Creatures of the Abyss Traveling Exhibit

An Evaluation of the Visitor Learning Experience

EVALUATION REPORT

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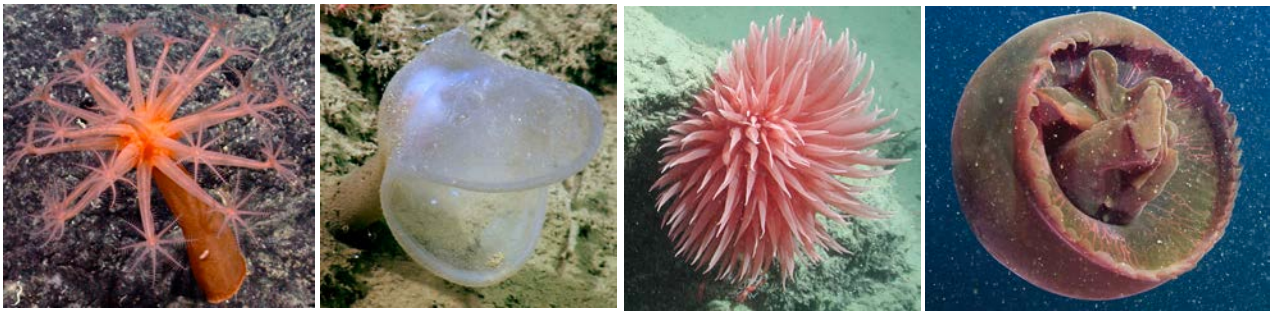


Creatures of the Abyss is a 600 square meter (6,000 square feet) traveling exhibit that takes visitors on a journey through the depths of our planet's ocean. Exhibits and experiences include full-scale models of sea creatures and their environments, preserved specimens, mechanical interactives, multimedia experiences, large full-image graphic panels, and maps. The exhibit takes visitors on a journey to discover and learn about both the physical features of the deep ocean and the fascinating creatures that inhabit these special places. *Creatures of the Abyss* takes visitors down into the deep, across the vast sea floor, up submarine mountains, and into canyons and hydrothermal vents. It is a mysterious, immersive, and awe-inspiring glimpse into another world.

Exhibit Objectives

The exhibit development team set out the following goals for the exhibition:

Creatures of the Abyss should:

1. introduce visitors to the amazing creatures of the deep sea,
2. involve visitors with adaptation and behaviour,
3. increase visitors' understanding of the oceans and the importance of these ecosystems, and
4. involve visitors with how scientists explore the deep ocean.

These goals were used as guidelines in the development of the *Creatures of the Abyss* exhibition.

Evaluation Objectives

The goals of this evaluation were to assess the learning impact of individual exhibits in *Creatures of the Abyss* on visitors and to enable the development team to get a complete picture of the visitor learning experience with respect to the exhibition's goals.

The exhibition was evaluated using the Visitor Learning Behaviour Framework (Barriault, 1998; Table A) to understand visitors' behaviours while engaging with the exhibits, and through a visitor survey (Appendix 1).

Table A. Visitor Learning Behaviours Framework (Barriault, 1998)

Learning Behaviours	Engagement Level
Doing the activity	**Initiation Behaviours**
Spending time watching others engaging in the activity	
Repeating the activity	**Transition Behaviours**
Expressing positive emotional response in reaction to engaging in the activity	
Referring to past experiences while engaging in the activity	**Breakthrough Behaviours**
Seeking and sharing information	
Engaged and involved: Testing variables, making comparisons, using information gained from the activity	

Methods - Data Collection

1. Observations of Visitor Behaviours

Observations of visitor behaviours were conducted through the use of video recordings of visitors interacting with exhibits. A video camera was set up in the exhibit hall from October to December 2009. It is important to note that the number of visitors is low due to limited data collection time and resources.

2. Visitor Surveys

Visitor surveys were conducted using a computer-based survey kiosk located in Science North's Special Exhibits Hall. The survey was comprised of eight questions.Visitors were asked to rate their knowledge and understanding **before** and **after** their visit to *Creatures of the Abyss,* answer knowledge questions based on the exhibition goals and the information in the exhibition, and

provide comments and feedback on the exhibition (see Appendix 1). A total of 44 visitors completed the survey.

Results

Visitor Observation Results

The exhibits in *Creatures of the Abyss* engaged visitors in all levels of learning behaviours. Three exhibits were evaluated from this exhibition. The following charts display the Visitor Engagement Profiles for these exhibits.

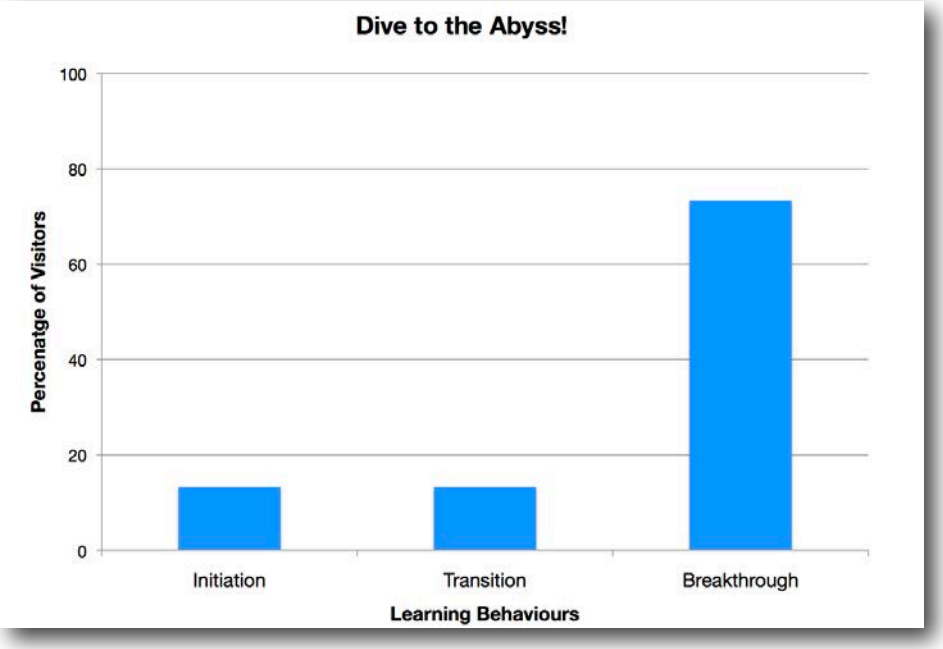


Chart 1. Visitor Engagement Profile for the *Dive to the Abyss!* Exhibit

At this exhibit, families would sit together and use the joystick to dive into the ocean and find numerous creatures that live in the deep. Visitors were extremely engaged with the exhibit as 73% displayed Breakthrough learning behaviours by seeking and sharing more information about the animals for extensive time periods (Chart 1). Children would often ask parents questions about the animal they were looking at, and the parents would read the information on the screen and have a conversation about the animal and how deep in the ocean it lives.

Nearly 40% of visitors engaged in Breakthrough learning behaviours at the *Ocean Issues* globe exhibit (Chart 2). This percentage of Breakthrough learning behaviours shows that this exhibit is quite successful at attracting and retaining visitors in a learning experience. Most visitors would seek and share information with other visitors by showing friends and family what was on the globe and discussing the information provided, and would become engaged in exploring the different facets of the experience.

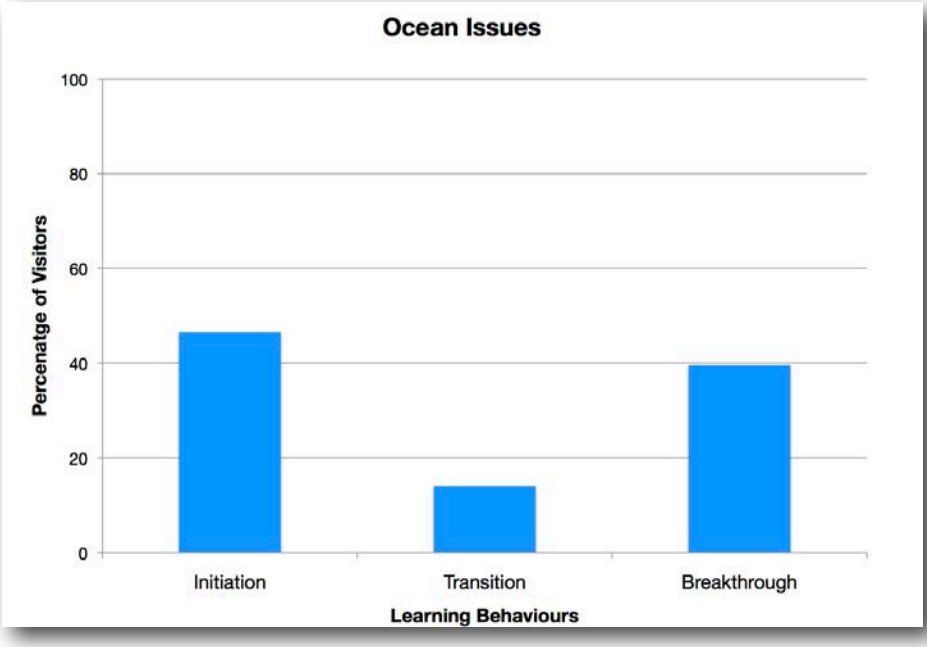


Chart 2. Visitor Engagement Profile for the *Ocean Issues* Exhibit

Of the eight exhibits focused on cephalopods, three of them were filmed: *Squid's Eye View*, *Cephalopod Ink*, and *Cephalopod Beaks*. These exhibits were grouped together for analysis as part of the larger Cephalopod exhibit. This exhibit had a medium percentage (30%) of visitors displaying Breakthrough learning behaviours (Chart 3). It was observed that older people were more likely to stop to watch the videos at the exhibit as well as look at the objects, while children looked more at the objects.

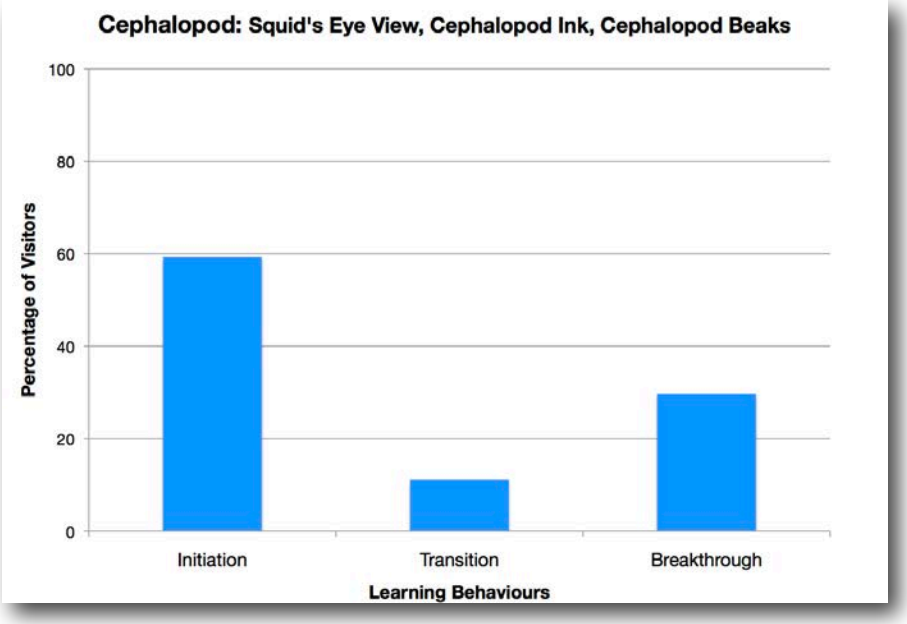


Chart 3. Visitor Engagement Profile for the *Cephalopod* Exhibit

Survey Results

Survey Section A

The survey questions were based on the key messages of the exhibit. When exiting the exhibit, visitors were asked to rate their knowledge and understanding of:

a) the diversity of life in the deep ocean.
b) threats to the ocean
c) research being conducted in the ocean.

Respondents rated their level of previous knowledge and understanding of these topics, on a scale from "very poor" to "very good". Using the same scale, visitors were asked to rate their knowledge and understanding of these topics, **after** experiencing the *Creatures of the Abyss* exhibition.

a) Knowledge and Understanding of Diversity in the Deep Ocean

Just over 50% of visitors rated their previous knowledge and understanding of the diversity of life in the deep ocean as "poor" or "very poor" (Chart 4). When visitors were asked to rate their knowledge and understanding of deep ocean diversity after visiting the exhibition, 67% reported their knowledge was "good" or "very good" (Chart 5). When looking at visitor ratings from before to after visiting the exhibition, we can see that the "very poor" and "poor" categories have decreased significantly.

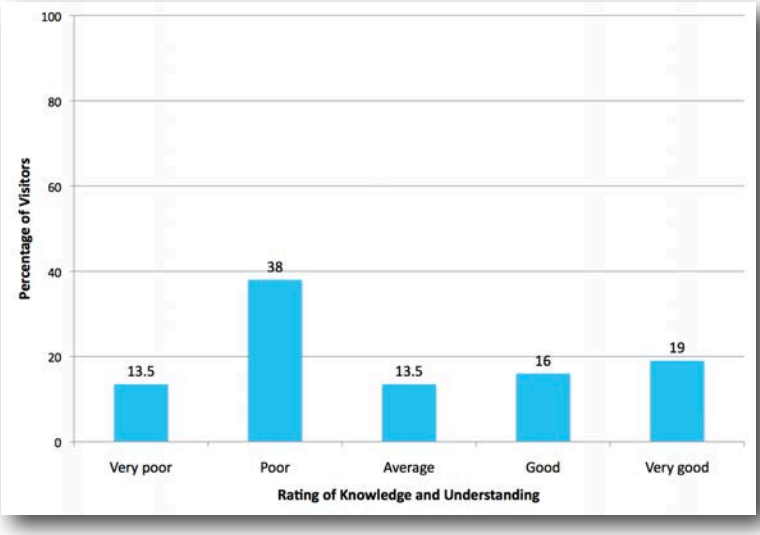


Chart 4. Rating of previous knowledge and understanding of diversity in the deep ocean.

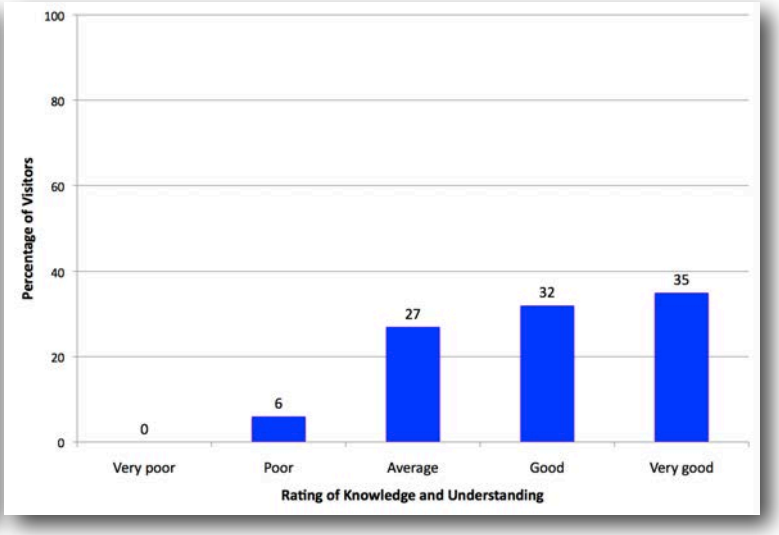


Chart 5. Rating of knowledge and understanding of diversity in the deep ocean *after* visiting *Creatures of the Abyss.*

b) Knowledge and Understanding of Threats to the Ocean

Most visitors rated their previous knowledge and understanding of ocean threats as "poor" or "average", while a total of 24% of visitors rated themselves as having "good" or "very good" (Chart 6). Despite having high original ratings, "very poor", "poor", and "average" ratings all decreased and 43% of visitors rated their knowledge and understanding as "good" or better after having visited the exhibition (Chart 7).

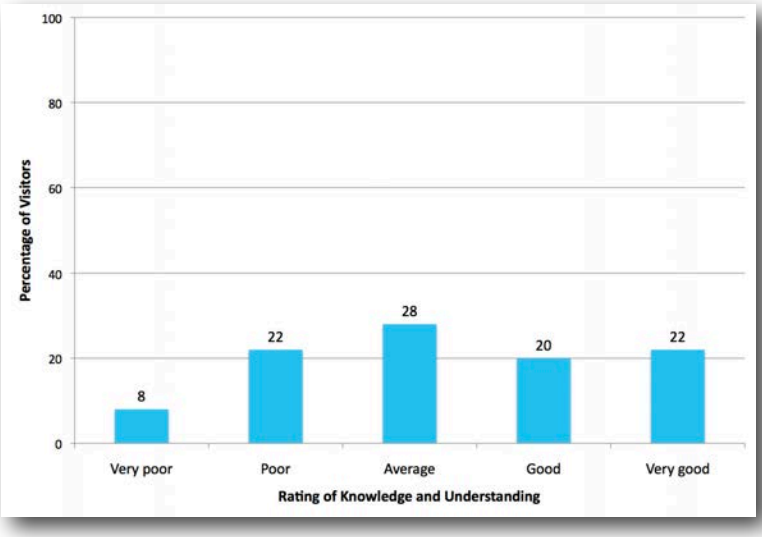


Chart 6. Rating of previous knowledge and understanding of threats to the ocean.

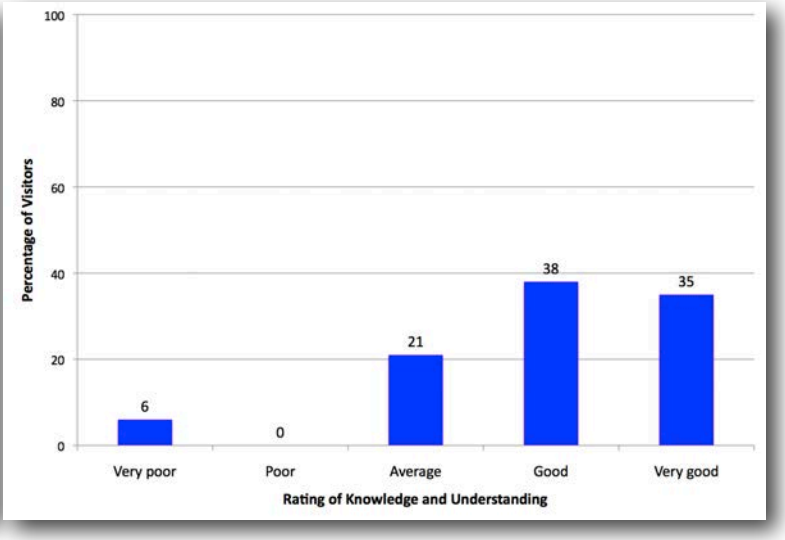


Chart 7. Rating of knowledge and understanding of threats to the ocean *after* visiting *Creatures of the Abyss*.

c) Knowledge and Understanding of Research Being Conducted in the Ocean

Visitors were asked to rate their knowledge and understanding of the research that is being conducted in the ocean before and after their visit to *Creatures of the Abyss*. Chart 8 shows that visitors' previous ratings were fairly spread throughout all five rating categories. A total of 58% of visitors rated their knowledge and understanding as "average" or better, and 42% as "poor" or "very poor". Visitors felt that their knowledge and understanding of ocean research increased after visiting the exhibition, with 73% of visitors ratings themselves as "good" and "very good". We can also see a marked decrease in the "very poor" and "poor" categories (Chart 9).

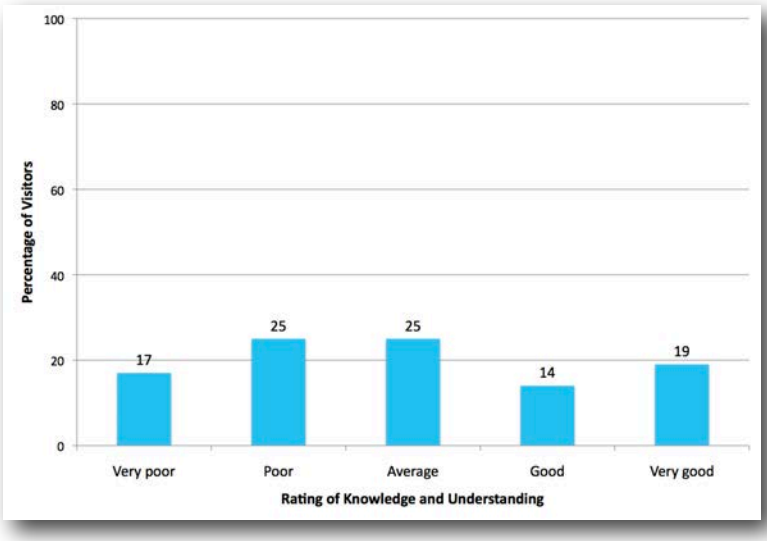


Chart 8. Rating of previous knowledge and understanding of research being conducted in the ocean.

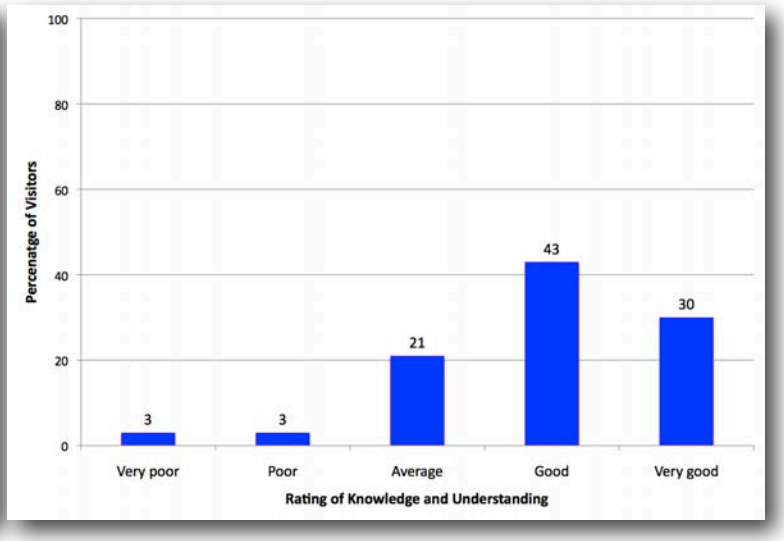
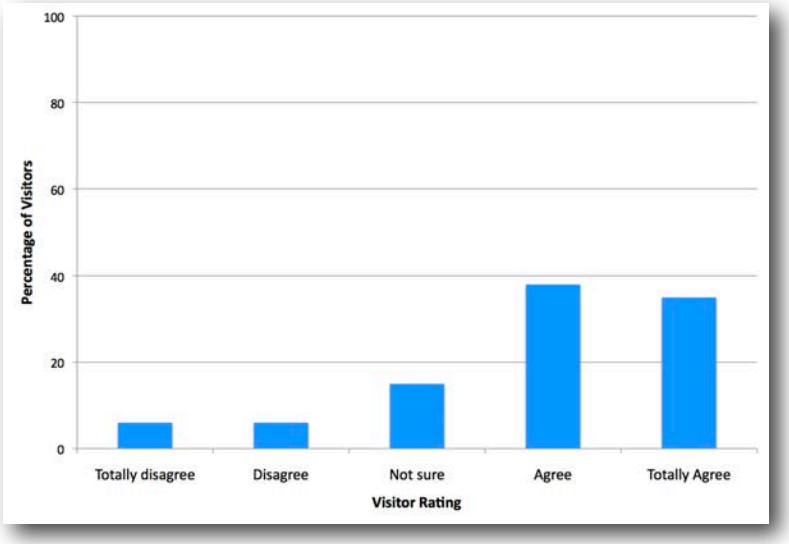


Chart 9. Rating of knowledge and understanding of research being conducted in the ocean *after* visiting *Creatures of the Abyss.*

Survey Section B

In this section of the survey, visitors were asked to respond to four knowledge questions based on information that was provided in the exhibition. Two of these questions asked the visitor to which degree they agreed with the statement presented, and the other two questions were basic multiple choice.

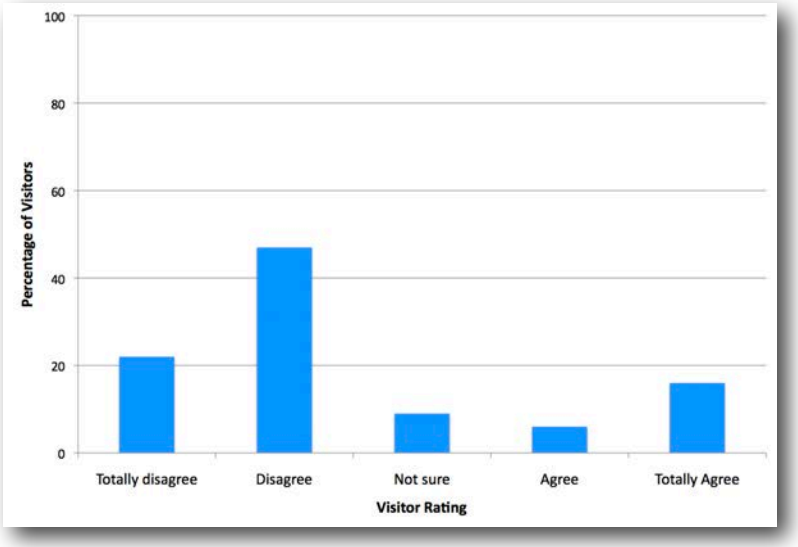
1) In the deep ocean, creatures commonly produce *bioluminescence*, which is a 'creature-created light'.



This statement is correct. Most visitors recognized that bioluminescence is 'creature-created light' (Chart 10). Over 70% of visitors agreed or totally agreed with this statement.

Chart 10. Responses to the question of *bioluminescence*.

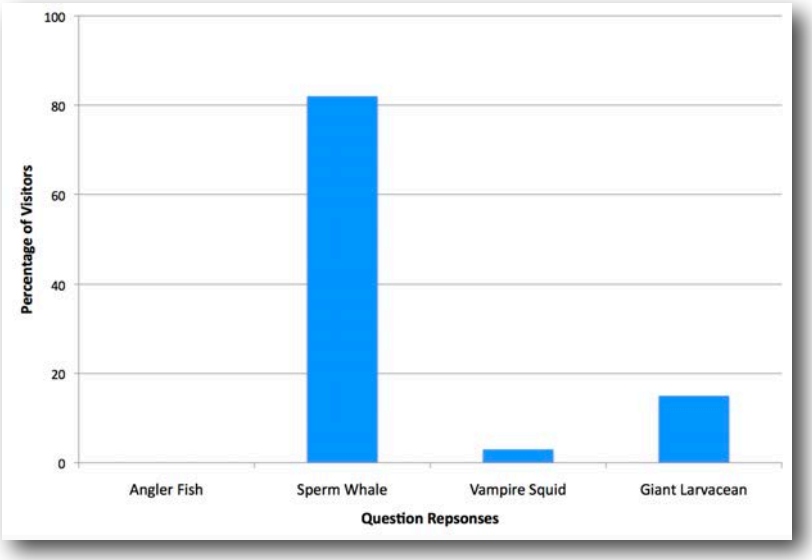
2) Humans have explored and understand most of what exists in the deep ocean.



This statement is false. Over 65% of visitors disagreed or totally disagreed with this statement, while 16% totally agreed with it.

Chart 11. Responses to the question of *human knowledge of the deep ocean*.

3) The primary predator of the colossal squid is...



This multiple choice question asked visitors to name the primary predator of the colossal squid: the sperm whale. The majority of visitors, 82%, answered this question correctly.

Chart 12. Responses to the question of the *colossal squid's primary pedator*.

4) Cephalopods have special adaptations for life in the ocean. Which of the following do you remember?

The following table (Table B) lists the choices of statements visitors had and the percentage of visitors that recalled the information after visiting the exhibition.

Table B. Cephalopod Statements

Responses	Percentage of Visitors
Octopuses usually have 8 arms and no tentacles.	38.6%
Many cephalopods can change the colour and texture of their skin.	31.4%
The only body part in cephalopods is the beak.	38.6%
All cephalopods have hard, sharp beaks for feeding.	36.4%
Squid arms and tentacles can have both suckers and hooks.	29.5%
All cephalopods can use jet propulsion to move.	38.6%
Cephalopods have similar eyes to humans.	25%
Researchers still don't know why deep-sea squids use ink.	36.4%

Survey Section C

The final section of the survey consisted of two open-ended questions where visitors were able to write as little or as much as they wanted regarding their visit. Visitors were asked what they found most interesting in the exhibition, and were asked to provide feedback for improvement of the exhibition.

When we asked visitors to share what was most interesting to them, we received a total of 26 comments. Over 50% of these comments identified an experience with an exhibit, demonstration, or interaction with a bluecoat. A smaller number of visitors, 19%, mentioned something they had learned from the exhibition.

When we asked visitors what could be improved on, we received 10 comments. Visitors made comments about improving lighting in the exhibit hall, having a live aquarium as part of the exhibition, and having more information about the colossal squid but reducing the number of videos in the exhibition.

Discussion

The *Dive to the Abyss!* exhibit had the greatest number of visitors, 73%, engaging in Breakthrough learning behaviours. This is an extremely high percentage and shows the learning successes of the exhibit. However, it was very interesting to notice how children approached the exhibit. They often thought it was a game where they were expected to shoot and kill the different animals. This may have been due to the controls of the exhibit: a joystick to control the depth you could travel to and a bulls-eye graphic focused on the animal on the exhibit screen. After they were shown by an adult or a staff member the actual purpose of the exhibit, they became very involved and engaged in learning from the exhibit.

The *Ocean Issues* exhibit had a medium percentage of visitors reaching Breakthrough learning behaviours while the *Cephalopod* exhibits had an adequate but lower number of visitors reaching Breakthrough learning behaviours.

Visitors self reported that they did gain knowledge and understanding in the *Creatures of the Abyss* exhibition. While some visitors reported higher knowledge on different topics before visiting *Creatures of the Abyss*, visitors still reported an increase in their knowledge and understanding after visiting the exhibition.

Visitors were also able to answer knowledge-based questions regarding the exhibition. Due to the nature of the evaluation methods, it is not possible to say with confidence that this knowledge was gained in the exhibition, however the findings are encouraging considering the goals and objectives of the exhibition seem to resonate as take away messages for our visitors.

Conclusion

It is important to remember that visitor numbers are low because our time for collecting data in the exhibition was quite short.

Based on the observational data collected, our visitors engaged in Breakthrough learning behaviours. Despite low numbers, we were able to watch visitors engage in learning behaviours such as:

- sharing information found on the signs at the exhibits with family and friends,
- making meaning through experiences and knowledge,
- interacting with an exhibit for ten minutes or more.

Survey responses were also low but the responses we received indicated that visitors felt they had increased their knowledge and understanding of diversity in the ocean, treats to the ocean, and ocean research after having visited *Creatures of the Abyss*.

Appendix 1 - Survey

1. Before visiting *Creatures of the Abyss*, how would you have rated your knowledge and understanding of:

a. the diversity of life in the ***deep*** ocean?

1 2 3 4 5

Poor Excellent

b. threats to the ocean?

1 2 3 4 5

Poor Excellent

c. research being conducted in the ocean?

1 2 3 4 5

Poor Excellent

2. After visiting *Creatures of the Abyss*, how would you rate your knowledge and understanding of:

a. the diversity of life in the ***deep*** ocean?

1 2 3 4 5

Poor Excellent

b. threats to the ocean?

1 2 3 4 5

Poor Excellent

c. research being conducted in the ocean?

1 2 3 4 5

Poor Excellent

3. In the deep ocean, creatures commonly produce *bioluminescence*, which is a 'creature-created light'.

1 2 3 4 5

I disagree I totally agree

4. Humans have explored and understand most of what exists in the deep ocean.

1 2 3 4 5

I disagree I totally agree

5. The primary predator of the colossal squid is:

a) angler fish
b) sperm whale
c) vampire squid
d) giant larvacean

6. Cephalopods have special adaptations for life in the ocean. Which of the following do you remember? *(choose all that apply)*

a) octopuses usually have 8 arms and no tentacles.
b) many cephalopods can change the colour and texture of their skin
c) the only hard body part in cephalopods is the beak
d) all cephalopods have hard, sharp beaks for feeding
e) squid arms and tentacles can have both suckers and hooks
f) all cephalopods can use jet propulsion to move
g) cephalopods have similar eyes to humans
h) researchers still don't know why deep-sea squids use ink

7. Tell us what you found most interesting in *Creatures of the Abyss* today!

8. Is there something we can improve in *Creatures of the Abyss*?