

# **Case Study:** **Evaluation of an Exhibit Design** *Horse Tales—An Evolutionary Odyssey*

Margaret Marino  
New Mexico Museum of Natural History  
Albuquerque, New Mexico

## **Introduction**

A museum sometimes finds itself faced with a project that is a wonderful opportunity, but which imposes funding and time limitations that extend human resources to the limit. This was certainly the case when the New Mexico Museum of Natural History was approached by the Hubbard Museum to develop a permanent exhibition on the history, biomechanics and importance of the horse in the southwest for the opening of the new Anne C. Stradling Museum of the Horse in Ruidoso, New Mexico. The Museum staff was inspired by the subject matter and excited by the opportunity to develop the exhibit completely in-house, premiering it in the New Mexico Museum of Natural History before it was moved to the new museum.

The final exhibit is very elegant in appearance and truly remarkable in many ways. The main components of the exhibit are three video presentation areas, objects consisting of a number of paintings, fossil remains, and horse paraphernalia, and two mechanical interactives which describe the strength and speed of horses. With the exhibit installed, it was decided that an extensive summative evaluation process should begin—initially to identify any problem areas prior to the exhibit moving to its permanent location and, finally, to inform staff of the success or failure of individual components and gain insights so that future projects would benefit.

## **Preliminary Research**

Evaluation was conducted in two parts. Preliminary work identified minor amendments to the basic design and a final, more comprehensive study observed general visitor behavior and searched for conceptual flaws. The earlier study focused on the following questions:

- What components within the exhibit are people attending to?  
What is the educational value of each component?  
Why are some elements less successful and how can they be improved?

Both quantitative and qualitative methods were used. Data were assigned numeric values whenever possible, but comments from visitors and observations were also recorded and used to interpret the numeric data. Initial information gathered through a simple attendance tally established a "success" rating by recording the number of people spending time in each area (Screven, 1990). Length of time was not established through individual timed observations, but inferred by setting observation periods at five-minute intervals. When groups were in attendance, the construction of each group was noted and interactivity within the group recorded. This information was collected for each individual component of the exhibition. (Taylor, 1991).

This information was augmented by an Exhibit Evaluation Response Scale administered to nine members of the Museum's education department. While in-house staff cannot be totally objective, a critical appraisal by experts can help to identify problem areas that need attention (Screven, 1990). The data gathered in this way established a professional opinion for comparison with observational data. If the two sets of data differed greatly, anomalies would be noted. This was not the case. Overall, the education department rated components slightly higher than attendance information indicated, but this difference was only minor. Having completed both studies, it became clear that the areas most in need of individualized evaluation were two interactives illustrating horse biomechanics.

It has been established that interactives require extensive formative evaluation so that any visitor misconceptions are cleared up before construction begins. No formative data were available for these two interactives. At first glance, they appeared to be a positive addition to the exhibition because they were visually attractive and elegantly crafted. The topic of biomechanics has relevancy to a specialized group of visitors—mainly those who breed horses or have frequent contact with them—of which there are many in New Mexico. Therefore, it came as a surprise to some staff members that the interactives did not appear to have any drawing power. Additionally, the small percentage of individuals who were attracted to these displays seemed to encounter great difficulty in understanding the underlying concepts.

Individually-directed and controlled interviews were conducted with only one of the interactives—one devoted to a discussion of power and strength. The interactive makes a comparison between the leg of a horse and a badger—a burrowing animal. The two different leg structures are then compared to simple levers. The handles for each of the legs are attached to springs which make the horse leg much more difficult to move. The point

of this is to illustrate that the horse's leg has less power than a burrowing animal by virtue of its shape and structure.

Interviews were frequently conducted with family groups. At first, visitors were tested to see if they could distinguish between the horse and badger leg as the badger leg was greatly enlarged. This alone did not seem to be a problem, but visitors seemed to have perceptual problems comparing a horse to this very different type of animal. On the basis of size alone, it did not make sense to them that a badger, a much smaller animal, would be more powerful than a horse. Although the text described the difference between each animal in detail, visitors could be observed manipulating the interactive before any text was read. The conclusion is that the concept of power is counter-intuitive and difficult to convey using an interactive that is text-dependent. Because the horse leg is more difficult to move, visitors erroneously concluded that a horse is more powerful than a badger.

Interestingly enough, when visitors were asked if the interactives added to their understanding of the exhibit, they unanimously said yes. Even parents who seemed to understand mechanical principles and still had difficulty using the interactives to describe those principles to their children also answered this question in the affirmative. Visitors are sometimes unwilling to admit to any confusion, even when reassured that any failure to understand is not their error (Nichols, 1990). It was clear that visitors appreciated having something to manipulate in the exhibit, and their ability to understand the function was irrelevant to them. A final question attempted to ascertain why so few people approached the interactives in the first place. Three possible reasons raised by the data concern the apparent lack of other touching opportunities in the exhibit, the similarity of the interactives to other aspects of the exhibit that could not be touched, and the adult nature of the concepts illustrated.

## A Comprehensive Approach

A final and more comprehensive evaluation was as much a test of the validity of various evaluation methods as it was a survey of information about individual exhibit components. For example, the earlier timed and observational studies showed that text panels were extensively read by visitors. Adverse comments suggested that the text may have been a little long, and that lighting levels made reading somewhat difficult. But was there actual learning taking place? In-depth interviews attempted to answer that question.

By this time, the Museum had received data from a major marketing survey conducted by the Business Information Group. This information was used to some extent for interpretation purposes. This survey indicated, not surprisingly, that visitors to the Museum were more affluent and educated than the community at large (Jacobs, 1991). It also showed that, in

comparison with other attractions in the Museum, *Horse Tales* rated fairly low.

In an effort to better understand visitor dynamics, observations of visitor behavior were conducted with the use of a pre-printed observation form (Appendix A). Specific information regarding the use of videophones, group dynamics, text panels and object interaction was noted.

### Video

Of the two video programs in the main gallery of the exhibit, visitors were slightly more interested in the video of interviews with people describing their experiences with horses. This may have as much to do with the atmosphere surrounding the video as with the video itself. A number of saddles mounted on stands allowed visitors a choice of ways to watch the video – sitting in the saddles, resting on benches or standing at the back of a theater-like area. The video showed five sequential presentations (see Table 1 below). Visitors were recorded coming into and leaving the area through the use of a bar chart and a column chart included here as Appendix B.

**Table 1**

#### **A Description of the Video Presentations**

<u>Title of Video</u>	<u>Description</u>
The Farrier	Discussion of farrier techniques with a man who apprenticed with a farrier.
The Jockey	Interview with three jockeys about the biggest mistakes they ever made as jockeys.
The Indian Cowboy	Native American tells the story of when a horse threw him in the middle of the desert.
The Olympic Rider	Discusses what Olympic judges look for when scoring Olympic horses and riders.
The Mounted Policeman	An interview with mounted policemen in Old Town Albuquerque.

Between family groups and individuals who viewed the video, the following findings were made. Visitors who entered the area at the introduction of the interview series were much more likely to stay to the end. If one member of a family group left the video, remaining members of the group left—either together or one by one over a short period of time. The story told by the Indian cowboy was one segment that intrigued visitors enough to make them enter the area, but this was also the segment which had the least holding power—so there was much more entering and leaving

during that period of the presentation. Acoustical problems combined with the storyteller's difficult accent made visitors impatient.

Confusion about the length of the entire presentation contributed to visitors' uncertainty about how much time to devote to this area. If they had been given a choice about which segments they could view or were made more aware of the length of the entire presentation, visitor attention might have increased and peer pressure might have taken a diminished role in the choices they made. While time and financial restrictions prevented such a sophisticated system from being used in this project, this possibility should be considered for future video projects or for enhancing this exhibit when funding can be obtained. Children were especially fascinated by the mounted policeman video. The policeman is an image that is immediately recognizable and one which they understand. Bringing prior knowledge to an activity may enhance informal learning.

Observations of visitors who used the saddles revealed a wide range of behaviors. Children seemed to spend more time seating themselves in the saddles than watching the video. During the movement of children around the saddles, most adults took this time to either watch the video without interruption or read text panels adjacent to the video. Occasionally small family groups would share a single saddle so that other children would have a chance to sit on them. Senior citizens in groups had no difficulty using the saddles to watch the video, but seniors who were alone, particularly women, were shy around the saddles and preferred the benches. Men together had no problem jumping on the saddles but always left abruptly when others not in their group joined them.

An ideal situation was observed when a young mother helped each of her three children into the different saddles and explained the individual parts of the saddles—reins, stirrups—to each child. Eventually her children settled down and they watched the videos together, discussing each of the characters. Additional interpretation in this area may facilitate this type of activity with other parents who are not as comfortable with their knowledge of different saddle parts. A hand-out or clipboard device with diagrams of the different saddles might be a desirable alternative to more text panels. One drawback to the saddle seating arrangement is that wheelchair-bound visitors were observed having difficulty positioning themselves in front of the presentation. Most often they were forced to one side of the viewing area, where their oblique view of the video was not ideal.

The unorthodox seating arrangement made the video more accessible to a diverse audience. A second video about different horse breeds was showing at the same time and used a standard bench area for seating. Although this other video was also popular with audiences, the saddle seating in the first video improved attentiveness and provided many different options to visitors. Instead of being left to passively view the video, visitors participated in many different activities.

## Objects

The many different objects in this exhibition can be broken down into three categories: (1) paintings, (2) fossils, and (3) horse paraphernalia. The paintings were original work and mural-sized reproductions by the artist Charles M. Russell. Individuals who looked at the paintings were likely to view all of them. The average time visitors spent with all of the paintings was five minutes. Although there was introductory and individual text with the paintings, less than half of those observed took the time to read it. The text in this area explained that the artist's renderings were so accurate that they are still used today to identify different breeds of horses. Therefore the text provided an important link between the fine art and scientific information conveyed elsewhere in the exhibit. That visitors appear to be unaccustomed to reading background information where fine art is displayed raises an interesting challenge regarding the use of fine artworks within a scientific setting.

Horse paraphernalia consists of a panel of different horseshoes, a wall of bridles and a collection of saddles. The horseshoes provided a "touch" experience, but more adults than children accessed this panel as it was hung high on the wall. The bridles were hung on plexiglass horse "heads" along one wall at a height and distance that were also difficult for visitors to reach. Little discussion at this display was heard, and only one-fourth of the visitors were observed reading the labels. The intricate nature of the bridles may require a different type of interpretation so that their delicate details and individualized function can be appreciated and still protected from damage.

The display of saddles varied during the course of the exhibition. Originally the saddles were displayed with no covering, and with text panels placed low at the base. Eventually these saddles were covered with plexiglass and the text was raised by means of a metal bracket. The placement of exhibit labels plays a critical role in the communication process between exhibition design team and visitors (Bitgood, Benefield, & Patterson, 1990). Observation revealed a marked improvement in reading after the text panels were raised to a more comfortable height. Time spent with the saddles decreased somewhat after the placement of the plexiglass covers, but average viewing time for each saddle was about one minute—ample time to review the text and remark on the unique features of each saddle. The saddles that provided seating at the area in front of Video II were a helpful addition to those who needed a more tactile experience. Some visitors were observed walking back and forth between the two areas. However, those visitors most interested in the display area may have also been frustrated by the lack of interpretation in the seating area.

## Interactives

While the earlier study focused on the mechanical exhibit devoted to the concept of power, the later study moved to the speed mechanical. This interactive again shows two leg models—one of a badger and another of a

horse. Again the text described the badger and why it was being used as the basis for comparison. The legs were mounted over distance charts to show how the horse could cover greater distance with one movement. Again, it was observed that few individuals read the text prior to performing the activity. Finally, an adult with four small children pointed out what now appears obvious. It is almost impossible for children to manipulate the handle and see the movement of the legs simultaneously. Subsequent observation confirmed this drawback. Older children and adults had no difficulty moving the handle, but the movement was too awkward to give them a comfortable view of the activity. The length of time the interactive was used increased when groups were present because one person could move the handle while others watched.

The combination of text dependency and physical awkwardness adversely affected the visitor's attention to the activity. Both of these difficulties could have been overcome through formative evaluation and testing.

### Text

The design of the panels in this exhibit simplified evaluation of their effectiveness. The text for each panel was clearly divided into primary, secondary and tertiary levels. Primary text was printed in large letters above, secondary text in smaller print to the left and tertiary text was isolated and separated from other text by placing it to the right. This layout was followed consistently for each panel. By watching the direction of the visitor's head as he read, one could gain some insight as to the depth of reading.

Timed studies showed that visitors spent an average of 44 seconds at one text panel. This is an extraordinary length of time for a visitor to stand and read. The text panels contain an extensive amount of information, yet visitors were not put off by these individual components of the exhibit. However, by tracking visitors through the exhibit one could easily see that very few visitors would read every panel so thoroughly. This seemed to have more to do with the quantity of text than its placement or layout. Visitors may have been selecting which panels to read thoroughly based on their previous knowledge or interest in the topic.

So that the Museum could learn more about visitors to *Horse Tales* and arrive at a better idea of visitor comprehension of what they read, personal interviews were conducted with visitors leaving the exhibit with the use of a questionnaire (Appendix C). Some general questions revealed that the primary motivation for a visit to the museum was entertainment. Only 20% were interested in gaining factual knowledge, which was similar to the museum audience in general as revealed by the Business Information Group Study (Jacobs, 1991). Half of those interviewed came to the Museum specifically to see the *Horse Tales* exhibit and many of those visitors

considered themselves either knowledgeable or expert in their understanding of horses.

The questionnaire ended with a series of statements requiring a simple "yes" or "no" in an attempt to find out how much of the text was understood and remembered. Two of the statements on the form were written to be intentionally erroneous. The erroneous statements did not appear anywhere in the exhibit and received a low rating of awareness, which may indicate that the test is valid to some extent. Visitors were asked to listen to the statement and answer "yes" if they remembered reading/seeing that information in the exhibit and "no" if they had no awareness of reading/seeing it. Each fact was divided into one of the three categories: primary, secondary or tertiary text, according to where it appeared on the panel. Over 80% of visitors interviewed remembered reading the primary text. An exception to this statement can be noted with regard to one fact that appeared in the credit panel. Even though the text was prominently displayed on this particular panel, only 13 percent of the visitors were aware of it.

The secondary text from the panel dealing with horse evolution fared very well with 76% of the visitors interviewed indicating awareness of having viewed them. A panel concerning the reintroduction of the horse into western North America rated very low with only 27% of the visitors indicating awareness. This piece of information was located very low on a panel, and the panel was at the end of the display, which may have contributed to visitor fatigue. There may have also been some competition from the audio of the nearby video area.

Facts located in tertiary text were still conveyed to as many as 87% of the visitors. The lowest percentage of people to indicate ignorance of a fact was 47%. It is important to note that visitors' previous knowledge could have increased their ability to answer questions correctly, regardless of their having actually read the labels. This circumstance casts some doubt on the validity of this test. However, the facts chosen for the true/false questions were chosen because they were more obscure. Overall, this test appears to offer some confirmation of the earlier finding that text panels are effective in conveying detailed information.

## Conclusions

This summative evaluation was conducted by an in-house evaluator for the purpose of improving the development and design of exhibits. The preliminary study used three evaluation strategies so that a "quick and dirty" report could be supplied to exhibit staff and immediate concerns could be addressed. This preliminary study was completed using attendance tallies, an Exhibit Evaluation Response Scale which was completed by education staff, and visitor interviews that focused on the least successful aspect of the exhibit.

A more comprehensive study also used a three-fold process. First, observations were made using a pre-printed form for consistency and direction; second, the most successful video area was observed and data carefully tallied to explore some of the ways this area functioned well; third, exit interviews were conducted using a pre-printed form to gain understanding of the audience attracted to the exhibit and to further test visitors' memory and comprehension of text.

Extensive data were collected, and they are discussed in part here. Based on these data, a list of questions for discussion was prepared. Examples of these questions are:

1. Would the exhibit have been improved by a clearly defined sequential order? (Kulik, 1989). Could the text on biomechanics be placed within closer proximity to the interactives as an aid to understanding the concepts?
2. Would acoustical improvements and directional sound equipment improve comfort levels without changing group dynamics?
3. Should the educational text accompanying interactive models be lowered and the concepts simplified so that more children are encouraged to use them? Could the concepts be explained without the use of text?
4. Should interactive models be separated from those areas where touching is prohibited?
5. Are mechanicals the best device to illustrate biomechanical principles? Perhaps an animated sequence operated by the visitor would better illustrate the concepts of power and speed.

These questions were designed to provoke discussion and aid in decision-making and are not intended to dictate specific action (Munley, 1987). Some improvements to the exhibit were and are being made from this report and other information will be used to improve future exhibit projects.

*Horse Tales: An Evolutionary Odyssey* is currently installed at the new Museum of the Horse in Ruidoso, New Mexico as part of its permanent exhibition. The Ruidoso location is expansive, allowing for greater flexibility of design than was possible during its run at the New Mexico Museum of Natural History. The area for interactives can be more clearly delineated, avoiding visitor confusion regarding touch and no-touch exhibits. In addition, an audience motivated to learn more about horses will set a positive pattern of visitor interaction. Only a portion of the information obtained through this study is applicable to the new location.

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## References

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Horse Tales Evaluation--Phase II--Observation Form--Gallery I--Date \_\_\_\_\_

Totals	_____ Adult	_____ Teenager	_____ Child	//	_____ Male	_____ Female
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**Video I** How many? \_\_\_\_\_ Adult \_\_\_\_\_ Teenager \_\_\_\_\_ Child // \_\_\_\_\_ Male \_\_\_\_\_ Female  
 \_\_\_\_\_ Used earphones \_\_\_\_\_ Did not use earphones  
 \_\_\_\_\_ Stayed until the end of the presentation  
 \_\_\_\_\_ Discussed the video w/ friends or family

Would you describe this group as: (Note number in the spaces below)  
 \_\_\_\_\_ Non-attentive \_\_\_\_\_ Passively interested \_\_\_\_\_ Very interested

**Video II** How many? \_\_\_\_\_ Adult \_\_\_\_\_ Teenager \_\_\_\_\_ Child // \_\_\_\_\_ Male \_\_\_\_\_ Female  
 \_\_\_\_\_ Standing \_\_\_\_\_ Sitting on bench \_\_\_\_\_ Sitting on saddles \_\_\_\_\_  
 Use addendum sheets to note when visitors began and ended their viewing of Video II

**Large Text Panels** How many? \_\_\_\_\_ Adult \_\_\_\_\_ Teenager \_\_\_\_\_ Child // \_\_\_\_\_ Male \_\_\_\_\_ Female  
 \_\_\_\_\_ Glanced \_\_\_\_\_ Read \_\_\_\_\_ Studied \_\_\_\_\_ Read to left of panel \_\_\_\_\_ Read to right of panel  
 How long did one visitor spend at the panel total? \_\_\_\_\_ (Use the most dedicated visitor for time)

**Paintings and Murals** How many? \_\_\_\_\_ Adult \_\_\_\_\_ Teenager \_\_\_\_\_ Child // \_\_\_\_\_ Male \_\_\_\_\_ Female  
 \_\_\_\_\_ Read introduction \_\_\_\_\_ Looked only at paintings and murals \_\_\_\_\_ Looked at paintings and read small text  
 How many paintings/murals did they look at? \_\_\_\_\_  
 How long did one visitor spend in this area of the exhibit? \_\_\_\_\_ (Use most dedicated visitor from group)

**Saddles** How many? \_\_\_\_\_ Adult \_\_\_\_\_ Teenager \_\_\_\_\_ Child // \_\_\_\_\_ Male \_\_\_\_\_ Female  
 \_\_\_\_\_ Looked at saddles only \_\_\_\_\_ Looked at saddles and read text? \_\_\_\_\_ Glanced at both, but did not study  
 How long did one visitor spend in this area of the exhibit? \_\_\_\_\_ (Use most dedicated visitor from group)

**Speed Mechanical** Observe the behavior of one visitor. Note the following: Does the visitor read? Touch? Manipulate? Do they touch or read first? How long do they spend with this exhibit?

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Bridles** How many? \_\_\_\_\_ Adult \_\_\_\_\_ Teenager \_\_\_\_\_ Child // \_\_\_\_\_ Male \_\_\_\_\_ Female  
 \_\_\_\_\_ Streakers \_\_\_\_\_ Strollers \_\_\_\_\_ Studiers Is there discussion? \_\_\_\_\_ Yes \_\_\_\_\_ No

Notes: \_\_\_\_\_  
 \_\_\_\_\_

General Notes on observation period: \_\_\_\_\_ Day of Week \_\_\_\_\_ Time of Day

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**APPENDIX A**



**Horse Tales: Visitor Survey (Phase II)**

**Will you participate?** Yes No

Reason: \_\_\_\_\_

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**1. Are you visiting the Museum today from:**

- The Albuquerque area Elsewhere in New Mexico
- Out of State Out of the country

**2. Are you visiting the Museum today:**

- Alone With a spouse or partner With friends
- With a child under 16 With a child over 16 With a tour

**3. Why did you come to the museum today?**

- To gain factual knowledge for myself To share information with a child/guest
- As entertainment To pass the time Other \_\_\_\_\_

**4. Did you come here today specifically to see Horse Tales?**

- Yes No

**5. How would you rate your understanding of horses?**

- Expert Knowedgable Amateur Interested Not interested

**6. Which video interested you the most?**

- Horse Breeding (I) Interviews (II) Behavior (III)

**7. Were you interested in the power mechanical?**

- No A Little Very Interested No Opinion

Comments: \_\_\_\_\_

**8. Were you interested in the speed mechanical?**

- No A Little Very Interested No Opinion

Comments: \_\_\_\_\_

**9. There are three kinds of objects in this exhibit: horse paraphenalia (saddles, bits and shoes), paintings by Charles Russell and fossil evidence of horses. Which interested you the most?** \_\_\_\_\_

- Horse paraphenalia Paintings Fossil

**10. The most important theme in this exhibit is the evolution of horses through time. Of the following information, which do you remember seeing or reading about in the exhibit?**

- Yes     No    The earliest horse was called a Hyracotherium. It was no more than two feet long from head to tail.
- Yes     No    The plants that grew in New Mexico at different times were important to the evolution of the horse.
- Yes     No    Three breeds developed from the thoroughbred horse were the Saddle Horse, the Morgan and the Quarterhorse.
- Yes     No    The sport of polo originated in England.
- Yes     No    The horse culture of the Plains Indians actually originated with the Pueblo Indians in the 1600's.
- Yes     No    Native North American horses became extinct 10,000 years before Spanish exploration.
- Yes     No    The legs of horses are very fast but are not very powerful.
- Yes     No    Modern horses are only 2 million years old.
- Yes     No    A Hoof is actually a single toe with an enlarged nail (hoof).
- Yes     No    Native American horses became extinct 10,500 years ago.
- Yes     No    The exhibit "Horse Tales" will be moved to Ruidoso when it leaves the Museum of Natural History.
- Yes     No    A horse's behavior is determined by the fact that it was frequently hunted--things like fast reflexes, peripheral vision, sharp hearing, and sense of smell.

**Did you enjoy the Horse Tales exhibit? Why or why not?**

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Profile:    Child under 12     Teenager, 13-19     Young adult (20-30)  
 Adult                       Senior    Comment \_\_\_\_\_

**APPENDIX C (CONTINUED)**