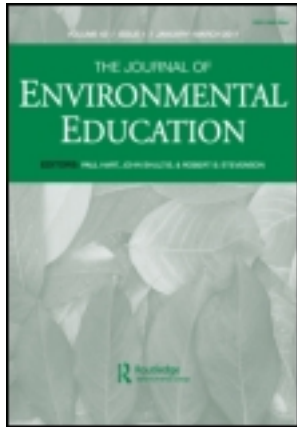


This article was downloaded by: [University of Warwick]

On: 12 January 2013, At: 02:25

Publisher: Routledge

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



The Journal of Environmental Education

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/vjee20>

The Risk of Delivering Disturbing Messages to Zoo Family Audiences

Maggie Esson^a & Andrew Moss^a

^a North of England Zoological Society, Chester Zoo, Chester, UK
Version of record first published: 11 Jan 2013.

To cite this article: Maggie Esson & Andrew Moss (2013): The Risk of Delivering Disturbing Messages to Zoo Family Audiences, *The Journal of Environmental Education*, 44:2, 79-96

To link to this article: <http://dx.doi.org/10.1080/00958964.2012.695408>

PLEASE SCROLL DOWN FOR ARTICLE

Full terms and conditions of use: <http://www.tandfonline.com/page/terms-and-conditions>

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden.

The publisher does not give any warranty express or implied or make any representation that the contents will be complete or accurate or up to date. The accuracy of any instructions, formulae, and drug doses should be independently verified with primary sources. The publisher shall not be liable for any loss, actions, claims, proceedings, demand, or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.

EMPIRICAL RESEARCH

The Risk of Delivering Disturbing Messages to Zoo Family Audiences

Maggie Esson and Andrew Moss

North of England Zoological Society, Chester Zoo, Chester, UK

One of the roles of the modern zoo is to provide environmental education. Zoo visitation comprises primarily family groups seeking to spend time together. There is potential for tension between message and audience expectation as zoos seek to raise awareness of the effects of irresponsible human behavior on the environment. This may unsettle family visitors. This study explored levels of tolerance of the zoo audience to a disturbing exhibition covering broad environmental themes. Results showed that participants were prepared to reflect on the content and at times feelings were sufficiently strong for zoo visitors to challenge one another's beliefs. The delicate positioning of zoos as environmental education providers is discussed.

Keywords *behavior, conservation, education, environment, visitor, zoos*

BACKGROUND LITERATURE

Zoos have evolved over the centuries in terms of their position in society and community. Once the private indulgences of nobility (Holst & Dickie, 2007, Baratay & Hardouin-Fugier, 2004), they gradually opened up to the paying public and went from private into public ownership, including being run as charitable trusts or by local governments. The re-positioning from animals for public entertainment to the Noah's ark model of conservation of endangered species represents another step in the evolutionary process (Gippoliti & Carpaneto, 1997; Mallinson, 2003; Miller et al., 2004). A review of current mission statements illustrates this trend toward higher ideals other than entertainment (Patrick, Matthews, Ayers, & Tunnicliffe, 2007). As the emphasis has shifted toward conservation, so too has the need to generate income to fund operations and aspirations (Turley, 2001).

Unlike other institutions serving their communities; for example museums and galleries, zoos house living collections and this risks multiple interpretations associated with the ethics of keeping wild animals in captivity. Zoos have their critics, in particular the animal welfare and animal rights movements. For example, the Born Free Foundation claims that zoo animals “suffer physically and mentally from the lack of freedom that captivity imposes” (Born Free Foundation, n.d.). The People for the Ethical Treatment of Animals (PETA) foundation states that “zoos, circuses, aquaria, bullfighting and hunting are all forms of animal abuse that occur for human amusement” (PETA, n.d.). The airing of these anti-zoo sentiments has sometimes caught wider public attention. In 2005, Advocates for Animals organized a demonstration and public petition against Edinburgh Zoo’s policy of keeping polar bears (The Scotsman, 2005).

More recently zoos have undergone another phase of re-positioning and now emphasize an educational agenda (Ballantyne, Packer, Hughes, & Dierking, 2007; Falk et al., 2007; Randler, Baumgartner, Eisele & Kienzle, 2007; Swanagan, 2000). The importance of education provision in European zoos is formally recognized through EU legislation (EU Council Directive 1999/22/EC; European Union, 1999). In the UK it is a statutory requirement of the holding of a zoo license that zoos produce and implement an education policy (Department for Environment, Food, and Rural Affairs [DEFRA], 2004). The ability of zoos to live up to their educational claims has also been challenged. The Royal Society for the Prevention of Cruelty to Animals (RSPCA) has specifically questioned the educational role of zoos, stating that “it is not enough for zoos to aim to have an educational impact; they should demonstrate a substantial impact” (RSPCA, 2006, p. 97). Balmford et al. (2007) suggest that it may be unrealistic to expect visitors to understand conservation messages on zoo visits, explaining that there were “remarkably few clear tests of whether. . . zoos change the knowledge, attitudes or behaviour” of their visitors (p. 121). The EU Zoo Enquiry 2011, published by the Born Free Foundation, states that the “quality of and standards in education were poor in the majority of zoos assessed” (Born Free Foundation, 2011, p. 35). Furthermore, in-zoo researchers are now also beginning to look critically at the educational claims made by their institutions. For example, Moss and Esson (2012, p. 12) assessed the public claims (via their websites) of zoo-accreditation organizations and zoos and found that “the research undertaken thus far (and there is a substantial amount) has clearly not been universally accepted as an effective demonstration of zoos’ positive [educational] impact.”

The potential for zoos to leave themselves open to multiple interpretations comes under further tension when visitor motivation is taken into account (Falk, Moussouri, & Coulson, 1998). Modern working patterns mean that time spent as a family is at a premium and entertainment and enjoyment are a strong feature of the family leisure-time agenda (Sickler & Fraser, 2009). Pekarik (2004, p. 257) states that the primary focus of zoo visitors is recreational, “to see the animals and have an entertaining outing, especially with children.” The majority of zoos visitors are families who want to relax together and get close to animals (Wolf & Tymitz, 1981; Dierking & Saunders, 2004; Woods, 1998). The almost universal appeal of suggests animals that zoo education should be animal-centric, optimistic, and uplifting (Beever, 2000; Conway, 2003; Rabb, 2004; Yalowitz, 2002). This focus on animal-related education is typical of zoo education content and is reflected in the education requirements laid out in the Zoo Licensing Act of 1981, which states that information “should include as a minimum the species name, (common and scientific), natural habitat, some biological characteristics and details of conservation status.” Zoos tend to stick to this legislative brief in terms of the education programs they offer, which is arguably fairly limited in scope and heavily focused on knowledge transfer from zoo to visitor.

The World Association of Zoos and Aquariums (WAZA) is the governing body for zoos and aquariums with more than 1,000 affiliates worldwide. WAZA describes education as "... a central role for all zoos' defining outcomes as 'influencing people's attitudes and behaviours towards wildlife and environments, local and global'" (WAZA, 2005, p. 35). This directs zoo education to focus on the environment and for visitors to accept responsibility under the vision of Agenda 21 and to "think global, act local" (United Nations, 2005). Education about the state of the environment is inevitably gloomy and often lacks the personal relevance that Agenda 21 advocates. Hyson (2004, p. 248) states that, "to most visitors a day at the zoo is not about environmental education; it's about family entertainment." Environmental education is far removed from the appeal of the living animal and learning about the species on exhibit. This appeal, together with spending leisure time together is most likely to be what motivated a family to visit a zoo. Here we have the potential for multiple perspectives and shifting ground. The zoo visitor is expecting to enjoy seeing animals as part of a day out and the zoo needs satisfied visitors to generate income. The zoo community is seeking (rather seriously) to influence attitudes and behaviors through environmental education while the very existence of zoos is being challenged on the grounds of animal welfare.

The balance between meeting visitor expectation to be entertained and moving the education agenda into new, and unexpected, territory is a delicate one for education principles and practice. Turley (2001) reviewed the motivational evidence from five studies and found that only one of these studies reported education as the primary reason for visiting a zoo. The remaining four reported a family or recreational motivation, although care must be taken in making comparisons as different methods were used in each of the reviewed studies. However, we must guard against the assumption that "education" and "entertainment" are separate, dichotomous entities. A majority of visitors have been found to be motivated by education *and* entertainment (Falk et al., 1998) with 92% reporting that learning in the free choice environment of a museum was an enjoyable way to spend time. Packer (2006) finds that learning can be bound-up as part of the recreational experience and (Packer & Ballantyne, 2002, p. 189) that an average visitor to an aquarium, rated both "learning and discovery" and "passive enjoyment" almost exactly equally. It should be noted that these studies do not attempt further analysis into the meanings visitors attribute to the term "education." Where the zoo education agenda and visitor motivation differ is another tension created by the multiple challenges of competing in the leisure market for the family day out, generating income, educating the public (according to agenda) and providing evidence of doing so. In free-choice learning environments (which zoos are) families may not be primed for the genre of education that zoos are aspiring to deliver, especially if messages are perceived to be gloomy and we are asking our visitors to take responsibility for their actions (Purrinton, 2005; Slivovsky, 2004). Falk, Heimlich, and Bronnenkant (2008) highlight the significance of taking visitor motivation into consideration when seeking to deliver prescribed behavioral outcomes since the pre-visit agenda can become a self-fulfilling prophecy. In contrast, Dawson and Jensen (2011) warn us against assuming that visitor motivation is fixed and suggest that visitor expectation, perception, and mind-set can change and develop during the course of a visit.

In pursuing the aim of influencing attitudes and behavior, zoos may be risking education that will, at best, be ignored and at worst, cause dissatisfaction as the family agenda is unsettled. Kola-Olusanya (2005, p. 301) believes that zoos can be "be ideal venues for developing emotional ties to wildlife and fostering an appreciation for the natural world as they offer a wide range of

opportunities to engage in free-choice learning experiences” but whether this permits zoos to offer a wider range of environmental issues is not clear. Pedretti (2002) feels that issues-based exhibitions have a place in museums and science centers; indeed, museums should not avoid displaying controversial exhibitions and “be braver in their choice of exhibition topics and interpretive techniques” (Pedretti, 2002, p. 23). Museums may however, be positioned differently in the public psyche from zoos (Esson, 2011; Hyson, 2004; Regan, 2004).

PROBLEM STATEMENT

The literature presents multiple and sometimes shifting perspectives on the role of the 21st century zoo. “Education” is a catchall term in itself and open to multiple interpretations. The challenge for zoos is to strike a delicate balance between positive, upbeat experiences that support family motivations to visit and spend, and the delivery of, often stark, reminders of the responsibilities we all have toward protecting the environment. Testing this balance is not without risk, and evaluation must be factored into the equation in order to justify taking this risk and, if results are encouraging, answer our critics. We surmise that evaluation of any educational initiative that seeks to influence attitudes and promote behavior change must incorporate measures of visitor outcomes, and allow for both positive and negative responses. Most zoos measure educational outputs; for example, the number of educational talks delivered each year or even just the number of people visiting the zoo. This does not, in any way, measure any kind of educational outcome. To do this requires careful research design to reduce possible biases that direct researcher involvement may promote. To this end, unsupervised qualitative feedback and unobtrusive visitor observations were utilized for this study.

THE EXHIBITION

Chester Zoo is registered as a conservation and education charity and the most popular zoo in the UK with more than 1.4 million visitors annually. The mission of the zoo is to be a “major force in conserving biodiversity worldwide.” It is against this background of aspiring to be at the forefront of zoo innovation that the zoo made the decision to test the boundaries of visitor tolerance to provocative and challenging (to leisure-time families) imagery and messaging by staging the exhibition “Hard Rain—our headlong collision with nature.”

The Hard Rain exhibition is a touring outdoor photographic exhibition that takes the form of a vinyl banner approximately 70 m by 1.5 m. The majority of the banner is given up to 43 large photographic images depicting some of the world’s biggest man-made crises. The exhibition content does venture to some small extent into human suffering and these images are particularly graphic but the bulk of the content stays with the exhibition byline, “Our headlong collision with nature.” Some of the issues tackled are common themes for environmental educators, such as climate change, pollution, and threats to wildlife. For example, one image displayed children salvaging rubbish in a polluted waterway (Figure 1). In one of the images that dealt directly with wildlife, an oil-covered bird is unable to hold up its wings. The Hard Rain Project (the not for profit company behind the exhibition) states that it supports “public exhibitions and other communications that campaign for realistic solutions to the interlinked problems of climate



FIGURE 1 An example of one of the images from the Hard Rain exhibition (color figure available online).

change, poverty, the wasteful use of resources, population expansion, habitat destruction and species loss” (Hard Rain, 2011). The exhibition is not designed specifically for display in zoos. Museums, universities, city centers, and even the UN building in New York have all hosted Hard Rain. It is estimated that more than 15 million people have viewed the exhibition around the world.

The images are selected to compliment the lyrics from the Bob Dylan song “A Hard Rain’s A-Gonna Fall,” where each line of the song accompanied an image. The Dylan song was adopted as the unofficial anthem of the 2009 UN Copenhagen Summit on Climate Change where the exhibition was also staged. As the imagery portrayed is stark, we predicted that the exhibition risked upsetting the family agenda. In response to some early feedback, we prominently positioned two “warning” signs at either end of the exhibition (visitors could approach from both directions). The location of the exhibition was carefully chosen bordering a zoo pathway where visitors could not see the images before they saw the signs (see Figures 2 and 3 to view how the exhibit was situated within Chester Zoo).

Chester Zoo was the first zoo in the world to stage the exhibition. As part of the “testing the boundaries” strategy the exhibition was opened amid attendant publicity for World Environment Day and visitor reaction was monitored as part of the zoo’s ongoing commitment to audience



FIGURE 2 The Hard Rain exhibition in Chester Zoo (color figure available online).

research. The investigation was carried out during high summer when the weather was at its best and the schools were on holiday thereby ensuring high family attendance at the zoo.

The aims of staging the Hard Rain exhibition were:

- to acknowledge the responsibility that zoos have to educate about the environment;
- to test visitor tolerance and receptivity to gloomy messages and stark imagery; and
- to trial and develop research methods to effectively evaluate visitor behavior and response at such an exhibit.

RESEARCH METHODS

Two methods were used to assist in the evaluation of the exhibit: the analysis of unstructured written feedback from visitors in the form of sticky (Post-It) note comments and unobtrusive visitor observations. Data were collected during the period May to September 2008 by researchers working within the zoo's Education Division. Because in-house researchers would be conducting the evaluation, methods that did not require any direct contact with visitors were believed to be advantageous; for example, in the avoidance of response bias or demand characteristics in the visitors sampled. We sought to measure visitor "response" to the exhibition, allowing for both negative and positive reactions. We felt that written comments would supply more considered responses and with the direct thoughts of visitors. Unobtrusive observations allowed the recording of more immediate, real-time, reactions to the exhibition.



FIGURE 3 The Hard Rain exhibition (color figure available online).

Unstructured feedback was collected via an unmanned comments board, where visitors could express their views on an adhesive note (Post-It note). The board itself held an explanatory sign that asked “Hard Rain Exhibition: What do you think? Have your say here...” A small writing table and pens were placed beside the board. Before each period of data collection, the same four “staged” comments were routinely added to the board to prompt visitor participation. These comments always said the same thing, were in the hand-writing of four different staff members and positioned in the same locations on the board. The wording of these statements was not pre-determined; the four staff members came up with comments that reflected their own opinions. These comments were:

- Not sure this is appropriate.
- This is what all zoos should be doing—animals and top-class exhibits.
- Disturbing images—very moving.
- Great to see images that make you think. They will stay with me for a very long time.

We decided to use quality of handwriting to separate comments into adult and child groups as it was felt useful to determine whether adults and children showed a differing response to the exhibition. This is a fairly crude way of determining adult and child responses, and some level of error was accepted as part of this method. However, confidence was high in the consistency of this approach, with an interrater agreement of more than 90%. In total, 227 comments were received.

The unobtrusive approach involved numerical observation of behavior throughout the visitor's stay at the exhibition. The researcher (dressed in "plain" clothes) was positioned where the entire length could be observed. Visitors were selected from both directions (alternately) by choosing the first visitor to approach the exhibition. After each observation and the data recorded, the researcher chose the next available visitor that approached the exhibition. If a group approached the exhibition, the first member of that group to make a positive movement or action toward the exhibition; for example, moving toward or pointing toward the exhibition, was chosen as the target for observation. Descriptive data were recorded about the visitor or visitor group, such as whether they were families, adults, or children, which direction they approached from and at what point they left the exhibition.

The main dependent measures used were:

- Exhibition dwell time: this is the total amount of time each visitor/visitor group spent viewing the exhibition. This was recorded using a stopwatch.
- A quantitative measure of visitor "engagement" related to the entire time the visitor was attending to the exhibition. This ran on a +/- scale from -3 to +3 and was developed using pilot observations prior to the study, where the extremes of behavior toward the exhibition were assessed. The detailed descriptions for each engagement level can be found in Appendix A.

In total, 238 visitors were observed using this method.

Analyses

Data from the unstructured feedback were analyzed using SPSS Text Analysis for Surveys (version 3.0). Initial extraction of key concepts was done using the program's built-in text analysis algorithms but further categorization was conducted manually using these concepts as a guiding tool. Representative quotations have been used to preserve the qualitative essence of the original visitor feedback. The number of responses falling into different categories allowed for some simple quantitative analyses to be conducted (χ^2 tests of independence).

Data from the unobtrusive observations were analyzed using non-parametric techniques such as the Kruskal-Wallis or Mann-Whitney methods.

RESULTS

Analysis of Visitor Comments

After initial automated text analysis, a series of 10 categories were further developed that were seen to represent the broad range of comments received. We wanted to assign each comment to only a single category to assist the analysis, but we realize that this means that some comments do overlap other categories. Table 1 contains verbatim examples of comments from each category.

As each comment was assigned to one of the 10 categories, relative proportions falling into each could then be calculated. Figure 4 depicts a fairly even spread across all the categories although Personal Reflection (25.81%), Positive Reaction (17.74%) and Negative Reaction (16.53%) accounted for around 60% of all visitor comments. When the responses are assessed in the child

TABLE 1
 Categories Developed From the Visitor Comment Data, With Examples From Each

<i>Category</i>	<i>Example comment 1</i>	<i>Example comment 2</i>
<i>Positive</i>	Educational and very appropriate!	I like these pictures.
<i>Negative</i>	It's sad and it shouldn't be put up in a childrens park! It's just sick.	This is supposed to be a zoo. Leave this to amnesty international.
<i>Positive and negative</i>	Very good, very thought provoking. Images may not be appropriate for young ones, but they do need to know what's happening.	Disturbing but very true!
<i>Personal reflection</i>	Very effective images. Makes you think! Good luck.	Makes you appreciate things we take for granted.
<i>Comments focused on children</i>	Very, very disturbing, the images will give the children nightmares. This is a family place.	It's a bit much for children.
<i>Environmental comment</i>	What are we all doing to our world?	I think pollution should stop.
<i>Responses to other visitor comments</i>	Can't believe you think that. What a stunning and effective display. It certainly makes you think!	Some very misleading comments!
<i>Empathetic</i>	I feel sorry that all the bottles go into rivers because people throw them in and people have to go into rivers like kids and people who are poor and when it is raining every morning.	Its upsetting to see people like this.
<i>Unrelated comments</i>	The best zoo ever!	Try doing away with all politicians! Olympics, second homes hypocrisy.

and adult groupings some significant differences are seen across the categories. For example, only 1.16% of adult responses fell into the empathetic category but this figure was 12.96% for children ($\chi^2 = 7.497, df = 1, p = .006$). Results indicate 13.95% of adult comments had an environmental theme, but only 4.32% of child comments did ($\chi^2 = 10.894, df = 1, p = .001$). Other categories showing significant differences were “focused on children” ($\chi^2 = 16.645, df = 1, p < .001$) and “response based on other visitor response” ($\chi^2 = 9.521, df = 1, p = .002$). In both of these cases, adults left more comments that fell into these categories.

The exhibition stimulated a more emotional response from children, with many leaving comments showing great empathy for the suffering of others, particularly in the imagery where other children were depicted.

For example:

[I]f we stop treating people in the world badly then these images would stop.

[I]t's really sad and very unfair. It's sad for the children and it makes them ill.

In the same vein, adults left a number of comments regarding the effect of the exhibition on their own children. While some of these were indeed negative (mainly questioning the suitability of the images for a younger audience), it was always interesting to read comments from adults pondering the future of the planet with their own children in mind.

All responses

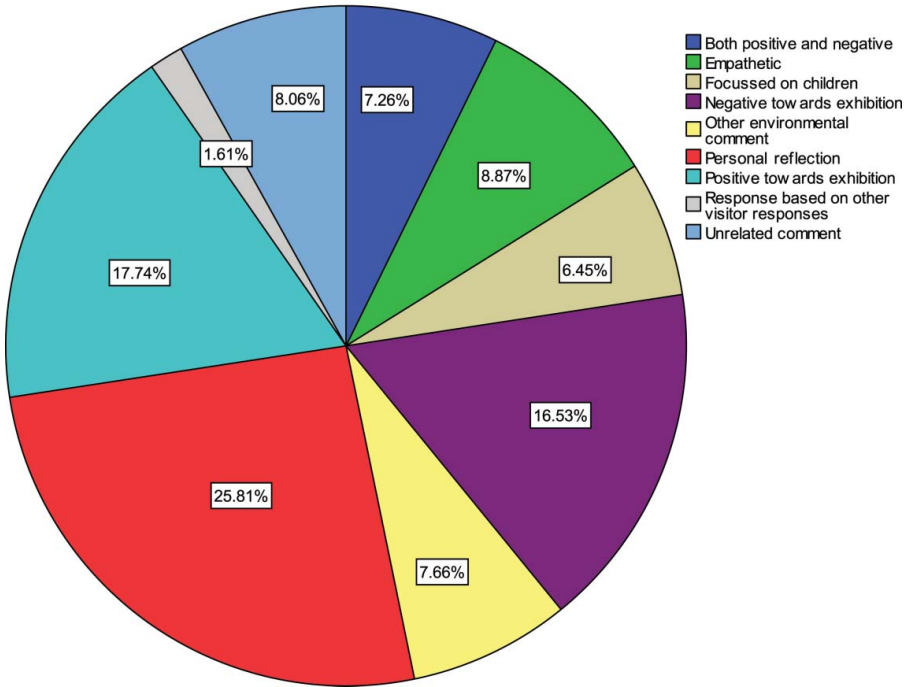


FIGURE 4 Proportional spread of comments across the 10 categories that were developed from initial text analysis. *N* = 227 (color figure available online).

For example:

I think it's very appropriate for the kids in this zoo. It's what's happening in our world—and you can't ignore it

Excellent and good that children can see the impact of the West and how lucky we are

Only adults appeared to respond directly to comments made by other visitors on the board and, in some cases, the dialogue between comments could be heated. The following example is a group of comments linked by arrows;

[T]his is supposed to be a zoo. Leave this to Amnesty International.

[Y]ou're obviously a selfish idiot.

Can't believe you think that. What a stunning and effective display. It certainly makes you think!

Which obviously you don't do. Half the images are complete and utter drivel. The world needs to stop being so concerned with matters that don't concern them!

Aside from this study, a small number of visitors wrote to local newspapers. For example:

Whilst innocently walking around the zoo one is presented with graphic images of death, decay, distress and nakedness. . . . I cannot understand why the zoo has chosen to place such horrific images in front of small children.

Quantitative Analysis—Visitor Observations

It is clear that more visitors engaged positively than negatively with the exhibition (Figure 5). In fact, the proportion of visitors between levels -3 to -1 was just 4.6%; at neutral response (0), 37.8%; and between levels 1 to 3, 57.6%. This was a significant finding ($H = 199.788$, $df = 2$, $p > .001$) and further testing revealed that there were significant differences between all permutations of these three groupings: Negative, Neutral and Positive (Negative and Neutral: $W = 66.00$, $z = -9.995$, $p < .001$; Neutral and Positive: $W = 4095.00$, $z = -13.578$, $p < .001$; Negative and Positive: $W = 66.00$, $z = -6.192$, $p < .001$). The median overall dwell time figure of 49 seconds was comparable to dwell times in a number of animal exhibits in the zoo; for example, the internal giraffe exhibit (median: 53 seconds).

The composition of the visitor groups had no significant bearing on either of our dependent measures: Dwell time ($H = 1.535$, $df = 2$, $p = .464$) and Engagement ($H = .947$, $df = 2$, $p = .623$). The same non-significant result was also found when visitors were segmented into those that approached the exhibition from different directions: Dwell time ($H = .003$, $df = 1$, $p = .957$) and Engagement ($H = .044$, $df = 1$, $p = .834$). However, the point at which visitors left the exhibition (i.e. 0%, 25%, 50%, 75%, 100%) along the length of the exhibition did have a significant impact on both dependent measures: Dwell time ($H = 73.395$, $df = 4$, $p < .001$) and Engagement ($H = 20.603$, $df = 4$, $p < .001$). This is probably explained by the fact that there appeared to be a relationship between Dwell time and Engagement—namely, visitor engagement increased with increased dwell time (Figure 6). Interestingly, it can be seen that median visitor dwell time for engagement levels -1 and $+1$ seem to be similar (48.50 and 57.0 respectively), indicating that a negative response to something took approximately the same amount of time to develop as a similarly rated positive response—in this particular case anyway. No visitors in the recorded sample fell into the -2 or -3 engagement levels.

DISCUSSION

Hard Rain ran for 12 months and we received a small number of letters of complaint from the public and also some correspondence praising the exhibition. We have to be cautious with this, however, as it has been reported that up to two-thirds of consumers do not report their dissatisfaction at all (Stephens & Gwinner, 1998) so we cannot be certain that formal complaints sent to the zoo are truly representative of wider feeling. Some initial concerns, regarding the suitability of the content for family audiences, were also expressed by zoo staff, illustrating that even within our own staff there was some confusion over the positioning of the zoo. The concerns were addressed by the sighting of the “warning” signs at each end of the banner. It is interesting to note that the most frequent reaction to the exhibition, recorded on the comments board, was one of reflection. Given that the zoo is commonly perceived as a family entertainment destination,

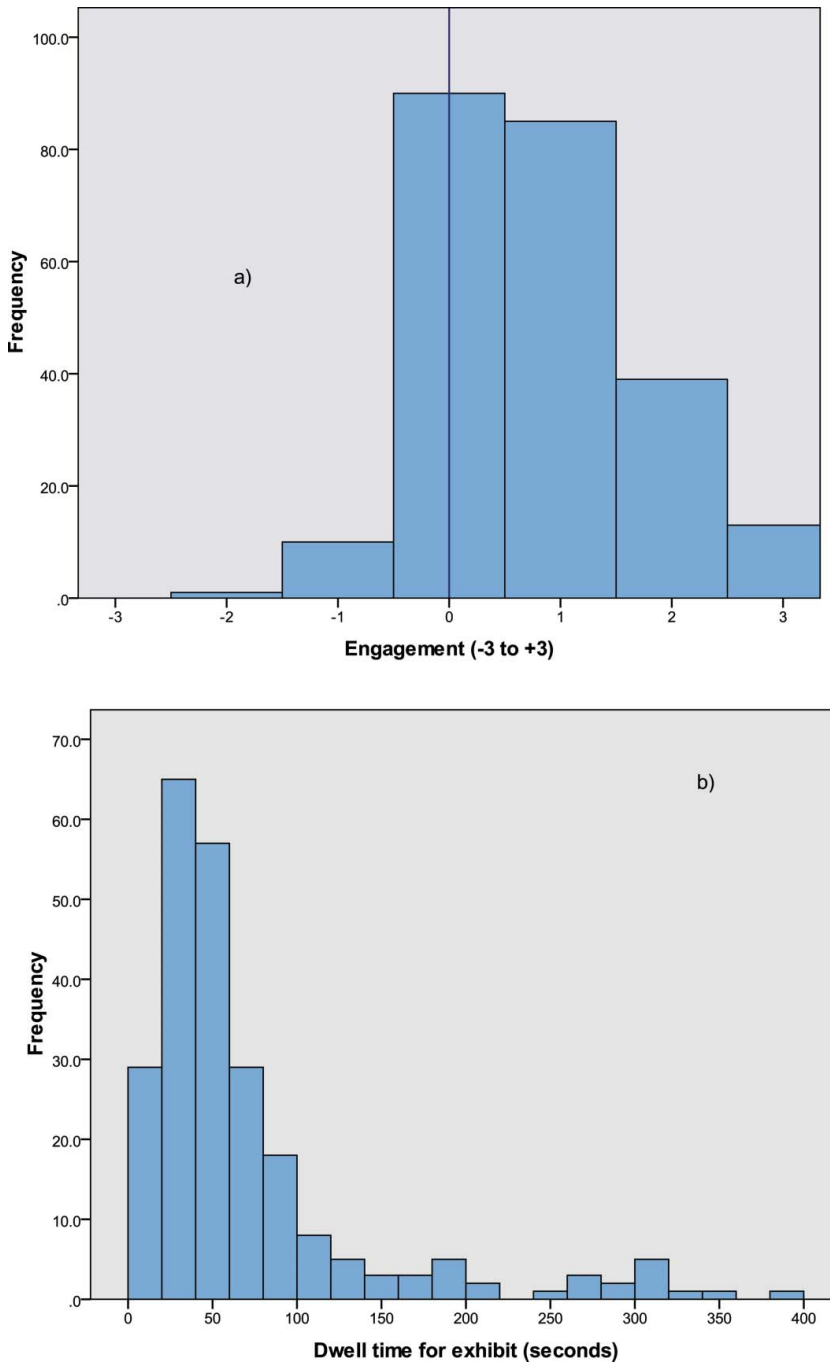


FIGURE 5 Exploratory distributions of the two dependent measures: (a) Engagement (-3 to +3), Mean = 0.8, Median = 1.0; (b) Dwell time for exhibition (seconds), Mean = 70.79, Median = 49. $n = 238$ (color figure available online).

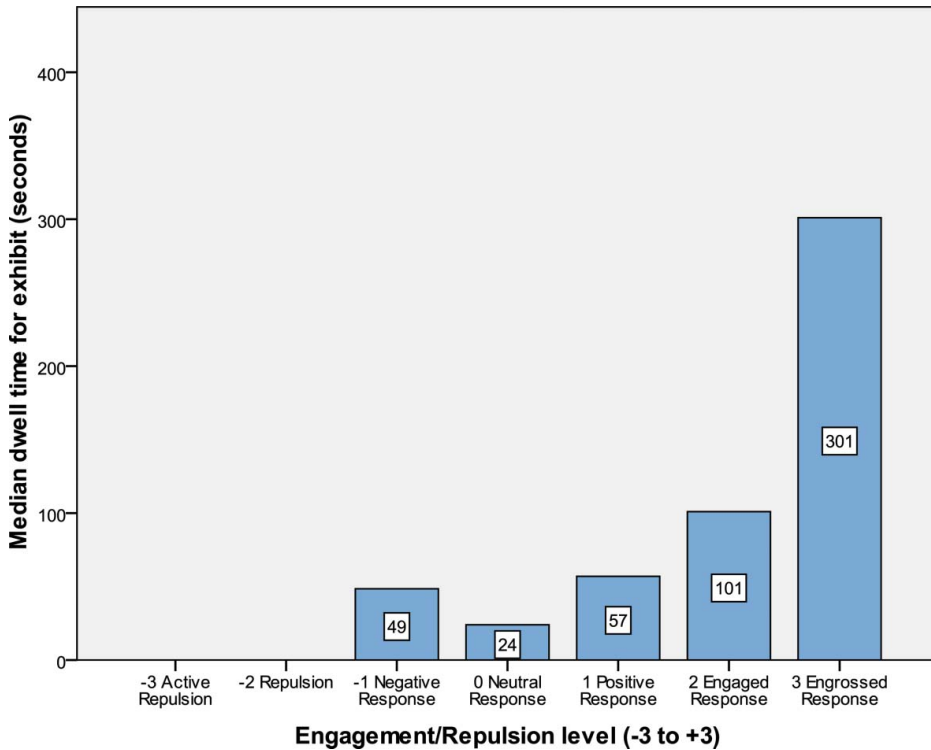


FIGURE 6 Relationship between the two dependent measures (median dwell time and engagement) (color figure available online).

bringing our zoo visitors to a point where they are prepared to ponder on such perplexing issues leads us to believe that it is possible for Chester Zoo and perhaps all zoos to deliver a challenging environmental education agenda. It may be that zoos have underestimated their own ability to stimulate this kind of critical thought with their primary audiences.

The segmentation between children and adults was a worthwhile exercise and shows that it is not always correct to label families as a single social identity (and, consequently, as a measurement unit) as there are variations in response even within the family unit. Perhaps surprising was the lack of any direct environmental concerns expressed by children, especially considering that the UK school curriculum does place great emphasis on global issues, such as climate change and pollution.

We had some reservations about using a comments board in the zoo. These were mainly concerned with monitoring to ensure individuals did not leave graffiti or obscene comments. Education staff reviewed postings on a regular basis and removed inappropriate material and for this reason, this proved to be a time-consuming research instrument. However, one of the positives was that visitors could and did challenge one another's opinions. As quoted previously, at times there were trails of comments with arrows pointing to other comments that visitors would either agree with or argue against. This was an unexpected, but satisfying, result as one of the reasons for having an unmanned comments board was to allow free and open opinions to be

expressed, without the usual weakness of interview bias and the potential “willingness to please” that sometimes affects more formal visitor contact.

The observational measure of visitor engagement with the exhibition was found to be significantly more positive than negative. Intriguingly it appeared to take visitors just as long to develop a negative response to the exhibition as a positive one—a finding which may be developed into a line of research in its own right. Purely observational data cannot give us insight into the thoughts of visitors when faced with a stimulus. Nor can it provide evidence of learning or other cognitive changes. However, what this approach can give us is a measure of the real-time visitor reaction, providing an insight into the immediate, visible response of visitors to the banner; something we felt would be crucial considering the emotive content of the exhibition. In fact, this is arguably not something that can really be measured by self-report at all. From a purely institutional point of view, observational data also give us a measure (overall dwell time) that we can use to compare with other zoo exhibits and exhibitions. That visitors spent the same amount of time at a static educational banner as inside the zoo’s giraffe exhibit is quite a startling finding, which gives at least some credence to the idea that zoos can utilize interpretive media that do not contain, or overtly link to, animals on display.

This leads us to believe that the zoo education agenda does not have to be exclusively related to the animals on exhibit or wildlife conservation. Hard Rain is primarily an exhibition about humans, and the effect they have on the environment and each other. Our conjecture is that stark environmental issues can be tackled in the zoo environment. Indeed, we feel that zoos have perhaps been too cautious with regard to the animal-centric educational themes that they have typically delivered. We have some limited evidence to support this. Namely that only a small minority of visitors who left a written response (either positive or negative) suggested that the zoo was an inappropriate venue to discuss broader environmental issues. Looking at the wider picture, there is a growing support for the idea that because almost all threats to wildlife are human-impact related, conservation as an academic discipline should essentially be seen as a social science (cf. Balmford & Cowling, 2006; Mascia et al. 2003; Schultz, 2011). Balmford and Cowling (2006, p. 692) put it succinctly by stating that “that conservation is primarily not about biology but about people and the choices they make.” From our perspective, this means that zoos are not only fully justified in delivering environmental education, but in fact, they *should* be delivering it as part of their drive to conserve the world’s biodiversity. The two are intrinsically interlinked—environmental and conservation education are both about people.

Even if we accept this, how, from an institutional perspective, should such holistic-style education be delivered? Lukasik (2010) argues that zoos are contested spaces and that their role in public pedagogy is not as clear cut as zoos would like to believe, stating that “the public space of the zoo is a constructed narrative, informed by the authoritative narrative of the institution, re-articulated through the experience of the participant” (Lukasik, 2010, p. 86). The staff response to Hard Rain illustrates that the zoo, in this case, can also be considered as contested space among its own staff. It is this “authoritative” voice of the zoo that could prove problematic.

More subtle than this, zoos have been shown to be capable of confusing the distinction between educational outputs and outcomes; that is, assuming that because they are delivering particular outputs, they are achieving the outcomes they desire (Moss & Esson, 2012). The guiding strategic document for zoos worldwide (WAZA, 2005, p. 35) claims that “zoos and aquariums enable people to develop appreciation, wonder, respect, understanding, care and concern about

nature”—but in reality there does not appear to be an accepted body of peer-reviewed evidence to verify this claim. Zoos can also be accused of using misleading language when describing the relationships between visitor knowledge, attitudes, and behaviors, often implying that by changing one (usually knowledge about the animals on exhibit), a change in attitudes and then behavior will then follow. For example, WAZA (2005, p. 35) again states: “Awareness can be converted into action with positive benefits for wildlife, people and conservation.” This is not necessarily the case as Schultz (2011, p. 1080) points out, “education does not typically result in increases in conservation behaviour.” Zoos would be well served in studying the failed deficit model in public science communication, whereby it was assumed that by redressing the deficit in public science knowledge, an improved public attitude and support for science would result; this was not the case (Miller, 2001). We argue that zoos might aspire to aim further than knowledge change, and to move beyond trying to solely redress the perceived knowledge “deficit” in their visitors. The Hard Rain exhibition consistently provoked comments that were emotional or attitudinal in nature. In terms of fulfilling both conservation and environmental education aspirations, zoos might also be better aiming to influence the way visitors “feel” about wildlife and the environment, in addition to what they “know.”

Zoos attract millions of visitors worldwide and with more than 1,000 affiliated members, WAZA zoos have the potential to influence vast numbers of people. Zoos have chosen to position themselves as champions of environmental education and this has consequences for the genre of teaching and learning that visitors are exposed to. In making the decision to stage this exhibition, we sought to test the levels of tolerance of our family visitors to this deliberate change in didactic education practice. We believe we were right to take this risk as it is in our interest and the interests of other zoos to be innovative, to move the education agenda from the safe, animal-centric education that visitors are expecting, to a more personally (for the visitor) challenging agenda. In accepting this moral obligation to teach about human impact on the environment, we may also mitigate against some of the criticisms leveled at zoos including those from the animal welfare movement. The next stage is for us to steer our zoo-based education practice toward environmental education, including a series of take-home messages that relate specifically to attitudinal and behavior change. This study has given us the confidence to progress this agenda as a strategic component of our education policy.

REFERENCES

- Ballantyne, R., Packer, J., Hughes, K., & Dierking, L. (2007). Conservation learning in wildlife tourism settings: Lessons from research in zoos and aquariums. *Environmental Education Research, 13*, 367–383.
- Balmford, A., & Cowling, R. M. (2006). Fusion or failure? The future of conservation biology. *Conservation Biology, 20*, 692–695.
- Balmford, A., Leader-Williams, N., Mace, G. M., Manica, A., Walter, O., West, C., & Zimmerman, A. (2007). Message received? Quantifying the impact of informal conservation education on adults visiting UK zoos. In A. Zimmermann, M. Hatchwell, L. Dickie, & C. West (Eds.), *Zoos in the 21st century: Catalysts for conservation?* (pp. 120–136). Cambridge, UK: Cambridge University Press.
- Baratay, E., & Hardouin-Fugier, E. (2004). *Zoo: A history of zoological gardens in the West*. London, UK: Reaktion Books.
- Beever, E. (2000). The roles of optimism in conservation biology. *Conservation Biology, 14*, 907–909.
- Born Free Foundation. (n.d.). *Zoo check: The welfare of animals in captivity*. Retrieved from <http://www.bornfree.org.uk/campaigns/zoo-check/>

- Born Free Foundation. (2011). *The EU Zoo Enquiry 2011*. Retrieved from <http://www.bornfree.org.uk/zooreports/summary>
- Conway, W. (2003). The role of zoos in the 21st century. *International Zoo Yearbook*, 38(1), 7–13.
- Dawson, E., & Jensen, E. (2011). Towards a “contextual turn” in visitor studies: Evaluating visitor segmentation and identity-related motivations. *Visitor Studies*, 14(2), 1–14.
- Department for Environment, Food and Rural Affairs (DEFRA). (2004). *The secretary of state’s standards of modern zoo practice. Chapter 7, Conservation and education measures*. Retrieved from <http://www.defra.gov.uk/wildlife-pets/zoos/documents/zoo-standards/chap7.pdf>
- Dierking, L., & Saunders, C. D. (2004). A guest editorial. *Curator*, 47, 233–236.
- Esson, M. (2011). The evolution of zoos as environmental education providers: The challenges of instilling behaviour change in visitors (Unpublished doctoral dissertation). Liverpool John Moores University, Liverpool, UK.
- European Union (EU). (1999). *Council directive 1999/22/EC: Relating to the keeping of wild animals in zoos*. Retrieved from <http://eur-lex.europa.eu/LexUriServ.do?uri=OJ:L:1999:094:0024:0026:EN:PDF>
- Falk, J. H., Heimlich, J. E., & Bronnenkant, K. (2008). Using identity-related visit motivations as a tool for understanding adult zoo and aquarium visitors meaning making. *Curator*, 51(1), 55–79.
- Falk, J. H., Moussouri, T., & Coulson, D. (1998). The effect of visitors’ agendas on museum learning. *Curator*, 41, 106–120.
- Falk, J. H., Reinhard, E. M., Vernon, C. L., Bronnenkant, K., Deans, N. L., & Heimlich, J. E. (2007). *Why zoos and aquariums matter: Assessing the impact of a visit to a zoo or aquarium*. Silver Spring, MD: American Association of Zoos & Aquariums.
- Gipoliti, S., & Carpaneto, G. M. (1997). Captive breeding, zoos, and good sense. *Conservation Biology*, 11, 806–807.
- Hard Rain. (2011). *The Hard Rain Project: Our headlong collision with nature*. Retrieved from <http://www.hardrainproject.com/index>
- Holst, B., & Dickie, L. A. (2007). How do national and international regulations and policies influence the role of zoos and aquariums in conservation. In A. Zimmermann, M. Hatchwell, L. Dickie, & C. West (Eds.), *Zoos in the 21st century: Catalysts for conservation?* (p. 22). Cambridge, UK: Cambridge University Press.
- Hyson, J. (2004). Education, entertainment, and institutional identity at the zoo. *Curator*, 47, 247–251.
- Kola-Olusanya, A. (2005). Free choice environmental education: Understanding where children learn outside of school. *Environmental Education Research*, 11, 297–307.
- Lukasik, J. (2010). Beyond these iron bars: An emergent (and writerly) inquiry into the public sphere. In J. Sandlin, B. Schultz & J. Burdick (Eds.), *Handbook of public pedagogy: Education and learning beyond schooling* (pp. 82–92). New York, NY: Routledge.
- Mallinson, J. J. C. (2003). A sustainable future for zoos and their role in wildlife conservation. *Human Dimensions of Wildlife*, 8(1), 59–63.
- Mascia, M. B., Brosius, J. P., Dobson, T. A., Forbes, B. C., Horowitz, L., McKean, M. A., & Turner, N. J. (2003). Conservation and the social sciences. *Conservation Biology*, 17, 649–650.
- Miller, B., Conway, W., Reading, R. P., Wemmer, C., Wildt, D., Kleiman, D., Hutchins, M. (2004). Evaluating the conservation mission of zoos, aquariums, botanical gardens, and natural history museums. *Conservation Biology*, 18(1), 86–93.
- Miller, S. (2001). Public understanding of science at the crossroads. *Public Understanding of Science*, 10(1), 115–120.
- Moss, A., & Esson, M. (2012). The educational claims of zoos: Where do we go from here? *Zoo Biology*, epub ahead of press. Retrieved from <http://onlinelibrary.wiley.com/doi/10.1002/zoo.21025/abstract>
- Packer, J. (2006). Learning for fun: The unique contribution of educational leisure experiences. *Curator*, 49, 329–343.
- Packer, J., & Ballantyne, R. (2002). Motivational factors and the visitor experience: A comparison of three sites. *Curator*, 45, 183–198.
- Patrick, P. G., Matthews, C. E., Ayers, D. F., & Tunnicliffe, S. D. (2007). Conservation and education: Prominent themes in zoo mission statements. *The Journal of Environmental Education*, 38(3), 53–60.
- Pedretti, E. (2002). T. Kuhn Meets T. Rex: Critical conversations and new directions in science centres and science museums. *Studies in Science Education*, 37(1), 1–41.
- Pekarik, A. J. (2004). Eye-to-eye with animals and ourselves. *Curator*, 47(3), 257–260.
- People for the Ethical Treatment of Animals Foundation (PETA). (n.d.). *Animals are not ours to use for entertainment*. Retrieved from <http://www.peta.org.uk/issues/animals-are-not-ours-to-use-for-entertainment/>

- Purrington, C. B. (2005). The conservation of evolution education in zoos. *Journal of the International Zoo Educators Association*, 41, 16–19.
- Rabb, G. B. (2004). The evolution of zoos from menageries to centers of conservation and caring. *Curator*, 47, 237–246.
- Randler, C., Baumgartner, S., Eisele, H., & Kienzle, W. (2007). Learning at workstations in the zoo: A controlled evaluation of cognitive and affective outcomes. *Visitor Studies*, 10, 205–216.
- Regan, J. (2004) *The manifesto for zoos*. Manchester, UK: John Regan Associates Ltd.
- Robinson, M. H. (1994). The new zoo and the old Adam. *Museum News*, January/February, 40–43.
- Royal Society for the Prevention of Cruelty to Animals (RSPCA). (2006). Evaluation of the effectiveness of zoos in meeting conservation and education objectives In *The welfare state: Measuring animal welfare in the UK 2006* (pp. 95–98). Horsham, UK: Author.
- Schultz, P. W. (2011). Conservation means behavior. *Conservation Biology*, 25, 1080–1083.
- The Scotsman. (2005). *Activists cold shoulder plans for more polar bears in zoo*. Retrieved from <http://www.scotsman.com/news/activists-cold-shoulder-plans-for-more-polar-bears-in-zoo-1-1058529>
- Sickler, J., & Fraser, J. (2009). Enjoyment in zoos. *Leisure Studies*, 28, 313–331.
- Slivovsky, K. (2004). Avoiding ecophobia: Redefining conservation messages for kids. *Journal of the International Zoo Educators Association*, 40, 28–30.
- Stephens, N., & Gwinner, K. P. (1998). Why don't some people complain? A cognitive-emotive process model of consumer complaint behavior. *Journal of the Academy of Marketing Science*, 26, 172–189.
- Swanagan, J. S. (2000). Factors influencing zoo visitors' conservation attitudes and behavior. *Journal of Environmental Education*, 31(4), 26–31.
- Turley, S. K. (2001). Children and the demand for recreational experiences: The case of zoos. *Leisure Studies*, 20(1), 1–18.
- United Nations. (2005). *Agenda 21*. United Nations Department of Economics and Social Affairs, Division for Sustainable Affairs website. Retrieved from http://www.un.org/esa/dsd/agenda21/res_agenda21_36.shtml
- World Association of Zoos and Aquariums (WAZA). (2005). *The World Zoo and Aquarium Conservation Strategy: Building a future for wildlife*. Berne, Switzerland: Author.
- Wolf, R. L., & Tymitz, B. L. (1981). Studying visitor perceptions of zoo environments: A naturalistic view. *International Zoo Yearbook*, 21(1), 49–53.
- Woods, B. (1998). Animals on display: Principles for interpreting captive wildlife. *Journal of Tourism Studies*, 9(1), 28–39.
- Yalowitz, S. (2002). Personality and motivation in visitor satisfaction. *Visitor Studies Today*, 5(1), 14–17.
- Zoo Licensing Act. (1981). Retrieved from <http://www.legislation.gov.uk/ukpga/1981/37>

APPENDIX A—Descriptions of Engagement Level Developed From Pilot Observations Before Study

<i>Level number</i>	<i>Level name</i>	<i>Definition and description</i>
–3	Active repulsion	Moving away rapidly in disgust. Stopping or not allowing children to see. Pulling children or group member/spouse away. Perhaps an obvious emotional response (e.g., crying)
–2	Repulsion	Very negative conversation (“disgusting” “disgraceful” etc., in relation to the exhibit being there) and/or behavior obvious. May only look at 1–2 photos before moving away. Conversation may continue afterward. Asks children/group member to move away.
–1	Negative response	Some negative comments and/or behavior (perhaps surprise at exhibit being in the zoo/not feeling it an appropriate setting/no warning). But perhaps a number of photos observed and actually stopped at. May actually laugh at exhibition. Possibly child-led parent/child interaction, but adult answers misleading and may deflect from true nature of exhibit
0	Neutral response	Lacking in response. Perhaps a purposeful walk (e.g., to aquarium) past exhibit with the odd glance toward it. Does not physically stop although may be actually looking at exhibition. If parent/child interaction, this will involve diverting and non-committal response from parent (discourse will be child-led)
1	Positive response	Continual movement along exhibit, perhaps with odd, brief stops. Interest mainly focused on exhibit but attention may wander off somewhere else (e.g., aquarium again). Does not look at all of exhibit and peels off before end. If parent-child interaction, this will be two-way and will mention the exhibit honestly.
2	Engaged response	Some stops and slow progress along exhibit. Concentration focused almost exclusively on exhibit. If conversation it will be exhibit focused and empathetic—parent child interaction can be led from either. Perhaps pointing things out to peers or photos taken. Aquarium may be missed and visitor doubles back.
3	Engrossed response	Generally silent, slow progress along exhibit, with prolonged stops. Groups/couples may split and take-in exhibit at own pace. If stop didn’t begin at the start, visitor may turn back and read opening panel before starting again. Often when visitor moves between photos, their eyes remain fixed on current photo whilst walking to next. Arms could be folded or behind back.