



Creating Apps for In-Gallery Interpretation

by Hélène Alonso and Jeff Hayward

Creatures of Light is an application developed as an integral part of the exhibition of the same name designed by the Exhibition Department at the American Museum of Natural History. Apple included it in the “Best Apps of 2012”; it also won the Graphic Design USA Magazine competition, was nominated for a Webby, and received an Honorable Mention from MUSE in 2013. An extended version of the application, prepared and made available for download by the Museum’s Department of Communications and Marketing, was downloaded more than 100,000 times in its first month. Visitors found the application highly engaging, according to the summative evaluation of its use as installed on iPads in the exhibition.

The Context: An Immersive Exhibition Space to Illustrate Bioluminescence

The *Creatures of Light* exhibition was designed to give visitors an immersive experience of bioluminescence, ranging from fireflies in your backyard to glowing fish in the deep ocean. We designed theatrical representations of places like caves and lagoons and offered visitors the opportunity to see how creatures emitted light and how they used that for mating, protection, and other functions. For this we designed a dark environment where every source of light was controlled. We distributed models, diorama elements and entire environmental treatments along the gallery. However, when we began planning for interpretation, we encountered a new challenge: how could we add text and images to a space that could not be lit? And how could we conserve the immersive quality of the design if we filled our scenes with interpretive panels? We solved this

problem by placing a large percentage of our interpretation within iPads.

Adding iPads to the show brought several challenges: design issues related to throughput (the speed of visitor’s pace through the gallery), legibility, housing, and many other issues related to the space; interpretive issues of information design, audiences, and navigation; and finally operational challenges that we will not cover in this article, but that were very interesting to solve and critical to the experience. But before we start talking about the challenges, let’s meet the app:

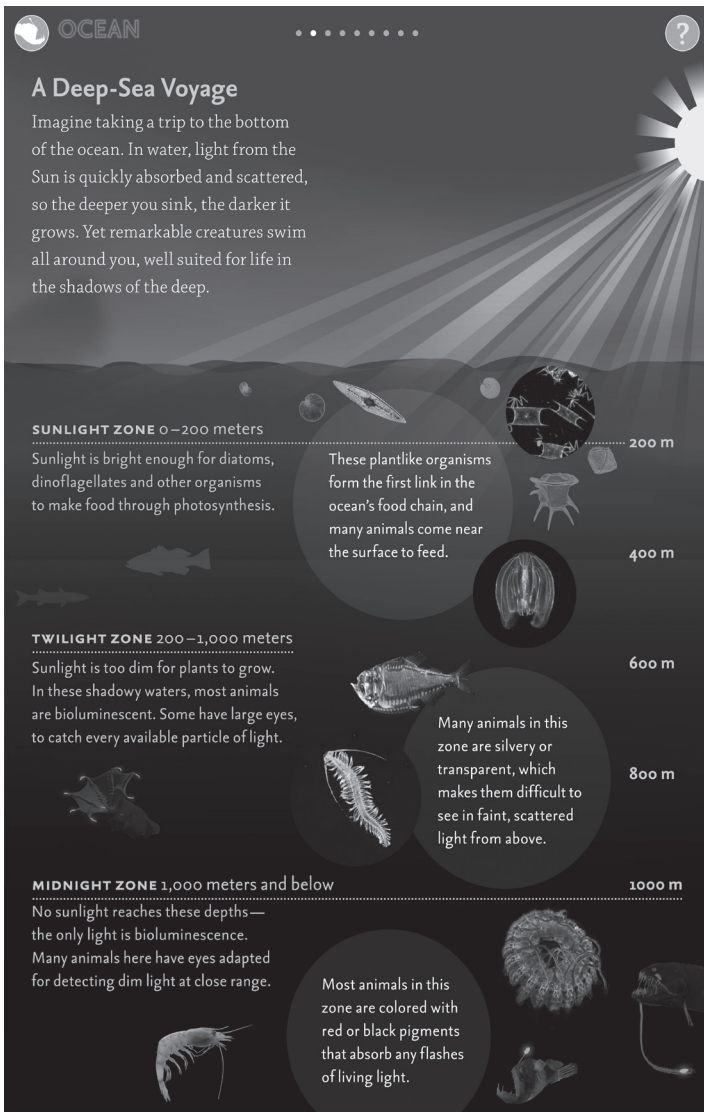
The *Creatures of Light* application is both a bilingual in-gallery interactive and a downloadable mobile app. It presents, through text, HD photographs, infographics, maps, videos, and animations, the fascinating world of bioluminescent creatures. The content is divided into five sections, each one related to a specific environment, and also presents, in the downloadable version, an additional chapter about the exhibition itself. The downloaded version also supports a soundtrack specially composed for the exhibition that is key to the enjoyment of the experience.

To navigate through the content, visitors must swipe their fingers sideways to go to the next page, as in reading a book. However, in this case, the chapters connect in the beginning and the end, creating an endless belt. Most pages are short and occupy one screen, but when content needs to be longer, visitors can swipe vertically and access a deeper take on a story. There are interactive components on each page. In some, visitors touch active spots to access

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The *Creatures of Light* exhibition was designed to give visitors an immersive experience of bioluminescence, ranging from fireflies in your backyard to glowing fish in the deep ocean.



Visitors can scroll down to reveal longer stories or features that benefit from a vertical design, like the layers of the ocean. Photo courtesy of AMNH.

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additional information related to parts of images or maps. There are also areas that can be animated, where users can activate videos, access and control step-by-step animations, open photo albums, and more.

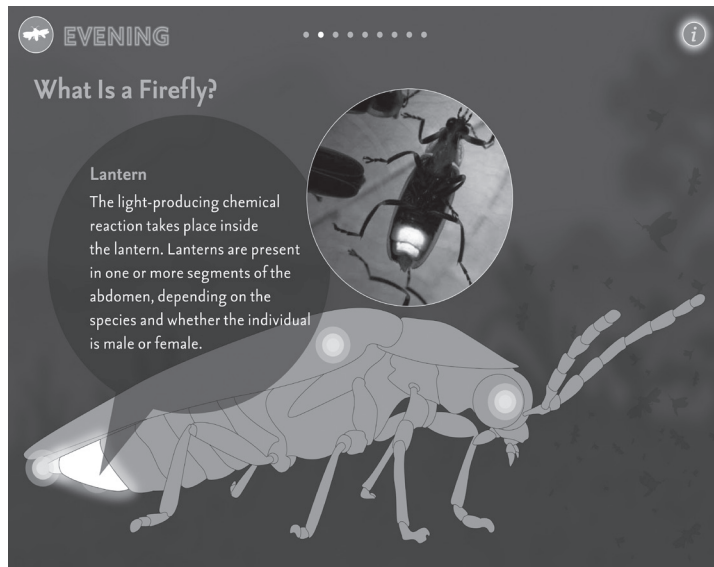
All of these elements were designed with consideration of the audience, engagement, legibility, translatability to other languages, navigation through the information and through the gallery, throughput, technical limitations and efficiencies, lighting, and many other factors. The goal of this article is to share our thinking behind the design of the app and the positive response it received.

Design Considerations

When reading wall panels and label decks, several visitors can read from the same graphic, and there are plenty of panels to engage our wide-ranging audiences. When you condense interpretation within an iPad, information display is not that simple. One can expect only a couple of people to share a screen that small. Therefore, we needed to install several iPads with the same content at each section to make the information available to everyone. To solve this problem, we created clusters of at least three iPads in every section (for a total of 16 in the exhibition), allowing people to sit down and enjoy the content for as long as they wanted. To make them accessible, we built the housing low, so children and visitors in wheelchairs could interact with the content. We also added stools to allow adults to sit down. All the housing and the stools were black, so their presence was discrete and did not interfere with the immersive design. Still, the soft glow of the screens called for visitors' attention, and the content was not missed accidentally.

Interpretive Considerations

We create graphic and interactive interpretation for every exhibition at the Museum. Graphics tend to focus on the overall storyline and are distributed through the gallery; interactives focus on specific areas of content, adding depth and an experience to specific points of the show. This time, a large percentage of the main storyline was intended to be carried by an interactive, distributed along the entire gallery. The idea was exciting, since adding interactivity to our general content would undoubtedly be a plus, but it also created a series of challenges.



A "click" feature allows you to explore all kinds of diagrams, like illustrations or maps. This helps provide multiple segments of text while keeping the graphic nature of the interface. Photo courtesy of AMNH.

The first one was the audience. While we normally design interactives for all ages and have "curiosity" as a main requirement for engagement, the truth is that interactives are mostly used by the young. Because of this we make them highly visual. We also break information into smaller bites rather than long paragraphs, allowing readers to jump from one piece of information to the other. Graphics panels, which are preferred by older audiences, have a lot of these elements too, but tend to rely on somewhat longer paragraphs. In general, graphic panels have a lot more text than interactives, since they do not have interactivity itself as a form of interpretation. So the first challenge we had to solve was how to adapt content normally directed at older audiences to a format that was accessible for younger visitors. And by "young" we mean approximately ages 7 to 25. We solved that by:

- breaking the content into the smallest chunks we could;
- relying on captions to visual materials as the main vehicle for information delivery;
- leaving the most complex explanations to step-by-step animations that the user could control;
- adding media to the mix, so the magic of real bioluminescence "in action" could be appreciated.

Another interpretive challenge was related to the order in which visitors would access the information. Graphic panels are

presented one after the other, creating if not a strong linear narrative then at least a loose one where visitors are presented with some concepts before others. While sitting at the iPad stations, visitors could "arrive" at any screen, and so we could not be sure they would read the beginning before the end. We solved this in two ways: first we added a home button that took visitors to the beginning of the chapter, and second, we created each chapter as a belt, linking together both beginning and end. This allowed visitors to slide the screen sideways to access the next bit of information, and go on and on without ever hitting an end. They simply returned to pages they had already seen. The sections each had an introduction, but it was not essential, and the segments within the chapters were independent from each other.

Depth of information was another issue. An iPad screen is much smaller than a typical panel. How could we show short appetizers of information and big meals as well? To access information, users would move through "pages" that contained information units. These units were carried mostly by a dominant graphic that was then interpreted through active spots, displaying more information. But for some stories, this was not deep enough. So we added a function to create "depth" that was graphically literal. Swiping the pages horizontally would allow our users to

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access normal information, but to access deeper content, they would have to slide vertically. These stories were either longer, or related to stories that use depth as part of their visuals, like the layers of the ocean, for example. We used this feature to give the content several meanings.

content (very easily). This has proven to be one of the best investments we have made. We also installed a series of provisions within the iPads, so they would work continuously in the gallery. These provisions have allowed us to use the system at AMNH and to install it at the Field Museum—and soon in the Canadian Museum of Nature—without major problems. We have received a great deal of praise from our in-gallery visitors, from our download users, and from the venues where the exhibition has been shown.

Learning About What We Did Through Evaluation

For over a decade, AMNH design teams, working in concert with the Museum’s Education Department, have reflected on temporary exhibitions by performing summative evaluations of visitor experiences. For *Creatures of Light* the design team wanted feedback on these topics: reactions to the dark exhibition space, visitors’ understanding of the sequence of immersive physical settings, use and understanding of the app on iPads, and the custom-created music soundtrack. From the evaluator’s point of view, it’s great to have a design team that wants to follow up and learn about visitors’ reactions to their initiatives. This is especially important when, as happens at AMNH, that learning is put to good use for future projects.

The team’s questions and concerns about the iPad app included: Who’s using the iPads? Is it primarily children? (This is a challenge noted about many of our interactives.) Are visitors getting something out of these stations or just swiping-and-playing? Do they recognize that the content is different in different



The “click” feature can take many shapes. It can be a diagram to click, a map or an album to explore. It is a very versatile piece of functionality that can be re-designed over and over. Photo courtesy of AMNH.

We created the app from start to finish, including not only the content and design but also the programming and installation in the gallery. On these subjects we could write another article, since technical considerations such as programming, equipment, and networks were innovative, numerous, and complex. But we can mention a couple of things: first, we programmed an entirely new framework that could be repurposed to make new apps by just switching out the

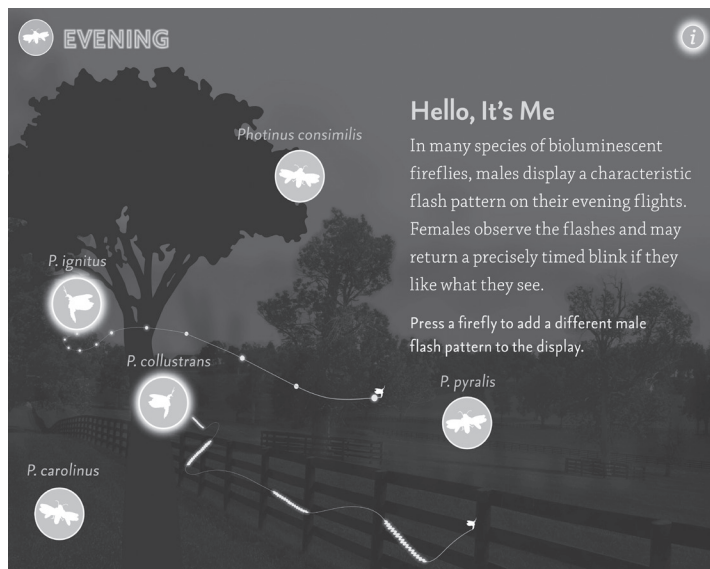
areas of the exhibition? We investigated such questions with multiple methods: exit interviews from the exhibition (n=240), observations of who was using the banks of iPads in three sections of the exhibition (n=269) followed by an interview if the user was over 8 years old (n=178), and interviews about the music perception and its specific use in the gallery (n=113).

Evaluation findings included these outcomes:

- the app has broad appeal in the exhibition: 69% of adult visitor groups and 83% of families used at least one iPad;
- for visitors who actually stopped at an iPad for more than a few seconds, the median duration of use was 2 minutes 28 seconds (adults, and parents using it with kids, had substantially longer average times, compared with children using it alone);
- most visitors' use of iPads involved social interactions (74% of observed use);
- there was clear evidence of take-away content: when asked "What was the most interesting thing you saw or found out about?" roughly 80% of visitors age 8 or over reported specific content from the app. (People, Places & Design Research, 2013).

Some of the comments from visitors about what they liked were:

It's interactive and you can get more information, the slider was cool.



The "click plus animation" feature allows you to activate small pieces of animation within a larger graphic environment, helping integrate several pieces of content and giving the app a magical look. Photo courtesy of AMNH.

Goes at your own pace and you can go back and go deeper.

I control the flow of information, my seven year old loved to look at everything.

It explained better than something on the wall; I liked the animations.

User-friendly, gave a lot of information in a very clear way.

Very cool, fun.

These were a nice addition—time to sit and read more.

Really fun for kids—I liked them too because they gave more information.

Ultimately, this was a worthwhile experiment, introducing a new media option that supported the storyline of the concept and the character of the primary spatial experience. By providing data about the thinking behind the design and how visitors used these iPad stations, we hope that other exhibit creators can make effective use of this new media too. For us at AMNH, the experience of designing this app was so exciting, creative, and satisfying that we are making another one. So stay tuned for *The Power of Poison* and our new downloadable mystery game. ✨

Reference:

People, Places & Design Research. Summative Evaluation of *Creatures of Light* at the American Museum of Natural History. Unpublished research report, 2013, 63 pp.

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