Parents' Evaluations of the Observation Guide Supporting Zoo Visitor's Scientific Observations

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Abstract

This study clarifies the effectiveness of a developed Observation Guide for children who visited a zoo based on parents' evaluations. The Observation Guide was developed to support the scientific observation of animals in zoo venues using animation, particularly the features and behaviors of different animal body parts. The themes of the Observation Guide were the observable features and behaviors of the hind flippers, noses, and claws of seals at the Asahiyama Zoo in Asahikawa City, Japan. The study participants were 14 families recruited publicly, consisting of 22 parents and 16 children. The average age of the children was 7.0 years (SD = 2.0). We prepared one Observation Guide for each child and evaluated its effectiveness for observation support, based on the results of a questionnaire provided to the parents and their interviews. We asked parents whether the Observation Guide animations were useful for the children's observation of the seals' hind flippers, noses, and claws. At least 90% of the parents found the guides useful owing to the following reasons: (a) Making the movements of seals comprehensible for children with ease, (b) Making children focus on features and behaviors, (c). Familiarity with animation and its effect on motivation, (d) Comparison of the animations with real seals by the children. The Observation Guide was found to be an effective tool for observing the features and behaviors of animal body parts. Future research can focus on improving the animations.

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Theoretical Background

In this study, we will clarify the effectiveness of an observation system for children who visit zoos based on parents' evaluations. Zoos can support science learning (Bell, Lewenstein, Shouse, & Feder, 2009) because they represent one of the primary points of engagement between live animals, biological science, and children (Wagoner & Jensen, 2010). Children, however, tend to visit zoos for entertainment (Patrick & Tunnicliffe, 2013). In addition, children cannot engage in scientific observation by themselves because scientific observation requires coordination of disciplinary knowledge, theory, practice, and habits of attention (Eberbach & Crowley, 2009). This generates a need to support children's scientific observations.

Nowadays, zoos try to support observation using technology. For example, Michel, Plass, Tschritter, and Ehlers (2008) developed a system that provides information about the animals living in the zoo, their natural habitat, and endangerment status. Suzuki et al. (2009), developed a system using GPS-equipped mobile phones that provides different viewpoints for observation. These systems provide information using explanations and still pictures on mobile devices.

We developed an Observation Guide that supports the observation of features and the behaviors of various animal body parts through animation (Tanaka et al., 2016). In accordance with Eberbach and Crowley (2009), this guide helped children "connect features to function and behavior," which is one item of the "Transitional" stage prior to "Scientific Observation." They also explained that children are capable of transitioning from "Everyday Observation," which focuses only on obvious characteristics to "Scientific Observation" with educational support. We first conveyed the viewpoints of features and behaviors using animation. Ainsworth (2008) states that children can learn about the movements of animals by watching animations of their motions. We also believe that animation can be used to focus children's observations.

In zoos, parents facilitate children's learning about animals with differing types of conversations, such as by associating the child's observations with prior knowledge or a shared context that the parent and child are familiar with (Patrick & Tunnicliffe, 2013). This is why it is important that parents evaluate the education system supporting children's observations.

Purpose of this study

The study aimed to evaluate the effectiveness of the developed Observation Guide in supporting children's observations via a workshop to observe seals in a zoo as a case study. The parents of the children evaluated the Guide.

System Overview

Figure 1 shows a system overview of the Observation Guide. The system is made of three items, which represent the features and behaviors of the seals' hind flippers, noses, and claws. There are three pages for each item: a Predictions page (Figure 2), an Animation page (Figure 3), and a Results page (Figure 4). The Predictions page provides four options, and each option is a drawing of the features and behaviors of the observed animal body parts. The bottom part of each option includes "Watch animation" and "Prediction" buttons. Children can watch an animation by clicking the "Watch animation" button. After watching the animation of each choice, they click "Prediction" button to indicate their prediction. When the children select "Prediction," the Results page is displayed. This page has the same options as the Predictions page, with "Watch animation" and "Result" buttons on the bottom of each option. A prediction stamp appears on the top of the option that has been selected. Following the appearance of the prediction stamp, the children observe the seals. They can also watch the animations during observation by clicking "Watch animation." After observations, the children need to select one option to represent their observation and click "Result" to indicate their choice. When the children select a "Result" option on the Result page, the Prediction page for the next observation item is displayed. The choices made by each child were saved as php files. The flow was repeated three items.

Methodology

The research was conducted at the Asahiyama Zoo in Asahikawa City, Japan, over a three-day period from December 25–27, 2015. The participants in the study were 14 families who had been recruited publicly, consisting of 22 parents and 16 children. The average age of the children was 7.0 years (SD = 2.0). One Observation Guide was provided to each child, who was accompanied by one or both parents during the observation.

First, the staff members asked a question about the seals' features and behaviors (Figure 5). Children and their parents watched the animations at each choice on the Animation page and chose one prediction on the Prediction page. Following this, they observed the actual seals and chose a result on the Results page (Figure 6). They could also then watch an animation on the Animation page. After the observation, the staff members provided the answer and explained the features and behaviors in detail. They observed the seals' hind flippers, noses, and claws using the Observation Guide with the children.

A questionnaire provided to the parents and their interviews were used for evaluation (Figure 7). In the evaluation, they were asked whether the animation for each observation item in the Observation Guide was useful for the children in observing the features

and behaviors of seals. They also explained the reasons for their opinions.

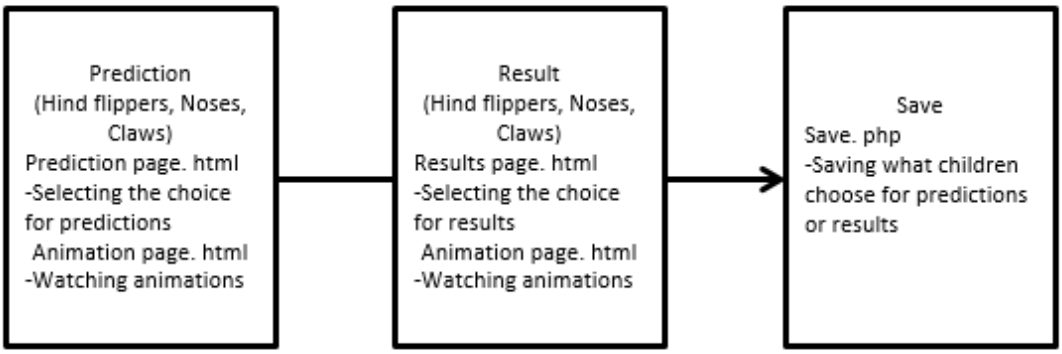

Figure 1. System overview of the Observation Guide

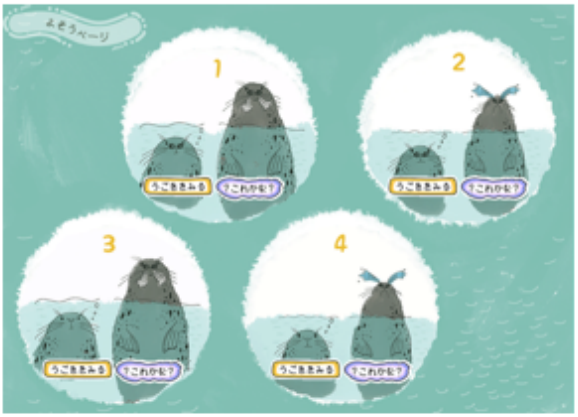

Figure 2. Prediction page

Figure 3. Animation page

Figure 4. Results page

Figure 5. Staff asking questions

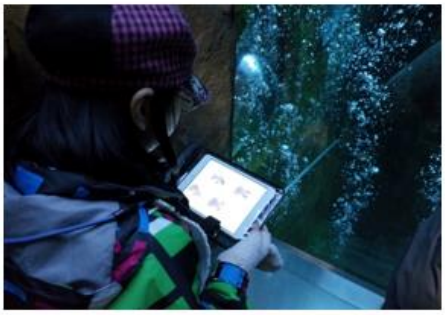

Figure 6. A child using the Observation Guide

Figure 7. Parents being interviewed

Findings

Table 1 shows the number of parents who answered whether these animations were useful. Of the total, 20 parents replied that the hind flipper animation was useful, and 2 replied that it was not useful. All the 22 parents replied that the nose animation was useful. In addition, 21 parents replied that the claws animation was useful, while one replied that it was not.

Table 2 shows the reasons for deeming the animations as useful or not useful. The following are the main reasons for deeming the animations useful: (a) Making the movements of seals comprehensible for children with ease, (b) Making children focus on features and behaviors, (c) Familiarity with animation and its effect on motivation, (d) Comparison of the animations with real seals by the children.

First, 17 parents mentioned that the animations easily made the movements comprehensible to children. For example, one parent said, "Animations show the same motions as real seals, so children can understand it (No.18-claws)." Some parents explained the details for their reasons. They pointed two features of the animation that helped understand the movements. First, parents said that unlike verbal explanations and still pictures, animations could directly show the movements of animals. One parent said, "My son hadn't understood how seals use hind flippers. He found it easier to understand the motion of the hind flippers by watching the animation than by listening to an explanation (No.17-hind flippers)." Another parent said, "Animation was good because children weren't able to imagine how seals move by using only still pictures (No.10-hind flippers)".

Particularly, with respect to hind flippers, some children did not know the meaning of "flippers." However, they were able to observe it through the animations. Next, parents said that the animations showed the movement in slow motion, and they helped observe the actual fast movements. For example, one parent said, "Real seals move fast, so we often see seals and only say they are cute. However, animation showed slow motions, and we understand the movements, so we wanted to observe the movements of real seals (No.4-hind flippers)." Slowly-played animations were effective for children to understand the real movements of seals.

Second, 13 parents said that animations helped children focus their observations. One parent said, "The animation taught children where and when to observe (No.5-noses)." Another parent said, "By watching the animation, children acquired the accurate viewpoint for observation (No.15-nose)." Particularly, regarding the observation of nose, it was slightly difficult for children to observe noses because children had to watch seals both above and under the water.

Third, 10 parents said that the familiarity with animations kept the children motivated. One parent said, "Animation was a good tool for my daughter to maintain her motivation. She could observe and think about seals' hind flippers by herself (No.15-hind flippers)." Another parent said, "When my daughter became tired, cute and familiar animations held her attention. Particularly, on watching the animation of eating fishes, she said that seals enjoyed eating just like herself. She compared seals to herself (No.20-claws)". Because many children often watch animations in their daily life, animations were an appropriate media to hold their attention.

Lastly, 7 parents said that animations helped observation because children compared real seals to animations. One parent said, "My son could not understand how seals walk using their claws without animations. However, animation was useful because he could compare the movements of the animated seals to real seals (No.16-claws)."

Few parents stated reasons for why they did not find the animations to be useful: (a) Lack of correspondence with reality in the animations, (b) Preventing children from imagining the seals' movements freely. In relation to the lack of realistic representation in the animation, one parent said, "The [animated] seals' movement was slightly different from the real movement (No.8-hind flippers)." Although animation could show the movement, there was scope for improvement. In terms of preventing children from imagining movements freely, one parent said, "I think that the choices were limited. My children seemed to have missed the opportunity to imagine the various ways in which seals might use claws (No.8-claws)." We have to think of better ways to make children predict and observe seals.

Table 1. Number of parents who found the animations useful and not useful

	Useful	Not useful
Hind flippers	20	2
Nose	22	0
Claws	21	1

Note: *N*=22

Table 2. Reasons for deeming the animations useful or not useful

Useful	
(a) Making the movements of seals comprehensible for children with ease	17
(b) Making children focus on features and behaviors	13
(c) Familiarity with animation and its effect on motivation	10
(d) Comparison of the animations with real seals by the children	7
Not useful	
(a) Lack of correspondence with reality in the animations	1
(b) Preventing children from freely imagining seal movements	1

Note: *N*=22, Multiple choice allowed

Conclusion and Implications

We evaluated the effectiveness of the observation support provided by the Observation Guide using a questionnaire provided to parents and their interviews. At least 90% of the parents positively evaluated the Observation Guide animation. The reasons for positive evaluation have been discussed. Because of this, we conclude that the system is an effective tool to support the observation of the features and behaviors of various animal body parts. In terms of future steps, there is scope to improve animation more realistically and to think of effective ways to ask questions about features and behaviors that can develop children's interest.

Acknowledgements

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