 2, who in your group interacted with the exhibit.	
4. What did you learn, if anything, from this exhibit?	

Talk to me about how this/these experiences [with the kiosks] relate to investigating gorillas or how to understand them better?

Based on your viewing in the primate area, what questions do you have about the gorillas?

How could someone investigate this?

This zoo is committed to conserving animals in the wild. Did these experiences introduce you to or remind you of things you might do to help the primates?

**Pittsburgh Zoo and PPG Aquarium
Hoot Like a Gorilla**

This zoo has recently installed new 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 with the gorillas?

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

During your visit today, do you remember seeing this touchscreen interactive? Yes No



Did you, or anyone in your group, interact with this exhibit (push buttons, read information, etc.)? Yes No

Who in your group interacted with the exhibit?

#Adult _____ #Youth _____

Please circle the best answer if you did any of the following during your visit at the gorilla area:

- | | | |
|---|-----|----|
| Compared myself to an animal | Yes | No |
| Listened to different calls animals make | Yes | No |
| Discovered that I am similar to an animal | Yes | No |
| Compared research results with others | Yes | No |
| Asked questions about what I observed | Yes | No |
| Talked with others in my group about what I observed or did | Yes | No |

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

Yes No

Based on your viewing in this area, what is a question you would like to ask about one or more of the gorillas?

How could someone investigate your question?

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
Recycle my cellphone or tell friends or family they should recycle.	1	2	3	4	5	6	7
Donate to this zoo for gorilla conservation or ask others to do so.	1	2	3	4	5	6	7
Donate to organizations that support gorilla 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 gorillas.	1	2	3	4	5	6	7
I can investigate gorilla behavior through careful observation.	1	2	3	4	5	6	7
I am more aware that gorillas need to be protected.	1	2	3	4	5	6	7
I can help gorillas.	1	2	3	4	5	6	7
I might like to study gorillas (behavior, personality, etc.)	1	2	3	4	5	6	7
I understand gorillas better	1	2	3	4	5	6	7
I would like to work to help save gorillas in the wild	1	2	3	4	5	6	7
I visit the Pittsburgh Zoo to learn and/or support conservation.	1	2	3	4	5	6	7

If you used the touchscreen interactive today, please answer the question below. **If not, please skip to the next page and tell us a little about yourself.**

We would like to know if the touchscreen interactive **added value** to your experience with the gorillas. 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 gorillas 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 the Pittsburgh Zoo and PPG Aquarium?

- Yes
- No

About how often do you visit this Zoo?

- 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 with today?

Including you, how many people are in your group today?

Adults _____ # Children _____

Are you

- Male
- Female

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

**Pittsburgh Zoo & PPG Aquarium
Which Gorilla Are You?**

This zoo has recently installed new 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 with the gorillas?

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

During your visit today, do you remember seeing this touchscreen interactive?

- Yes No



Did you, or anyone in your group, interact with this exhibit (push buttons, read information, etc.)? Yes

No

Who in your group interacted with the exhibit?

#Adult _____ #Youth _____

Please circle the best answer if you did any of the following during your visit at the gorilla area:

- | | | |
|---|-----|----|
| Participated in research by answering questions | Yes | No |
| Compared myself to an animal | Yes | No |
| Discovered that I am similar to an animal | Yes | No |
| Asked questions about what I observed or did | Yes | No |
| Talked with others in my group about what I observed or did | Yes | No |

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

- Yes No

Based on your viewing in the gorilla area, what is a question you would like to ask about the gorillas?

How could someone investigate your question?

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
Recycle my cellphone or tell friends or family they should recycle.	1	2	3	4	5	6	7
Donate to this zoo for gorilla conservation or ask others to do so.	1	2	3	4	5	6	7
Donate to organizations that support gorilla 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 gorillas.	1	2	3	4	5	6	7
I can investigate gorilla behavior through careful observation.	1	2	3	4	5	6	7
I am more aware that gorillas need to be protected.	1	2	3	4	5	6	7
I can help gorillas.	1	2	3	4	5	6	7
I might like to study gorillas (behavior, personality, etc.)	1	2	3	4	5	6	7
I understand gorillas better	1	2	3	4	5	6	7
I would like to work to help save gorillas in the wild	1	2	3	4	5	6	7
I visit the Pittsburgh Zoo to learn and/or support conservation.	1	2	3	4	5	6	7

If you used the touchscreen interactive today, please answer the question below. **If not, please skip to the next page and tell us a little about yourself.**

We would like to know if the touchscreen interactive **added value** to your experience with the gorillas. 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 gorillas 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 Pittsburgh Zoo & PPG Aquarium?

- Yes
- No

About how often do you visit this Zoo?

- 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 with today?

Including you, how many people are in your group today?

Adults _____ # Children _____

Are you

- Male
- Female

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? [Check all that apply]:

- 18-29
- 30-39
- 40-49
- 50-59
- 60+

What are the ages of the children in your group (if any)? [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

Thank you for taking the time to help us today!

**Pittsburgh Zoo and PPG Aquarium
Help Save Primates! Poster**

This zoo has recently installed new 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 with the primates?

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

During your visit today, do you remember seeing this touchscreen interactive? Yes No



Did you, or anyone in your group, interact with this exhibit (push buttons, read information, etc.)? Yes No

Who in your group interacted with the exhibit?

#Adult _____ #Youth _____

Please circle the best answer if you did any of the following during your visit at the primate area:

- | | | |
|---|-----|----|
| Learned about an animal or conservation issue | Yes | No |
| Shared what I learned with others | Yes | No |
| Asked questions about what I observed | Yes | No |
| Talked with others in my group about what I observed or did | Yes | No |

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

- Yes No

Based on your viewing in this area, what is a question you would like to ask about one or more of the primates?

How could someone investigate your question?

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
Recycle my cellphone or tell friends or family they should recycle.	1	2	3	4	5	6	7
Donate to this zoo for gorilla conservation or ask others to do so.	1	2	3	4	5	6	7
Donate to organizations that support gorilla 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 primates.	1	2	3	4	5	6	7
I can investigate primate behavior through careful observation.	1	2	3	4	5	6	7
I am more aware that primates need to be protected.	1	2	3	4	5	6	7
I can help primates.	1	2	3	4	5	6	7
I might like to study primates (behavior, personality, etc.)	1	2	3	4	5	6	7
I understand primates better	1	2	3	4	5	6	7
I would like to work to help save primates in the wild	1	2	3	4	5	6	7
I visit the Pittsburgh Zoo to learn and/or support conservation.	1	2	3	4	5	6	7

If you used the touchscreen interactive today, please answer the question below. **If not, please skip to the next page and tell us a little about yourself.**

We would like to know if the touchscreen interactive **added value** to your experience with the primates. 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 primates 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 the Pittsburgh Zoo and PPG Aquarium?

- Yes
- No

About how often do you visit this Zoo?

- 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 with today?

Including you, how many people are in your group today?

Adults _____ # Children _____

Are you

- Male
- Female

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? [Check all that apply]:

- 18-29
- 30-39
- 40-49
- 50-59
- 60+

What are the ages of the children in your group (if any)? [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

Thank you for taking the time to help us today!

Appendix B: Demographic Tables

Table 11. Amount of time spent with gorillas

	Number	%
Less than 3 minutes	40	15%
3 – 5 minutes	56	20%
5 – 10 minutes	71	26%
10 – 15 minutes	58	21%
15 + minutes	49	18%

N = 274

Table 12. Zoo membership

	Number	%
Yes	47	17%
No	227	83%

N = 274

Table 13. Visit frequency

	Number	%
Today is my first visit	72	26%
I haven't visited for many years	29	11%
Once every few years	54	20%
About once a year	55	20%
2-4 times per year	43	16%
5+ times per year	22	8%

N = 275

Table 14. Others in respondent's group

	Number	%
Family	138	65%
Friends	28	13%
Family & Friends	8	4%
Couple	27	13%
Alone	3	1%
Group	7	3%
Other	3	1%

N = 214

Table 15. Number of Adults in Respondent's Group

	Number	%
1	0	0%
2	113	46%
3	46	19%
4	40	16%
5	22	9%
6	11	5%
7	4	2%
8	4	2%
9+	5	2%

N = 245

Table 16. Ages of adults in respondent's group

	Number	%
18-29	139	50%
30-39	92	33%
40-49	76	27%
50-59	68	24%
60+	29	1%

N = 278

Table 17. Number of Children in Respondent's Group

	Number	%
0	0	0%
1	61	35%
2	54	31%
3	27	16%
4	16	9%
5	6	4%
6	1	1%
7	4	2%
8	0	0%
9	2	1%
10+	2	1%

N = 173

Table 18. Ages of children in respondent's group

	Number	%
Infant – less than 2 years old	47	17%
2 – 4 years old	66	24%
5 – 7 years old	69	25%
8 – 12 years old	80	29%
13 – 17 years old	37	13%

N = 276

Table 19. Respondents' Gender

	Number	%
Male	101	37%
Female	172	63%

N = 273

Table 20. Respondents' Race/Ethnicity

	Number	%
African American/Black	10	4%
American Indian/Native Alaskan	2	1%
Asian/Asian American	3	1%
Latino(a) or Hispanic	10	4%
Native Hawaiian/Pacific Islander	2	1%
White, Non-Hispanic	256	93%

N = 274