Investigating factors which affect visitor understanding of the information displayed on species signs: a multi-method evaluation approach

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Introduction
One of the key educational roles of modern zoos is to communicate important messages about the conservation of biodiversity and to engage with individuals and with society to elicit positive action for nature (Zimmermann et al, 2007). This case study presents an example of how the Isle of Wight Zoo in the UK has evaluated one type of interpretation: printed species information signs that use text to convey information about animals and the conservation issues that they face to zoo visitors.

Research questions
The zoo’s species signage had been in place for several years and replacement signage was planned. An evaluation investigating how effective the existing signs were in communicating information to visitors was carried out to inform the design of the new signage. The study was later repeated to evaluate the impact of the new signs. The study aimed to answer two research questions:

Do visitors understand the information on the species signs? What factors affect visitor understanding of the information displayed on the species signs?

A multi-method approach
Data was collected in three ways: in-depth interviews with visitors to probe their understanding of the information and to collect their opinions about the layout and content of the signs; direct observations of visitor interactions with the signs to find out if those visitors actually stop to read them; and a documentary analysis of the text in the signs to find out how easy or difficult they are to read.

Method: Documentary analysis
The signs were analysed for legibility and for readability. Legibility is generally accepted to be measurable by the speed and the distance at which text can be read (Webster and Tinker, 1935). Elements that have been shown to influence legibility are font size, type face, and colour of text and background (Webster and Tinker, 1935), (Serrell, 1996), (Moriarty and Scheiner 1984), (de Lange, Esterhuizen and Beatty 1993). These were assessed qualitatively and visitors were questioned about the legibility of the signs.

A quantitative readability assessment of the signs’ text was carried out using the Flesch-Kincaid Grade Level Readability Formula. This method is included as an automated option in Microsoft Word. The validity of the scores was checked by testing three randomly-selected samples of text using another commonly-used readability testing method: the Fry Graph Readability Formula (Fry 1977, cited in Harrison 1980).

A qualitative analysis of sentence structure was undertaken in order to gain a clearer picture of syntactic complexity that might not be apparent from the readability tests. A word count of each sign was also made. The text was analysed for specialist vocabulary relating to the biology or ecology of the animals and for the presence or absence of definitions or explanations for those terms identified.

Direct structured observations
To find out the proportion of visitors that read the signs, how long they read them for and whether or not they discuss the content with others in their group, direct structured observations were carried out from a discrete distance. Observations were carried out in blocks of one hour and were timed so as to avoid coinciding with public presentations such as feeding times.

Visitor interviews
Randomly-selected participants (n=10) were each asked questions about the content and design of the species information signs. Participants were encouraged to expand on their answers and to make additional comments in order for the researcher to gain maximum insight. Interviews were audio-recorded, leaving the tape running for a short period after wards in case the participant made
any additional relevant spontaneous comments. Once all the interviews had been transcribed they were read and re-read to allow themes to emerge from the data using a content analysis approach (Dawson 2009). Sample size was small because each interview yielded much data and time available for analysis was limited.

**Results**

The mean number of words on the signs was 411. Depending on reading speed, this quantity of text would take between 75 and 120 seconds to read in full (Rayner, Slattery and Bélanger, 2010). Documentary analysis and interview comments indicated that legibility was good. The results using the Flesch-Kincaid Grade Level Readability Formula ranged from reading age 9.0 to reading age 14.2. Most of the information in the signs was written in sentences. Sixteen specialist terms were present with the meaning defined. Seventeen specialist words were not defined. During the interviews it became apparent that the terms used to describe conservation status in the original signs were not understood in the context in which they were being used.

None of the signs in the study sample were totally ignored. However, for every sign except one (the sign for the leucistic tiger) the number of non-readers exceeded the number of readers. Overall, 69% of visitors (n=386) who entered the reading zone for a sign did not read it. Of the 31% (n=175) who did read it, about half discussed some aspect of the content of the sign with others in their group (see Figure2 left). The interviews revealed that the most commonly read section was that relating to individual animals (e.g. name, origin).

**Do visitors understand the information?**

Ten comments related positively to the acquisition of new knowledge and five comments identified that the headings and bullet points helped them to locate the information they wanted. Many positive comments were made about the suitability of information for children. Participant opinion and understanding about the information in the ‘Key Facts’ section was mixed. One mother thought that it was well laid out and enabled her to quickly and easily answer her children's questions. This was not a universal view though. Almost half the participants had either ignored or not even noticed that section. Every participant found the information about conservation status poorly explained. These symbols, terms and abbreviations were not understood by any of the participants.

**Discussion**

What factors affect visitor understanding of the information displayed on the species signs?

**Quantity of text:** More than two thirds did not read the signs. The mean number of words is approximately 400, considerably higher than the 75 suggested by Bitgood.
(1991) as being the upper limit for maximising the likelihood that they will be read.

Position of sign: The species signs in this study were located on the safety barrier directly in front of the exhibit (see figure 4) and often obscured by people standing directly in front of them.

Legibility: The participants interviewed all commented that the font and type were easy to read.

Readability: The readability assessments indicate that all except one of the signs are written at a level that could be read by children from nine to twelve years of age.

Do visitors understand the information on the species signs? When asked about the information presented on a sign most participants initially located facts about the biology of the animals and read them directly from the sign. Further questioning probed their understanding of what they had read and most participants expanded their explanations using their own words and referring back to the sign to support their comments. The information about the biology and ecology was considered by the participants to be clear and well explained. However none of them were able to understand the IUCN conservation terminology and classification data used on the signs. Although they understood that categories such as vulnerable or endangered mean that a species is threatened they were unsure about how these categories relate to each other or to how serious.

Applying Findings

Well-designed species information signs can be useful tools for communicating messages to zoo visitors, they are available throughout, however, to be effective they rely on people making a personal choice to read them. This study also found that the vocabulary used to explain conservation information on the old-style signs was not understood. Addressing this was a priority when designing the new interpretation. The study findings have been utilised in the development of new species signage that has now been installed at the zoo. This is illustrated in Figure 5 below.

Visitor interviews tell us that they find the new signs attractive. For example one visitor commented, “Good layout. Eye-catching. You want to go and read them.” Unfortunately this opinion was not supported by direct observation data. The new signs appear to have poorer attracting and holding power than those they replace (see figure 6).

Figure 6. Pie chart showing sign-reading behaviour for the new signs. (83% did not read; 10% read by self; 7% read and discussed with others)

Figure 5 (below) - example of new sign design
This may possibly be explained by the fact that the new species signs do not include any biographical information about individual animals. ‘Who Lives Here?’ signs are displayed separately. Therefore time spent reading the new species information signs concentrates on biological and conservation information, whereas people who read the old-style signs spent a proportion of that time finding out the animals’ names and their personal history. It is somewhat disappointing that even though the signs were designed to maximise attracting power 83% did not read them at the time. However this result does correspond with the reading behaviour of visitors in Chester Zoo so perhaps we should not be too down hearted (Esson and Moss, 2015). Interestingly, several visitors were observed using smartphones to photograph the signs, so it is possible that they may refer to the information later.

Pleasingly, interviews revealed that conservation information on the new signs was better understood. A simple ‘traffic light’ symbol was chosen to illustrate the degree of threat to each species. Readers who desire more detailed information are referred to the zoo’s website, where the IUCN system is explained. In addition to the traffic light, each sign includes a ‘Without me’ section, which explains one reason why this species is of value. This was prompted by Aichi Biodiversity Target 1 which aspires for people to be aware of the value of biodiversity. Comments from visitors included: “Traffic lights help you see how seriously they are threatened.”; “The conservation stands out because of the ‘without me’.” and “Found out about the conservation - you can’t always find that out from wildlife programmes.” The zoo also received an unsolicited email from a visitor whose comments included “…the information boards outside the enclosures are the best I’ve seen from any zoo…… whoever wrote them should get an award”.

**Conclusion**

Well-designed zoo interpretation can stimulate wonder and the desire to know more, developing people’s ideas and attitudes in a positive way and enriching their understanding of the natural world. Conversely interpretation that fails to engage the visitor, or which presents information in a way that is too difficult to understand, may mean the opportunity to communicate important messages is irretrievably lost. Of course written signs are just one element in the zoo educator’s toolbox. Good zoos will use a selection of approaches to integrate information into their exhibits in many different formats, including immersive exhibits, written signs, keeper presentations and interactive displays. However evaluating our interpretation is essential - otherwise how will we know if it is effective in communicating our message?

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**Reference List**


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