



Antarctica Exhibition

Evaluation (2)

Under the Sea Ice computer interactive

Families with children aged 7-11

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April 2007

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1.0 Introduction

This document reports on the feedback on one of the three computer interactives tested at this stage as part of the formative evaluation undertaken for Antarctica, a temporary exhibition to be held at the Natural History Museum in 2007. It was the second stage of evaluation for this exhibit.

The intended visitor outcomes were as follows:

- Visitors will know there are; starfish, sea spiders, sea urchins, krill, algae, penguins, in Antarctica
- Visitors will enjoy pretending to explore marine life
- Visitors will know the main challenges and hazards of working under sea ice

The key messages were:

1. The seas of Antarctica are just as exotic as the surface, filled with interesting and varied marine life that can't be found anywhere else on Earth.
2. Being a diver (particularly in the Antarctic) is a challenging endeavour, and requires the careful balancing of resources (your oxygen supply and the tension of the line).
3. There are many dangers under the water – such as seals, rocks, and passages where your contact line could get caught, and care must be taken to avoid them.

The evaluator trialled the exhibit with families with children of the target age range (7-11 years) on Wednesday 4th April (during the Easter holidays).

2.0 Methodology

The approach taken was as follows:

- The evaluator asked the child/children to try out the exhibit with minimal explanation and observed them
- They were asked questions as they used the exhibit and also at the end (see Appendix B for the final checklist)
- One day of evaluation was undertaken in April 2007.
- One evaluator conducted the testing (Alison James) – she had also undertaken the earlier stage of evaluation in March.

- Children (and adults) were thanked and asked to choose a postcard to take home. They were also given information about the exhibition with details of the website.

Sample

Ref.	Gender	Age
1	F & M	9 & 8
2	F	9
3	M* & aunt	11
4	M & F	10
5	F x 2	11
6	F x 2	6 & 13
7	F x 2	10 & 11
8	F	9
9	M x 2	7 & 5
10	M & dad	8
11	M x 2	9 & 11
12	M x 2	9 & 10
13	M x 2 & F	10 x 2 & 12

- *This child was German and his aunt translated all the questions and answers*

A total of 23 children trialled the exhibit, several in sibling or friendship pairs. The exhibit was trialled a minimum of 13 times (though in fact several children chose to play it a second time and in some cases gave additional feedback).

Most of the sample were from within the target age range (see table below) with two children slightly younger (5 and 6 years) and two slightly older (12 and 13 years).

5 yrs	6 yrs	7 yrs	8 yrs	9 yrs	10 yrs	11 yrs	12 yrs	13 yrs
1	1	1	2	5	6	5	1	1

There was a fairly equal gender split with 11 girls and 12 boys. Most were in family groups with eight from youth clubs.

They were from a range of backgrounds but not particularly ethnically diverse, however, two were from Italy and one from Germany.

3.0 Summary of findings

For detailed findings see Appendix A

Evaluation objectives/questions	Summary of findings
Understanding start of game	<p>It was not intuitive and several children needed to be prompted to use the controls. Most did not notice the text at the bottom of the screen until prompted. Several initially confused about which diver they were. One child was colour-blind. <i>At one stage no explanatory text came up for one of the divers.</i></p>
Did you understand how to operate the controls?	<p>A lot of confusion here and I had to tell most of them what to do: <i>'I'm just trying to work out...' 'I don't know how to move... I can't go down'</i> No-one was able to connect the arrows on the controls to the arrows at the bottom of the screen. In fact the arrows were confusing as they all appeared to be pointing in the same direction and/or upwards, when in fact they took the diver in different directions and downwards: <i>'The triangles all point one way only'</i> Several kept taking their fingers off and were surprised when the diver went upwards. For many, their creature-spotting happened by chance, especially at the start. One child used just one button throughout and seemed to do quite well. Several children thought the buttons did different things from what they actually did.</p>
Reading/understanding text	<p>Most had to be prompted to read the text. Even then they only read it sometimes and some were less likely to once involved in the game. However, some read it aloud and clearly understood it: <i>'I've got a crab and found an octopus'</i> <i>'Yes! A sea spider!'</i> Some didn't understand the text: <i>'What does it mean: 'Grows on other creatures'?''</i> Some parents read aloud (especially to younger ones). Instructional text at start and info at end came too fast for some to follow. Many did not read text at the end – once they realised the game was over they looked away from the screen.</p>

<p>What do you think you were trying to do?</p>	<p>All but one child were very clear what the task was: <i>'You had to find/spot creatures'</i> and some elaborated: <i>'Find new species for scientists and take photos'</i> One thought they were collecting rather than just spotting creatures. Most used the term 'find'.</p>
<p>Did you realise you had a time limit? (link to oxygen level)</p>	<p>Most were unaware of the time limit. Several were prompted at the end of the game to notice the coloured light disappearing but still did not know what it meant and guessed it was the number of creatures, or their speed. Only four out of 23 were aware that they had a time limit which related to their air levels: <i>'it's how much time you have – air'</i></p>
<p>Did you enjoy it? Score out of 10? What did you like/not like?</p>	<p>Everyone enjoyed it with one adult commenting: <i>'It's even fun for me!'</i> When asked to give marks out of 10 most scored it highly, at 8 or 9 out of 10, with several 10 out of 10s (x 6) and one startling 15 out of 10! Things they particularly liked included having control of the diver, finding out about sea creatures and the authentic atmosphere (graphics and sound effects): <i>'...it feels like you are inside the sea and controlling the diver'</i> Things they didn't like included problems with the controls and not having enough control over what the diver actually did: <i>'Not enough control – sometimes you want to get something and you just can't'</i></p>
<p>What do you think about how it ended?</p>	<p>Several were unclear that the game had ended until they were told: <i>'How did it end?'</i> They liked the fact that the diver popped up and waved at them. They liked the fact that they were told how many creatures and species they had spotted – however, many would have failed to notice this text if not prompted. Most looked away from the screen once they realised the game had ended. The text was not large/eye-catching enough to attract their attention. The element of competition appealed to several of them. One child suggested: <i>'It could have been better – you could swim up to the top and they could say: 'Good job!' or 'Well done!''</i></p>
<p>Which Antarctic sea creatures do you remember seeing?</p>	<p>The children were able to recall between two and nine of the creatures. (Interestingly, it was children at the upper end of the age range who recalled only two). Several of them looked at the screen to remind them, when asked this question.</p>

<p>What do you think are the main challenges and hazards of working under sea ice?</p>	<p>Most were aware of the challenges and some summed them up very well: <i>'Difficult – anything could happen: a shark could eat you, a fish could sting you, you could get stuck in the coral and run out of oxygen, you could go in a cave and not be able to get out'</i> Sharks, whales and octopus were among the dangerous creatures mentioned. However, the five year old was concerned about crocodiles... Several were aware that they might run out of oxygen and a few mentioned temperature and the frozen ice above. Only one thought it would be an easy job!</p>
<p>Did anything confuse you?</p>	<p>The main area of confusion mentioned (by nearly half) was to do with the controls and which buttons did what: <i>'Buttons and what to press'</i> One child mentioned not understanding which diver they were (initially).</p>
<p>Do you think you would go on to the website? (expectations)</p>	<p>The majority did not read the information about going online to find out more. When asked if they would, most were positive. One pointed out that it would be useful to know the address. They expected to find: information, games (including the 'Under the Sea' one) as well as links and contacts. In terms of the kind of information they wanted one said: <i>'Probably – would play games and find out more about the creatures, what they do, their habitats, explore the ocean, see what they eat, etc.'</i></p>
<p>Any other comments? Improvements?</p>	<p>Comments included: <i>'The graphics are amazing...'; 'This is a very cool game'; 'It's amazing to explore'</i> and <i>'It was difficult with the instructions at the bottom and too small'</i> Suggested improvements included: <i>'It should tell you about how to use the controls at the beginning'</i> <i>'Label the controls!'</i> <i>'...the arrows on the controls should point down'</i> <i>'... different levels, getting harder'</i> <i>'...make it more realistic – the animals more distinguishable'</i> <i>'It would be better if the names came up more clearly, bigger'</i> <i>'...you get bonuses if eg. you find a submarine'</i> <i>'More oxygen to last longer'</i> <i>'Make the light brighter'</i> <i>'...could you have specially designed suits that you wore?'</i></p>

4.0 Conclusions and Recommendations

Firstly, I will address the intended visitor outcomes:

- ***Visitors will know there are; starfish, sea spiders, sea urchins, krill, algae, penguins, in Antarctica***

Most children were able to name at least four or five of the creatures they had seen after using the exhibit once.

- ***Visitors will enjoy pretending to explore marine life***

All the children enjoyed trying out the exhibit and rated it highly: *'It's amazing to explore'*

- ***Visitors will know the main challenges and hazards of working under sea ice***

Most of the children were able to name some of the challenges and hazards but tended to focus more on danger from animals than on practical issues such as air and temperature.

In terms of the key messages:

- *The seas of Antarctica are just as exotic as the surface, filled with interesting and varied marine life that can't be found anywhere else on Earth.*

Some the children spontaneously referred to the diversity of marine life: *'...how many species you can get...'*

However, they were not actually asked about this and this message is not directly communicated as part of the exhibit.

- *Being a diver (particularly in the Antarctic) is a challenging endeavour, and requires the careful balancing of resources (your oxygen supply and the tension of the line).*

Some of the children understood the importance of having sufficient air but only a couple mentioned the risk of getting lost or stuck and not being able to find your way up through the frozen ice. The importance of the tension of the line is not made clear as part of the exhibit.

- *There are many dangers under the water – such as seals, rocks, and passages where your contact line could get caught, and care must be taken to avoid them.*

Most of the children were able to guess at the danger presented by some of the sea creatures, however, as mentioned above, few mentioned the risk of getting stuck underwater. None of these dangers are actually evident as part of the exhibit.

Recommendations

- The **instructions** need to be larger and clearer at the start and to appear more slowly, giving children more time to read it.
- The **controls** need to be explained or labelled clearly: *'Arrows should show the way you are actually going'*
- The **challenges** the diver faces could also be presented at this stage using text or images.
- The presence and significance of **air level measure** needs to be made clearer.
- The **name of the creature** collected should flash up more clearly – possibly in larger text: *'It would be better if the names came up more clearly, bigger'*
- The **ending** should be more obvious: *'... they could say: 'Good job!' or 'Well done!''* and the final text larger.
- The information about **going online** should be more obvious and the web address provided.

Additional comments

There were intermittent problems with the text and numbers:

- At one stage no text appeared for player 2. Text appeared as normal for player 3.
- Throughout the testing period the welcome message appeared in German (only the German family appreciated this!)
- On several occasions, the score of creatures spotted included previous players' scores with totals reaching 30 and 40+ as a result when in fact only 10-15 creatures had been spotted.

Appendix A: Detailed findings

Evaluation objectives/questions	Detailed findings
Understanding start of game	<p>1 Explanatory text at start was too fast for them (bilingual in Italian/English)</p> <p>2 <i>'Which colour am I?'</i> - some confusion; later: <i>'Bit confusing to see who you are at the start'</i></p> <p>3 Child sat and waited (he didn't speak English and unfortunately German text not yet operational). I prompted adult with him (aunt) to get him to touch the controls. He was confused about which diver he was. No instructional text came up for aunt.</p> <p>4 <i>'Which one am I?'</i> I asked which he thought he was: <i>'Green?'</i> - uncertainty</p> <p>5 Prompted</p> <p>6 Explained purpose as one child below target age range (6 years)</p> <p>7 Some confusion</p> <p>8 OK</p> <p>9 Prompted</p> <p>10 OK</p> <p>11 OK</p> <p>12 <i>'I'm colour blind'</i></p> <p>13 OK</p>

<p>Did you understand how to operate the controls?</p>	<p>1 Seemed to work out the buttons but commented: <i>'Mine doesn't seem to want to go down'</i>. When asked, said they said they didn't really understand the controls.</p> <p>2 <i>'The triangles all point one way only'</i></p> <p>3 Yes</p> <p>4 <i>'I'm just trying to work out...'</i> <i>'I don't know how to move... I can't go down'</i> Said they didn't really understand the controls</p> <p>5 I explained you had to hold the buttons down as they were having trouble. One didn't know what she was doing and spotted most creatures by accident. They said they <i>'sort of'</i> understood the controls at the end.</p> <p>6 The 6 year old had trouble keeping the diver down. 13 year old was OK with them.</p> <p>7 Some difficulties. Said <i>'quite difficult'</i></p> <p>8 Looked as if things were happening more by chance than anything else. When asked said: <i>'No, all the arrows were pointing up'</i></p> <p>9 Yes and No (but this child was only just 5 years old)</p> <p>10 <i>'I didn't even notice I had a sea worm!'</i> and <i>'Yes, I am used to computer games'</i> (father a little confused)</p> <p>11 <i>'Yes, I just used one button'</i></p> <p>12 <i>'Mostly'</i> but thought one of the buttons was for going down</p> <p>13 <i>'How do you go down?'</i> <i>'How do you go left or right?'</i> Later said: <i>'It was very simple – even if you don't read the instructions it explains itself'</i></p>
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<p>Reading/understanding text</p>	<p>1 Had to prompt them to read text, but it went too fast for them at start (bilingual in Italian and English) 2 OK 3 No, needed translation from accompanying adult (German-speaking) 4 Sometimes 5 The adult was reading aloud 6 13 year old was fine 7 I prompted and then they were fine 8 Reading but not always understanding. 9 Parents reading aloud and child saying: <i>'I got a sea spider!' 'I found a starfish'</i> 10 <i>'I've got a crab and found an octopus' 'Yes! A sea spider!'</i> 11 <i>'What does it mean: 'Grows on other creatures'?''</i> 12 Yes, sometimes 13 Very hyperactive – too busy talking/asking questions to look at them!</p>
<p>What do you think you were trying to do?</p>	<p>1 <i>'Trying to find animals'</i> 2 <i>'Find new species for scientists and take photos'</i> 3 <i>'Look for little creatures swimming around'</i> 4 <i>'Collect as many items as possible to send back to the lab'</i> 5 <i>'You had to find/spot creatures'</i> 6 <i>'Find things'</i> 7 <i>'Go down and find different species'</i> 8 <i>'Get as many species as you can'</i> 9 <i>'Find the most sea creatures'</i> 10 <i>'Find sea creatures'</i> 11 Not sure at start and one unclear at end. Other: <i>'finding animals'</i> 12 <i>'Look at different species'</i> 13 <i>'Finding sea creatures – very simple to understand and it's very interesting'</i></p>

<p>Did you realise you had a time limit? (link to air level)</p>	<p>1 No 2 No. Thought that lights along bottom showed the number of creatures spotted or speed 3 No 4 No & Yes: <i>'It was to do with how much oxygen you had'</i> 5 Didn't realise at first but later: <i>'I think it's my air'</i>. 6 Yes x 2 7 After a while, said <i>'it's how much time you have – air'</i> 8 Yes – <i>'It's how much air you have'</i> 9 Prompted 10 <i>'Actually, no'</i> 11 No 12 No 13 <i>'No – it should be in numbers'</i></p>
<p>Did you enjoy it? Score out of 10? What did you like/not like?</p>	<p>1 Yes (x 2); 8 & 9 out of 10. Liked going up and down and right and left to find things 2 Yes; 8.5 out of 10. 3 Yes; 10 out of 10. Liked <i>'swimming and being under the sea – wouldn't normally do that'</i> 4 Yes: <i>'I liked searching for things'</i> & <i>'Sort of: it was hard to control it, holding the button down'</i> (F) 10 out of 10 and 6 out of 10 5 Yes. 7 & 8 out of 10. 6 Yes 8 and 9 out of 10. Older child enjoyed: <i>'creature name and picture and info'</i> 7 Yes, 9 and 8 out of 10. <i>'Not enough control – sometimes you want to get something and you just can't'</i> 8 Yes 10 out of 10. Didn't like the dark bit. 9 Yes, 10 out of 10 and 15 out of 10! 10 Yes, 10 out of 10. Liked: <i>'using the lights, it feels like you're in the sea'</i> 11 Yes: 9 out of 10, but: <i>'I couldn't really see what I found'</i> 12 Yes, 8 and 9 out of 10. Didn't like time limit. Did like: <i>'how many species you can get...it feels like you are inside the sea and controlling the diver'</i> 13 Yes, 10 out of 10</p>

<p>What do you think about how it ended?</p>	<p>1 <i>'How did it end?'</i> <i>'No oxygen left'</i> 2 She wasn't aware that it had – I told her 3 No text came up for aunt at all 4 <i>'He beat me!'; 'It was weird how he turned round and went up'</i> 5 I prompted them to look to see how many creatures they had spotted. They stopped looking at the screen when the game ended. 6 <i>'Getting the total numbers was good'</i> 7 <i>'Good – 'cos they waved and getting the numbers was good'</i> 8 <i>'Nice – waving'</i> 9 N/A 10 <i>'It was fair 'cos I ran out of air'</i> 11 <i>'It could have been better – you could swim up to the top and they could say: 'Good job!' or 'Well done!''</i> 12 <i>'Yes, OK – if you split the screen it would be clearer'</i> (I explained why this wouldn't work with multiple players starting at different times) 13 OK</p>
<p>Which Antarctic sea creatures do you remember seeing?</p>	<p>1 spider, octopus, whale, seal, fish, starfish, corals, sharks (but they were looking at screen to remind them) 2 coral, starfish, seals, molluscs, arachnids 3 whale, fish, penguin, seals, coral, plants 4 sea cow, starfish, spider, sharks, seals, eels, blue whale, sea urchins 5 fish, spiders 6 starfish, lemon snail, octopus, sea anemone 7 starfish, sea spiders, seals, octopus, clams 8 octopus, starfish, plants 9 starfish, sea worm, clam, turtle, crab, spider, jellyfish 10 sea worms, sea spiders, sea lions, whale, crabs, puffer fish 11 starfish, octopus, anemone, squid 12 spiders, sharks, fish, starfish, lemon snail, octopus, seal, coral, sea anemones 13 spiders, corals, fish, crab, octopus, shark, whales</p>

<p>What do you think are the main challenges and hazards of working under sea ice?</p>	<ol style="list-style-type: none"> 1 <i>'Scary' 'Difficult – anything could happen: a shark could eat you, a fish could sting you, you could get stuck in the coral and run out of oxygen, you could go in a cave and not be able to get out'</i> 2 <i>'It's interesting, looking for new creatures. You need to make sure your oxygen doesn't run out'</i> 3 <i>'Cold, lack of oxygen'</i> 4 <i>'If you swim away and the oxygen runs out and you are under a sheet of ice...' 'You might be chased by beasts'</i> 5 <i>'Sharks' 'You don't know what you might find'</i> 6 <i>'If you are underneath and out of oxygen and you can't get up because of the ice' 'Sharks'</i> 7 <i>'Run out of air' 'An octopus could grab hold of you'</i> 8 <i>'Too cold... An octopus could grab you... a clam could catch you... and you might run out of air'</i> 9 <i>'Sharks... jellyfish... drown?' 'Crocodiles' (5 year old!)</i> 10 <i>'I don't know' and when asked, do you think it is an easy job he answered 'Yes!'</i> 11 <i>'Sharks and killer whales'. Prompted by dad re running out of air and said 'slight fear' about this</i> 12 <i>'Whales, sharks... enough oxygen'</i> 13 <i>'Oxygen supply... frozen ice' 'It's a computer game so you know there's no real danger'</i>
<p>Did anything confuse you?</p>	<ol style="list-style-type: none"> 1 <i>'What the arrows (on the controls) meant'</i> 2 <i>'The controls'</i> 3 <i>'Which diver I was'</i> 4 <i>'The controls'</i> 5 No 6 No 7 <i>'The controls – if you let go you go up again'</i> 8 <i>'Just the controls'</i> 9 No 10 No 11 <i>'Just the controls at the start'</i> 12 <i>'The buttons – better if you wrote on them'</i> 13 <i>'Buttons and what to press'</i>

<p>Do you think you would go on to the website? (expectations)</p>	<ol style="list-style-type: none"> 1 Didn't notice this info, but said they would 2 Didn't notice but said: <i>'Yes, if I knew the address!'</i> 3 Didn't notice but said: maybe 4 <i>'Not sure – if she (mum) lets us'</i>. Would expect: <i>'programmes about what you could do, information'</i> 5 Yes, but no idea what would find there 6 Yes, would expect more info and games 7 <i>'Might do – more info re creatures'</i> 8 <i>'Yes, would like to play this game again, and others'</i> 9 <i>'Yes, play the game again'</i> 10 Yes – but didn't know what to expect 11 <i>'Probably – would play games and find out more about the creatures, what they do, their habits, explore the ocean, see what they eat, etc.'</i> 12 <i>'Yes, why not?'</i> Would expect: <i>'more info, links, contacts and to play the game'</i> 13 <i>'Definitely – to play games and do research'</i>
<p>Any other comments? Improvements?</p>	<ol style="list-style-type: none"> 1 <i>'It should tell you about how to use the controls at the beginning'</i> 2 <i>'Arrows should show the way you are actually going. And it would be better if there were different levels, getting harder'</i> 3 <i>'It's even fun for me!'</i> (adult). Child didn't like running out of oxygen. 4 <i>'Label the controls!'</i> 5 - 6 - 7 <i>'It was difficult with the instructions at the bottom and too small' 'Not so many hills!'</i> 8 <i>'I liked seeing the plants'</i> 9 <i>'More oxygen to last longer'</i> 10 Father a little confused throughout 11 <i>'More time'</i> 12 <i>'This is a very cool game' 'Make it better – you get bonuses if eg. you find a submarine; make it more realistic – the animals more distinguishable; could you have specially designed suits that you wore?'</i> 13 <i>'Make the light brighter' 'It's amazing to explore'</i> 12 year old girl's comments: <i>'The graphics are amazing... It would be better if the names came up more clearly, bigger... and the arrows on the controls should point down'</i>

Appendix B: Observation/question checklist

Observe for	√ if OK	Comments/follow up questions
Logging on		
<i>Start of game</i>		
<i>Use of controls</i>		Did you understand how to operate the controls?
<i>Reading text</i>		
<i>Understanding text</i>		
<i>Understanding purpose – spotting sea creatures</i>		What do you think you were trying to do?
<i>Time limit – link to air level</i>		Did you realise you had a time limit? (prompt: link to oxygen level)
<i>Enjoyment</i>		Did you enjoy it? Score out of 10? What did you like/not like?
<i>End of game</i>		What do you think about how it ended?
Follow up questions		
Which Antarctic sea creatures do you remember seeing?		
What do you think are the main challenges and hazards of working under sea ice?		
Did anything confuse you?		
Do you think you would go on to the website? (prompt: expectations)		
Any other comments? Improvements?		

