Explorations: Sea Lions

Assessment

Note: This is an edited summary of the complete report

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Summary

In February 2003, the JASON interactive show, *Explorations: Sea Lions* played on three different sites throughout the U.S. involving about 2.000 students, mostly from age 9 to 14. During the two week event a random sample of students and their teachers participated in an assessment of the show, including aspects of usability, entertainment experience, and the impact on learning. About a month later a follow-up was undertaken to complete the evaluation.

Results demonstrate that the show was highly appreciated by both, the participating students as well as the teachers: The usability aspect of the show was satisfying; the technology was found to be suitable for all age groups involved, and the entertainment experience was clearly intense. Students reported a high learning impact. Furthermore, this assumption was reinforced by the teachers' opinion. The follow-up results, did not however, provide proof of long lasting recall of facts that were embedded in the show. It did however provide some evidence that the show provoked a discussion about the topic after the fact.

Principles of Entertainment Education

During the last few years a new educational approach had been developed, which explicitly blends educational goals with entertaining experiences. The so-called Entertainment-Education paradigm (Slater, 2002) tries to bridge the gap between learning and enjoyment in two respects. First, school and leisure time contexts are merged. Second, the powerful impact of a cognitive and emotionally involving entertaining experience is used to promote educational goals.

Entertainment-Education has been proven to be an extremely successful approach to inform and instruct people about issues concerning health, violence, parenting etc., (Cody et al., in press). Obviously this approach is most valuable in reaching audiences that have limited access to accurate information or are reluctant to process this information. Entertainment-Education can also help enhance the educational experience in primary and secondary school environments by encouraging less motivated students to participate more extensively in the learning process.

Explorations: Sea Lions

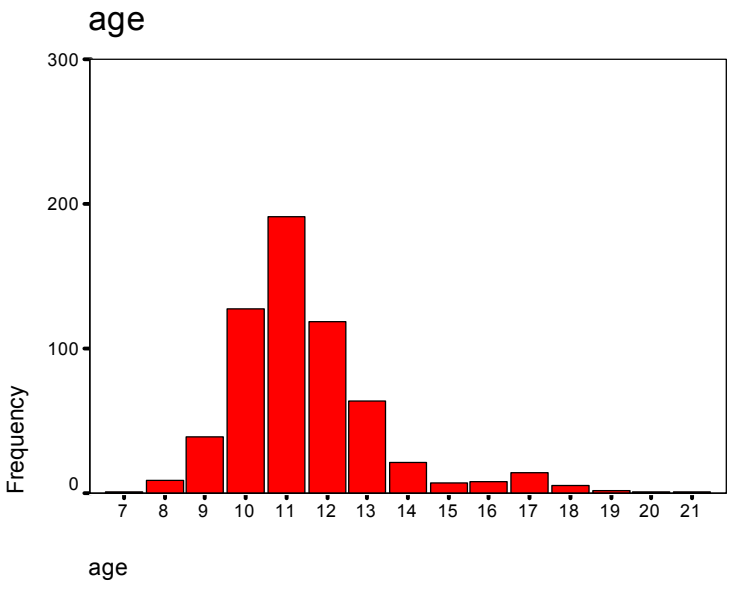
During the show students are presented with the real condition of the California Sea Lion pups on San Miguel Island. The pups are dying at a higher rate this year than in other years. Students are asked to help scientists prove or disprove one of the three hypotheses explaining why the pups are dying. Students accomplish their goal by exploring a virtual San Miguel Island on individual work stations. Each site they explore presents a game along with factual information and an "ask the expert question environment". The information they discover gets transferred into their field notes. When the time is up, students revise their notes, and send those facts that they believe support or disprove their hypothesis. A final presentation on each hypothesis is made for the whole audience, and the correct hypothesis is summarized by a scientist.

Students communicated through an expert dialogue once they reached an expert status. Communication was possible between all three remote sites. All the shows were synched to start at the same time. The show is split between big screen video presentations and computer game activity. Special software allows for the interactivity between big and small screen, and manages the communication between individuals (console to console).

This unique technology of combining a movie like cinematic presentation with computer game playing had been developed by Immersion Studios Inc. Each of the presentations offers a characteristic potential for learning. The cinematic presentation provides audiences with compelling narratives that are used for contextual framing, goal setting, instruction, and feed-back while at the same time alerting social consciousness. The computer game playing part offers an interactive tool, challenging and reinforcing on an individual basis. The combination of both, a narrative addressing the whole audience and individual game interactivity, creates individualized experiences embedded in a social environment.

Population and sample

The three sites contributed almost equally to the study, MOTE/FL had collected data of 215, Mystic/CT of 205, and Lamphere/MI of 236 students. Overall we could get valid data from 656 students mainly between 9 and 14 years of age (M = 11.66; SD = 2.94). 39.7 percent of the students were boys and 53.8 percent girls, with 6.5 percent who did not reveal their gender.



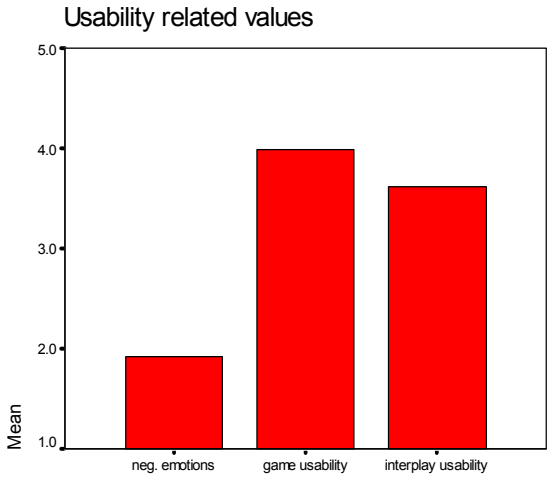
Results

Study 1: Short term impact of the show from the children's perspective

Identifying problems of usability

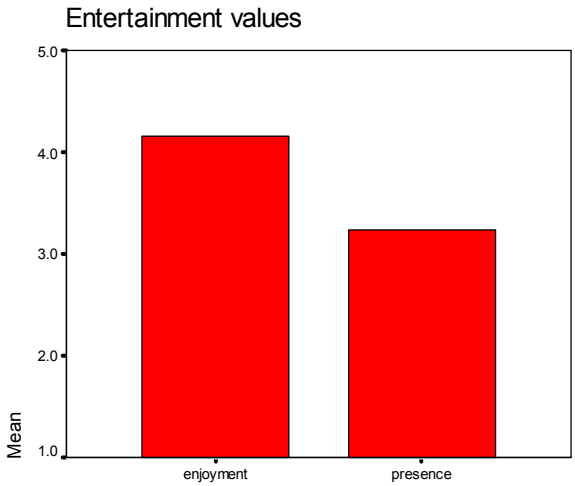
The first chart reflects the usability of the show. The first bar reveals negative emotions (anger, distress) experienced during the show. Such negative emotions serve as a highly sensitive indicator for usability problems. Difficulties in usability lead to anger or distress, because intentions (i.e., goal attainment during game playing) cannot easily be transformed into action.

The low negative emotions are therefore consistent with relatively high level of interplay usability.



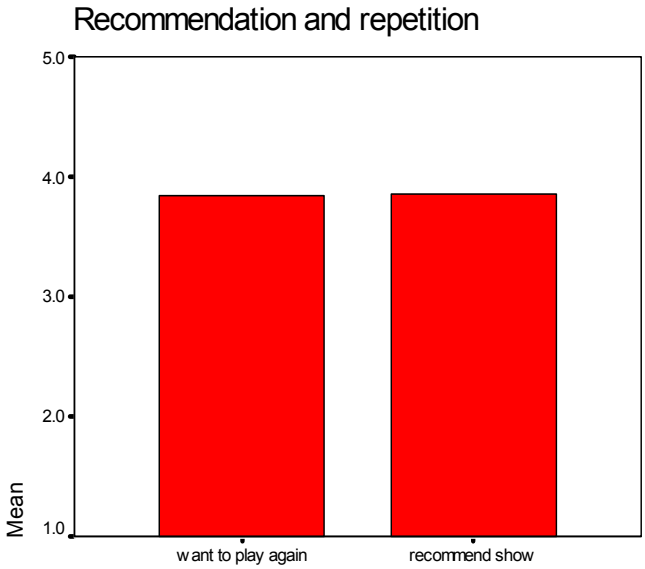
Assessing the entertaining impact of the show

The parameters chosen to measure entertainment include enjoyment and presence (being immersed/sense of being there). The results demonstrate clearly, that the majority of the students really enjoyed the show.



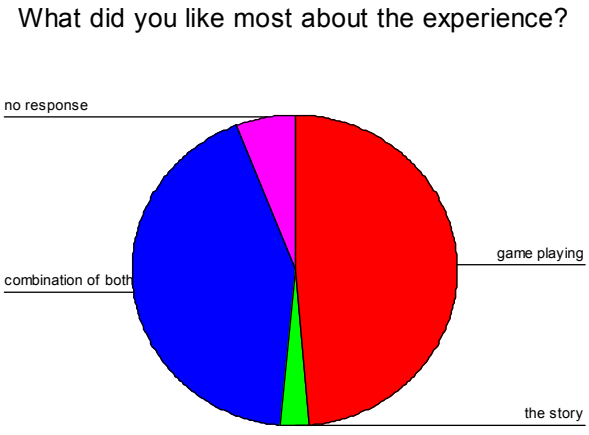
Besides enjoyment, the wish to play the games again and the intention to recommend the show to others serve as indicators for appreciation. The students report high scores

for both, with the desire for repetition reaching an average mean of M=3.82, and recommendation being almost identical (M=3.81).



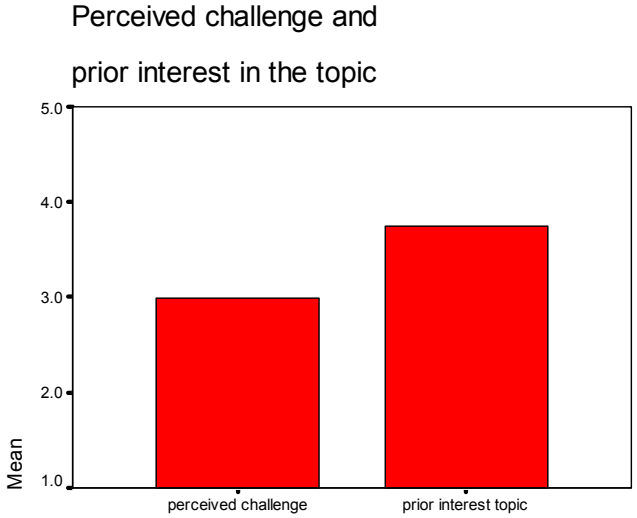
When asked which aspects of the show (the game playing part, the story part, or the combination of both) the students liked most, the students preferred game playing the most. The story which was a narrative about the Sea Lion pups' deaths was much less attractive than investigating the issue through game playing. However, the combination of the narrative with the possibility of game playing received almost as high of an appreciation as the game playing alone.

This result questions whether the complex technology is justified or whether game playing activities alone have the same effect. Clearly, the entertaining value is derived from game playing, but according to Entertainment-Education principles the educational value is most likely to be dependent on the combination of both. If students rely primarily on game playing they frame the experience most likely as entertainment and not as education. Again, this matches perfectly with the key principle of Entertainment-Education, implicit education through the use of a highly motivating entertainment experience.

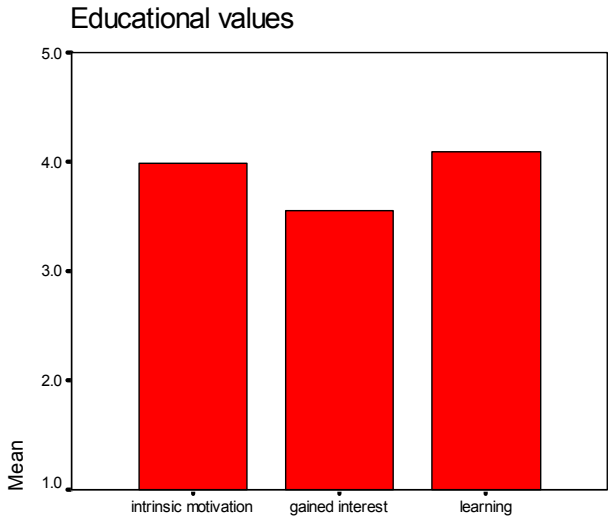


Evaluating the educational impact of the show

The next chart demonstrates that the level of complexity was indeed highly adequate for the age group participating in the show: for most of the children it was neither too complex not too boring. This is a very good result because it validates JASON's estimate of the appropriateness for the age range. Students who were too young would have perceived the show as too complex, children who were too old, would have suffered from boredom.



Obviously the majority of the children evaluated the educational impact of the show as very high. They were also highly convinced that the show communicated valuable information. The children report high intrinsic motivation to game playing which signifies overtaking the role of the scientist and investigating the causes for the sea lion population decline during game playing (M=3.99). For self reported learning the average score reaches even higher (M=4.10).



Overall, the data revealed a high appreciation of the show in the vast majority of the children: they enjoyed it and they reported an educational impact. Most interestingly,

the variance between the children is in fact lowest for the enjoyment and the learning experience. In both cases children agree that they got a lot out of the show. In terms of usability, negative emotions, and the big screen/small screen interplay, the responses of the children vary significantly.

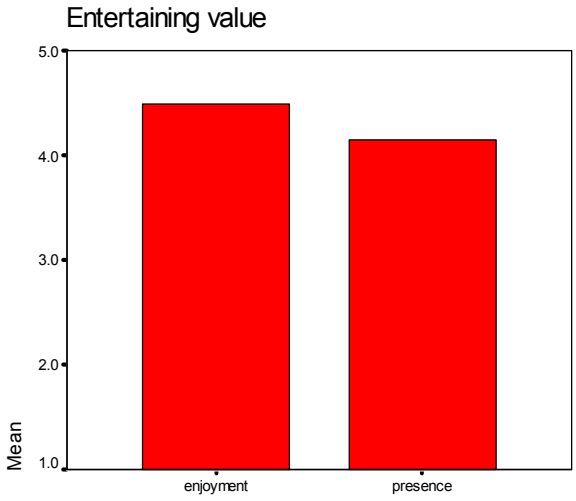
The descriptive results mentioned above reflect the opinions of the majority of the children. Although they demonstrate clearly the overall positive impact of the show, there are always children who do not agree with the majority.

Study 2: Short term impact of the show from the teachers' perspective

Assessing the entertaining impact of the show

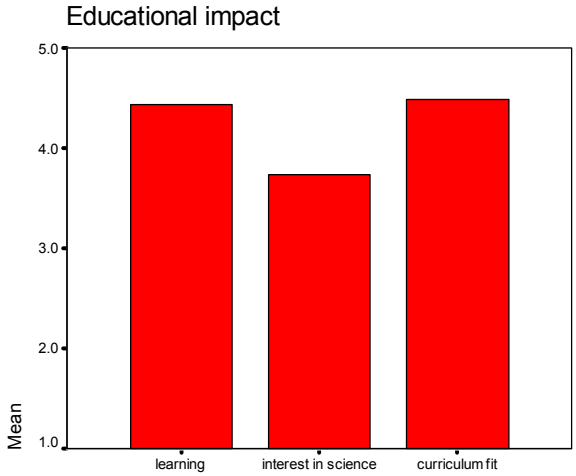
The teachers reported that the students enjoyed the show very much (M=4.50) and reported the students' involvement in the game playing (M=4.15), higher than the students themselves.

However, it must be noted that the teachers' opinions are derived from a totally different perspective than that of the students'. Teachers know the level of involvement of the children during school activities, and compared this to their level of involvement during the show. Based on this prior knowledge, they concluded that the students were extraordinarily immersed in the show. The students, however, might compare the show to other experiences while playing computer games on their own and at home.



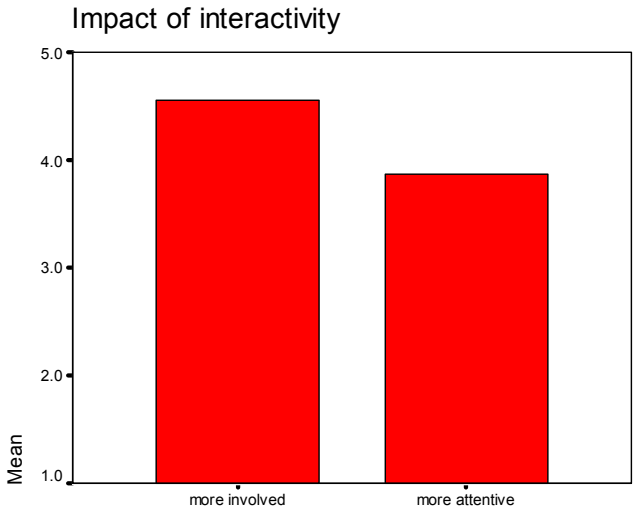
Evaluating the educational impact of the show

The teachers predict a very high educational impact of the show (M=4.48) and recognize a strong fit with the curriculum (M=4.33). However, like the students themselves, the teachers are not as enthusiastic about the long lasting motivational impact of the show (M=3.76): Although they seem to expect an increased interest in science, they have some doubts about whether they can rely on it.

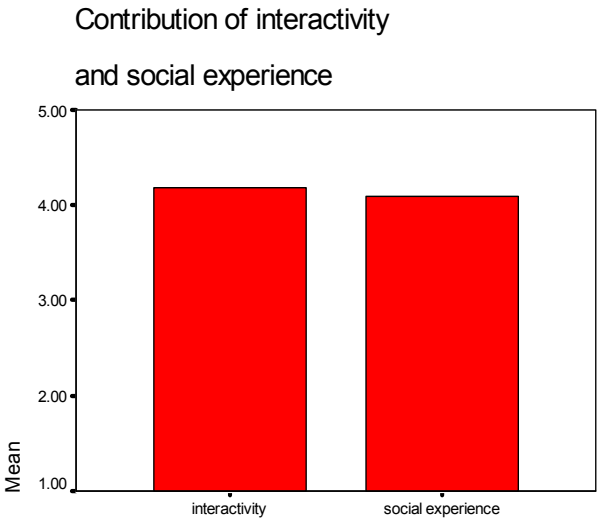


Investigating the relationship between entertainment and education

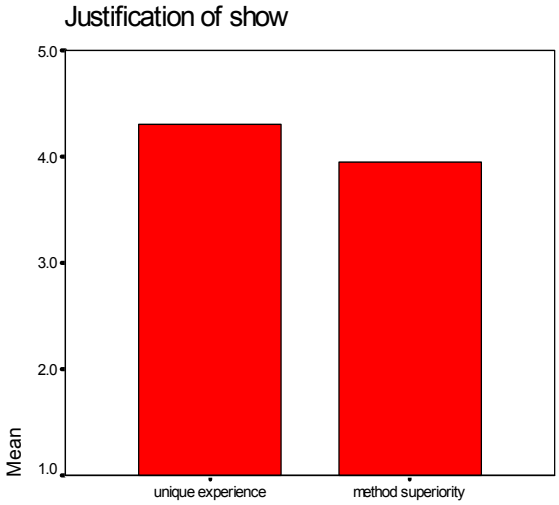
The teachers interestingly evaluated the impact of interactivity on learning while game playing as highly positive. According to their observations the students were becoming more involved and stayed attentive during the whole show.



Overall, the positive contribution of interactivity received a mean of M=4.21 which is almost identical to the contribution of the social experience during the show. The teachers reported a high-perceived educational value of the social interactions during game playing (M=4.10). They expect an added educational benefit since the game playing/show enhanced social interactions.

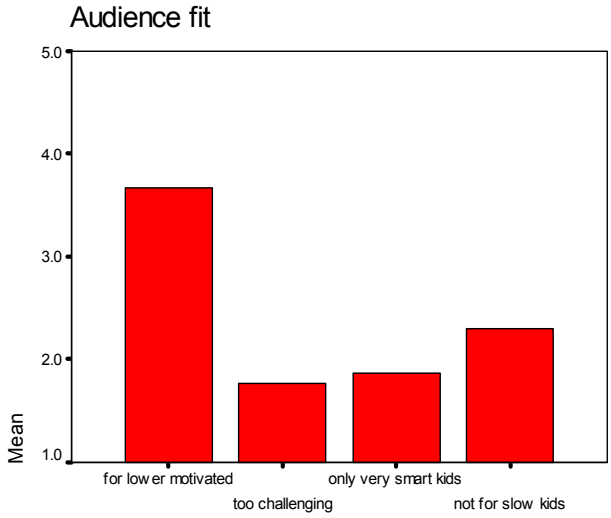


The teachers considered the show a very unique experience (M=4.30) that is superior to conventional teaching methods, and therefore justifies the costly technology (M=3.98). In fact, they consider reading a book about the topic not as educational as the participation in the show. However, it must be noted that the teachers participating in the shows were probably a self selected sample of less conservative educators. For example, they reported only minor doubts towards Entertainment-Education in general (M=1.47) and the majority (80.27%) had some experiences with JASON before.



Identifying which children are most and least successful

Since teachers are experts on education, we asked them about their opinion on the audience fit of the show. The majority of the teachers were convinced that the show is especially helpful for students who are less motivated to learn. This result corresponds with the next two ratings, indicating that the show was neither too challenging, nor especially designed for the smartest children. A significant minority of teachers, however, evaluated the show as being too challenging for slightly handicapped (slow) children. The data confirm a perfect audience fit for less motivated children, but not for children with below average skills. Again, the result proves the key principle of Entertainment-Education. The entertainment experience can overcome motivational deficits and focus attention, but does not compensate for cognitive limitations.



In sum, both, student and teacher evaluations confirm each other in many respects, which strengthens the validity of the data reported.