

DESIGN DOCUMENT

# Whale Box

An **interactive project** by  
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Amy Zhang

MSC2006 Advanced  
Media Design  
Technologies

Prof. Michael Corrin



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- Project Workflow
- Research
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# Overview

## About Whale Box

Whale Box is a guided tour of physical and social characteristics of different whales and marine animals. It is intended for wildlife conservation outreach and education. Although linear narratives (e.g. documentaries) exist to serve this purpose, there are few interactive experiences that invite exploration and educate users at their own pace.

To fill this gap, Whale Box will meet the following objectives:

## Objectives

- 1 Create a didactic narrative tailored to our audience that features unique facts about different whales and marine animals
- 2 Develop a visual-focused, interactive application that invites exploration and uses scaffolding to guide users at their own pace
- 3 Design and evaluate the usability of the application

## Learning Goals

This course-based project will further the creators' skills and techniques:

- 1 Learn and apply interaction design, asset production and development techniques that aid our other projects
- 2 Create and carry out a feasible plan for smooth handoff between design and development
- 3 Coordinate workflow and communication across a seven member team, from conception to development

## Audience

Whale Box is intended for an English-speaking adolescent audience without background knowledge in the subject. It combines lay language with stylistic, didactic visuals that engage young audiences.

## Medium and Venue

Whale Box is a web-based application accessible via a laptop or desktop computer. This medium was chosen due to our audience's technological aptitude and access to such technologies.

## Timeline

Design and development occurred from February 04, 2022 to March 25, 2022. Usability testing will occur from March 25, 2022 to April 8, 2022. See **Project Workflow** for details.

## Minimum Viable Product (MVP)

The MVP is a working interactive prototype of the **narwhal module** in Unity. This prototype will contain all 3D assets intended for the final product. Only the Physical Features section will have an active hotspot, and 2D assets for this hotspot will be produced. This MVP was designed to include elements and workflows that require usability testing.

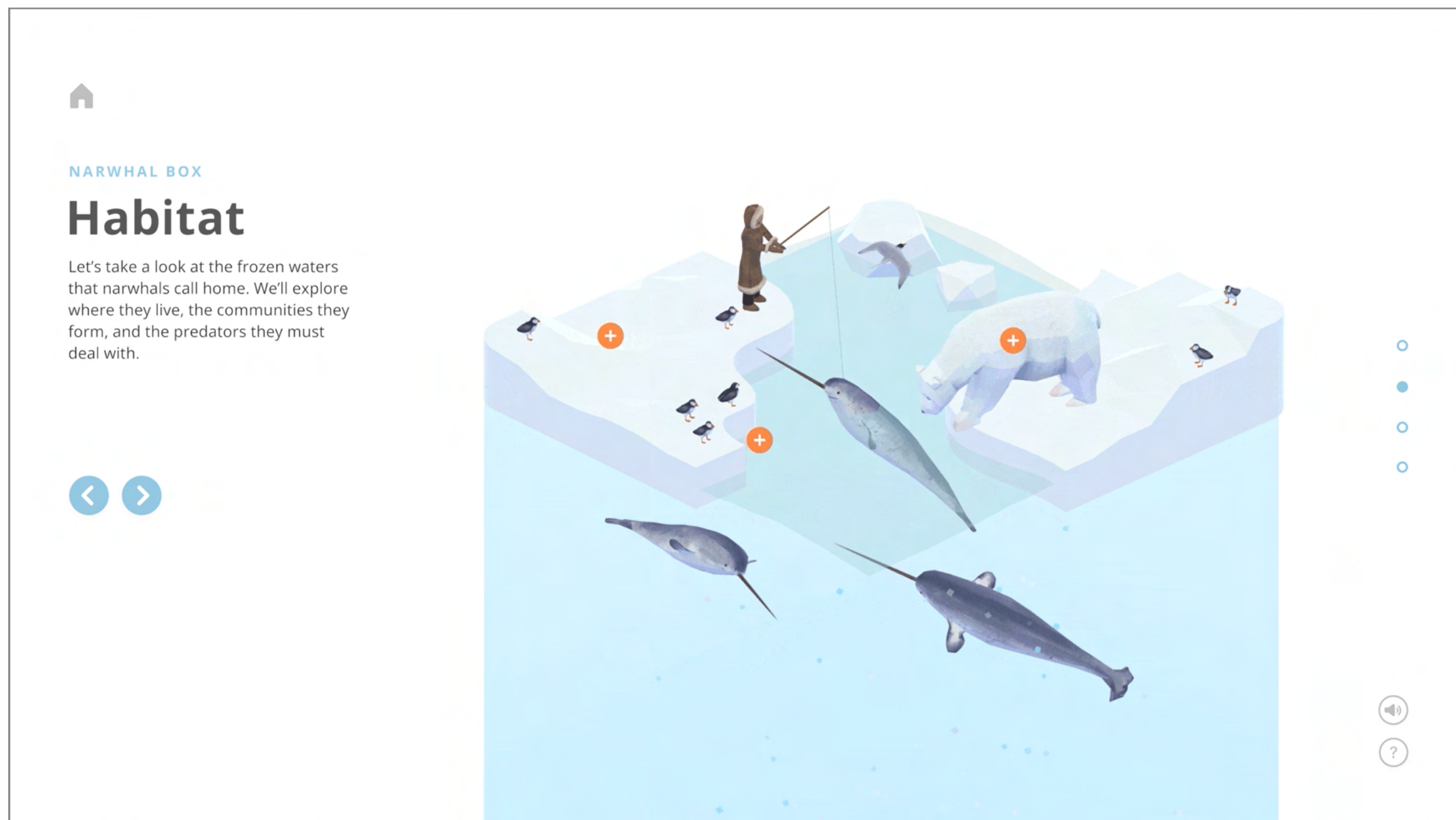
## Credits

Whale Box is a collaborative effort by Amy Assabgui, Viktoriya Khymych, Shehryar (Shay) Saharan, Abeeshan Selvabaskaran, Jennifer (Jenn) Shao, Mengyu (Aimy) Wang & Ke Er (Amy) Zhang, supervised by Prof. Michael Corrin. We thank Ata Dogan for contributing his Unity expertise. Whale Box was designed for MSC2006 Advanced Media Design Technologies under the Biomedical Communications (BMC) program at the University of Toronto.

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# Overview

Watch the [video walkthrough](#) here.

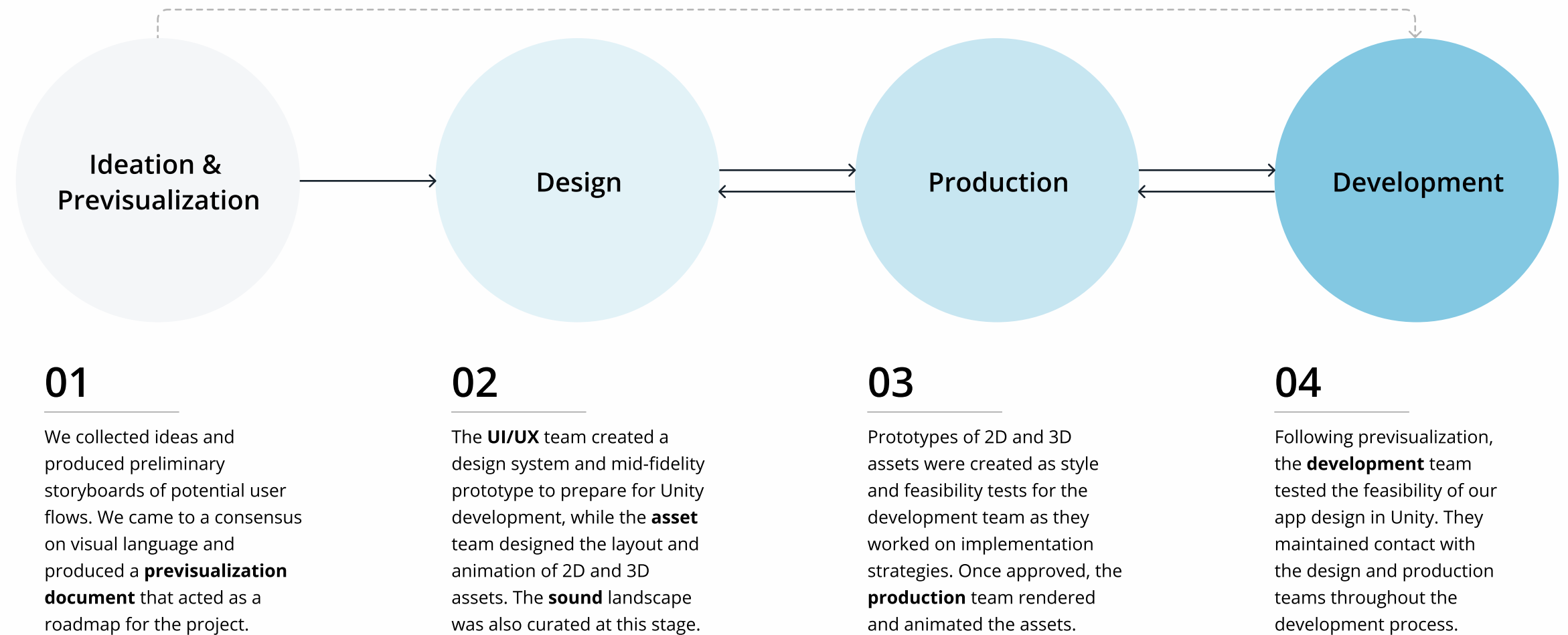


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# Project Workflow

We used a design thinking approach for this project. Based on initial research and a scan of existing resources, we identified a need and began by ideating as a group. We iterated on our work collectively within and between each stage of the design and development process.

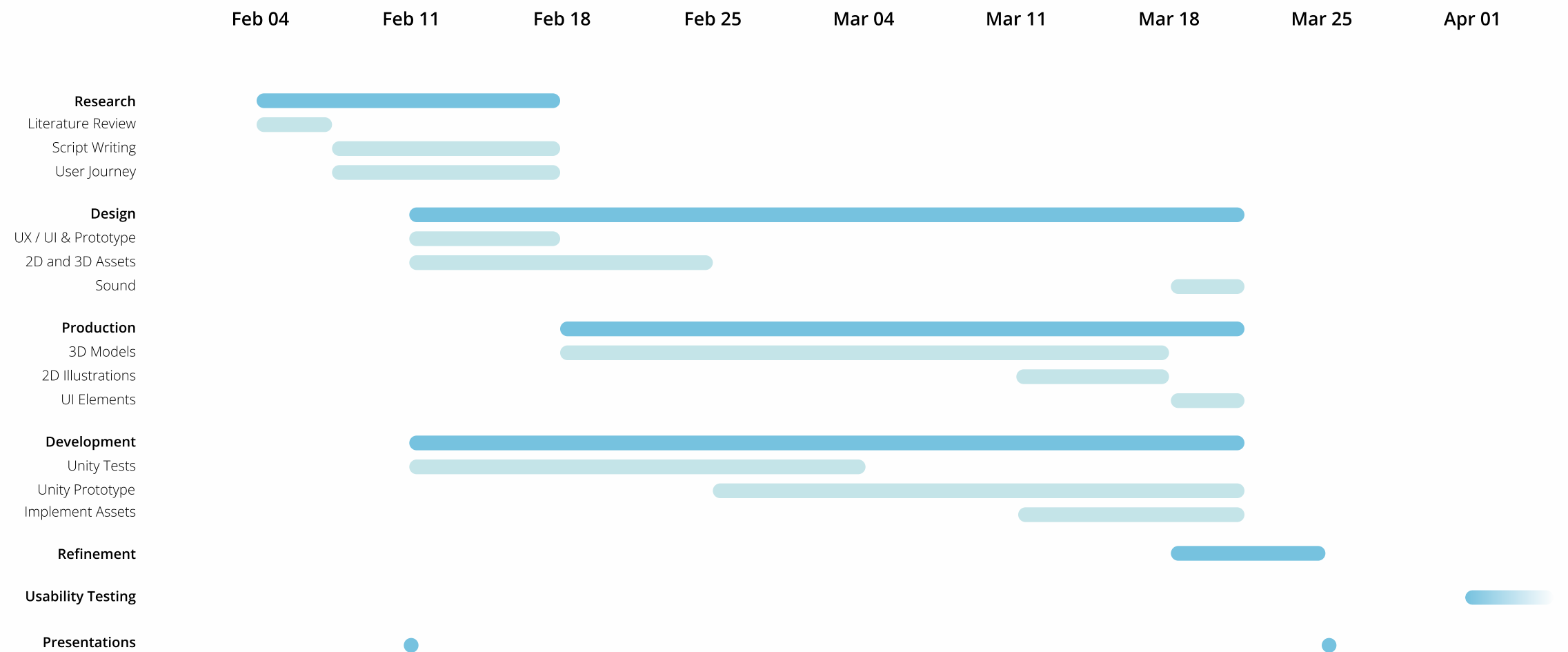
Every team member contributed to different stages of the project, and each stage was coordinated by a team lead. The project itself had an overall manager that delegated tasks and oversaw weekly milestones.



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# Project Workflow

## Timeline



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# Project Workflow

## Roles & Responsibilities

|           | Preproduction |            |         |       |       | Production |    | Development | Admin.        |
|-----------|---------------|------------|---------|-------|-------|------------|----|-------------|---------------|
|           | Research      |            | Design  |       |       | 3D         | 2D | Unity       | Documentation |
|           | Script        | Storyboard | UX / UI | Asset | Sound |            |    |             |               |
| Viktoriya | ●             | ●          | ●       | ●     | ●     | ○          | ○  | ○           |               |
| Aimy      | ●             | ●          | ●       | ●     | ○     | ○          | ○  | ●           |               |
| Jenn      | ○             | ●          | ●       | ●     | ●     | ○          | ○  | ●           |               |
| Abeeshan  | ○             | ○          | ○       | ●     | ○     | ●          | ○  | ○           |               |
| Amy A     | ○             | ○          | ●       | ○     | ○     | ●          | ○  | ●           |               |
| Shay      | ○             | ●          | ○       | ○     | ○     | ○          | ○  | ●           |               |
| Amy Z     | ○             | ●          | ○       | ●     | ○     | ●          | ●  | ○           | ●             |

- Lead
- Contributor
- Consult

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# Research

## Media Audit & Literature Review

When conducting the media audit and literature review for the Whale Box, the key was to make informed decisions that would integrate the group's ideas with what was appropriate and relevant for both the **audience** and **medium of choice**.

Guiding questions included:

- 1 What physical, social, or environmental characteristics make the narwhal interesting?
- 2 What is our pedagogical intent with this exhibit, and how will that inform the content we will show?
- 3 What type of content would be fitting for our choice of medium (3D, interactive)?

Many of the resources found during the initial media audit, even from reputable publications, cross-referenced themselves, lacked depth, and were almost always targeted at children. However, the media audit was useful for narrowing the scope of our project, and we were able to proceed with a deeper review of published sources.

The primary resources from the literature review included scientific literature and doctoral dissertations, as well as investigative reports on traditional ecological knowledge conducted by governmental organizations. From these, an outline was constructed that would serve as the basis of the script and aid in the development of storyboards with ideas for user experience, interactivity, and content.

## Script & Interaction Planning

When writing the script, the priority was maintaining a clear guided storyline with appropriate transitions in the narrative, while also scaffolding the information appropriately. Writing the script in a question-answer format helped maintain control over both the narrative and the suitability of the content for the intended audience.

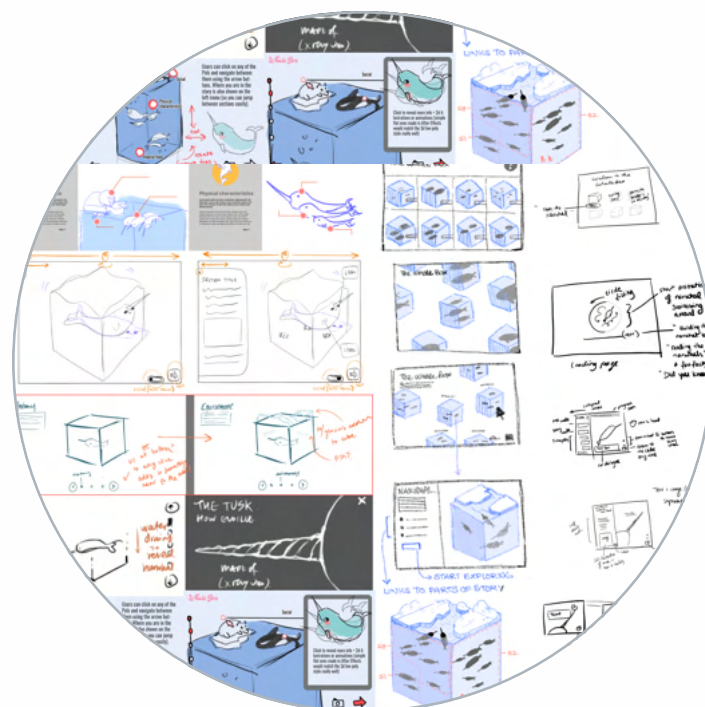
A key consideration when planning interactions was making the entire user journey visible immediately for clarity. As such, we planned for distinct scenes to be at different levels within the cube, with appropriate grouping of informational categories. The content of each clickable hotspot guided the level of interactivity to be implemented without compromising the cleanliness of the UI.

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# User Journey

The user journey was a collaborative effort between the entire team. Once a content outline was created, members diverged to sketch the potential user experience, and converged to create a collective user journey.

This user journey served as the basis for collaborative prototyping, storyboard drafting, animation planning and script writing.



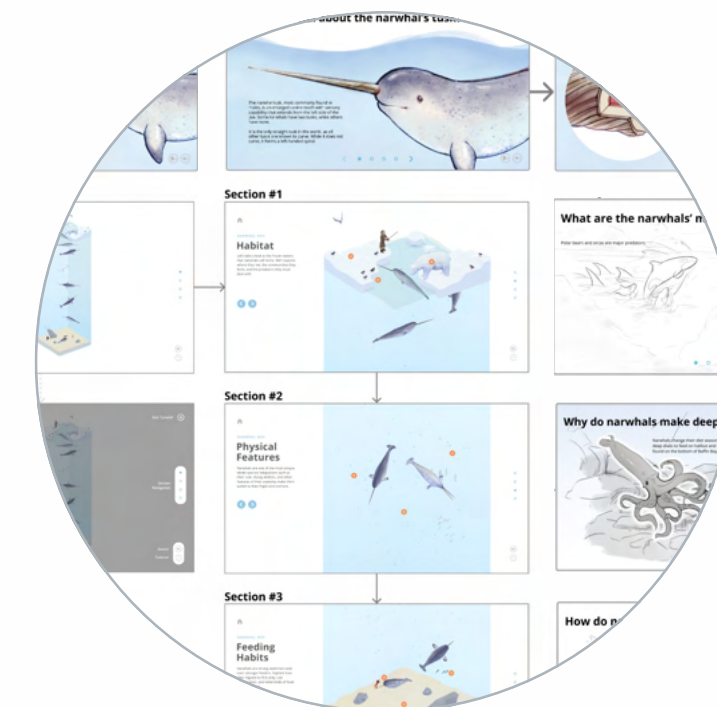
## 01

Individual Sketches



## 02

Collaborative User Journey



## 03

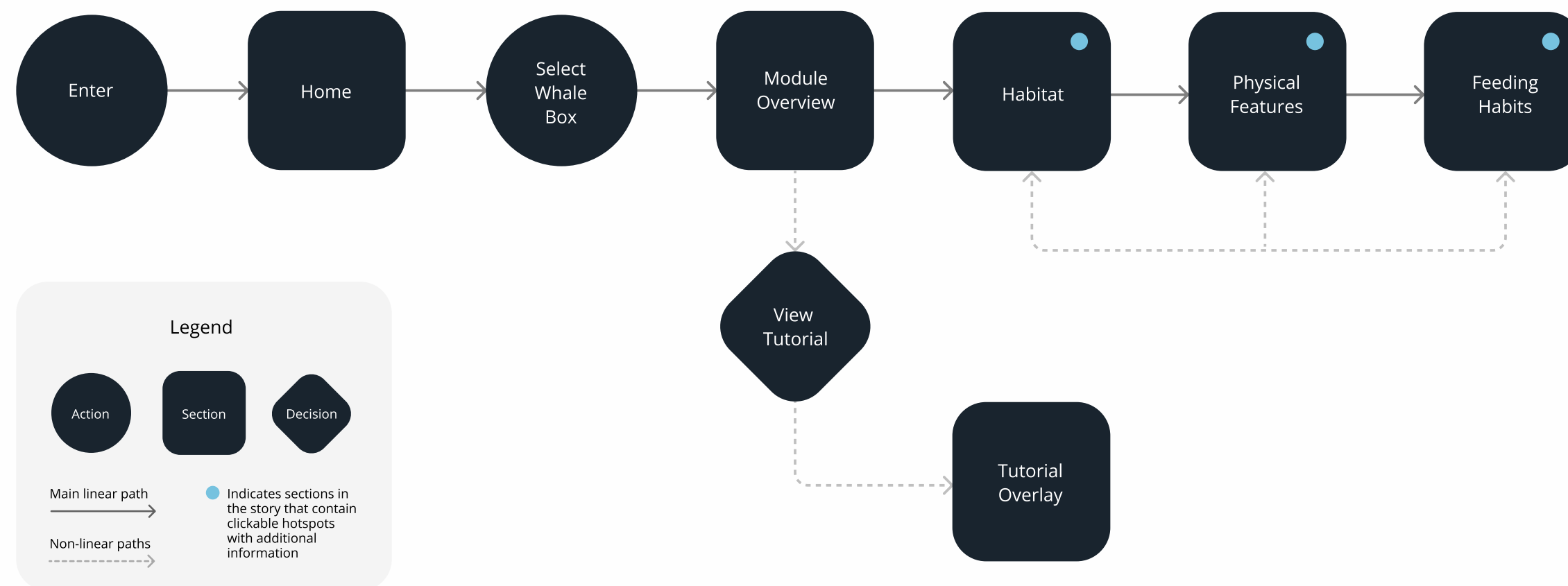
Storyboards & Interactions



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# User Journey

After we refined our concept, we created a user journey map to visualize the paths a user may take through the application.

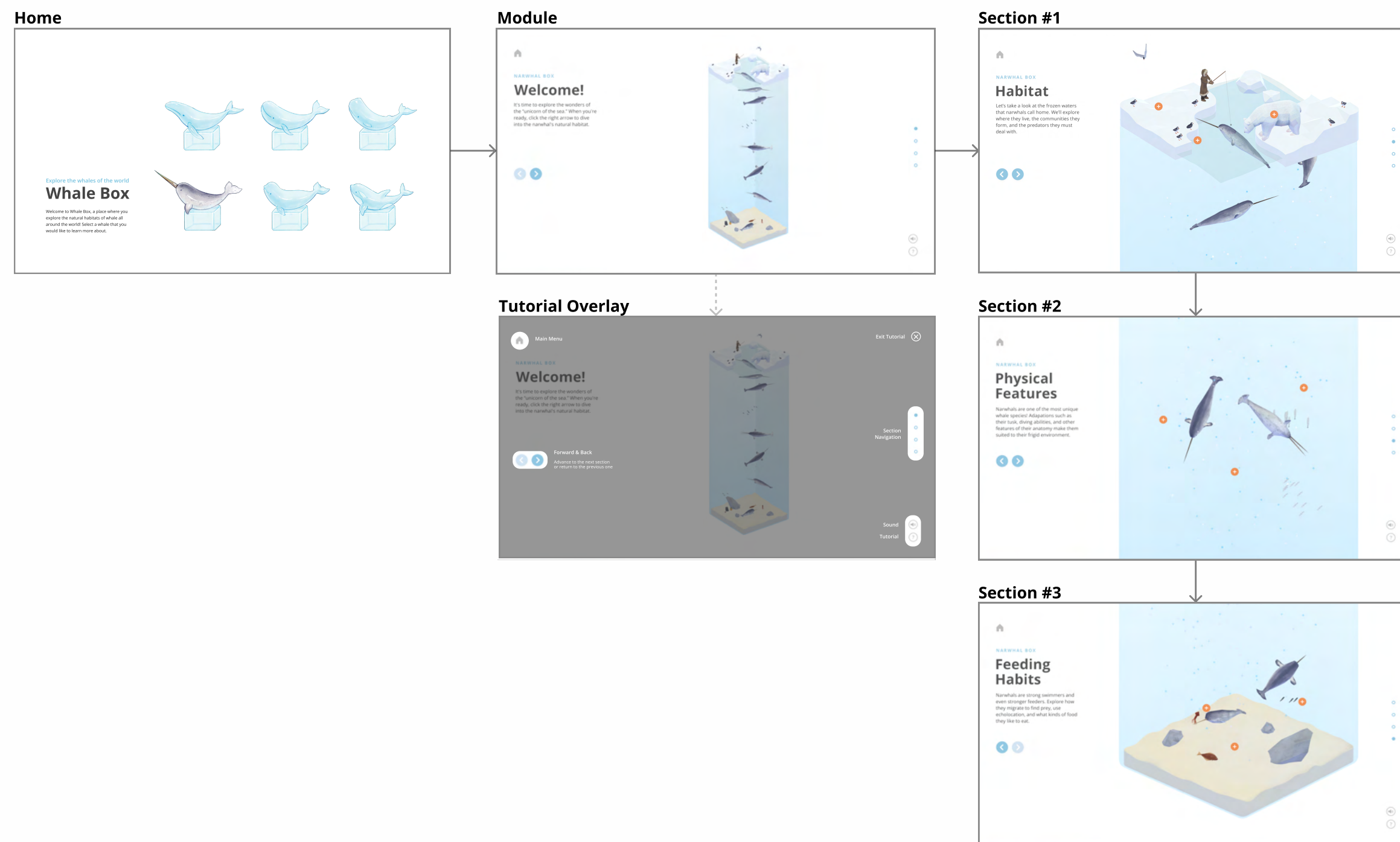


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# User Journey

After creating a user journey map, we designed storyboards and animations for sections and hotspots within the application.

These storyboards served as the basis for our mid-fidelity prototype, which included interactions and copy. Check out the [prototype](#) here.

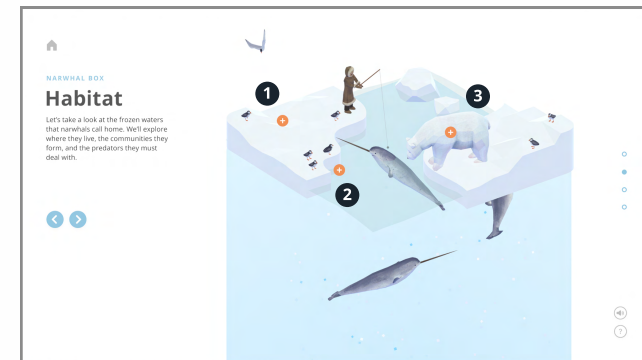


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# User Journey

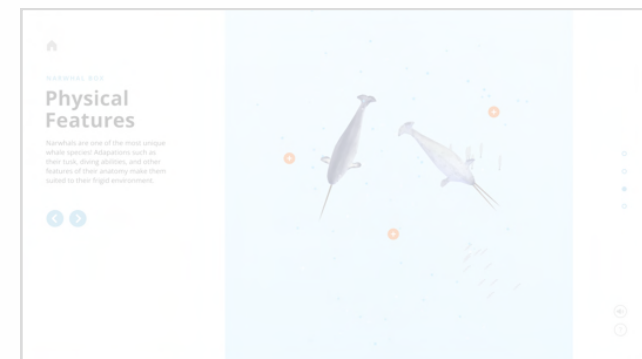
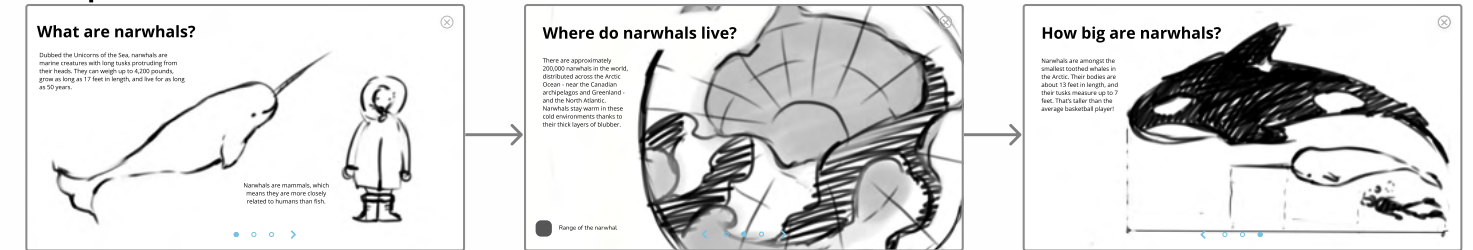
These are storyboards for hotspots in the Habitat section.

## Section #1



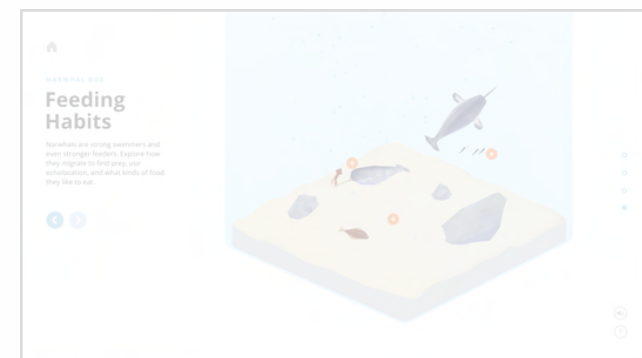
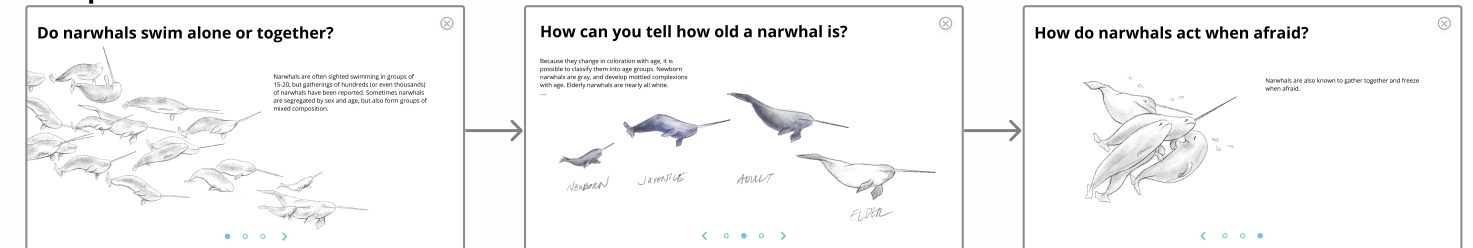
1

### Hotspot #1



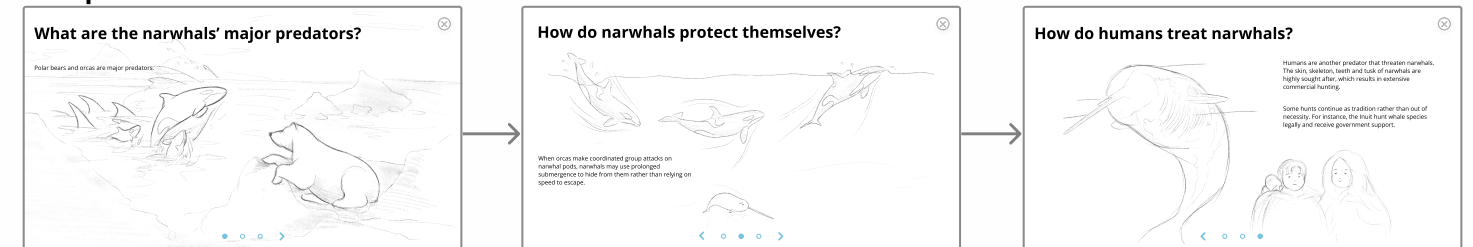
2

### Hotspot #2



3

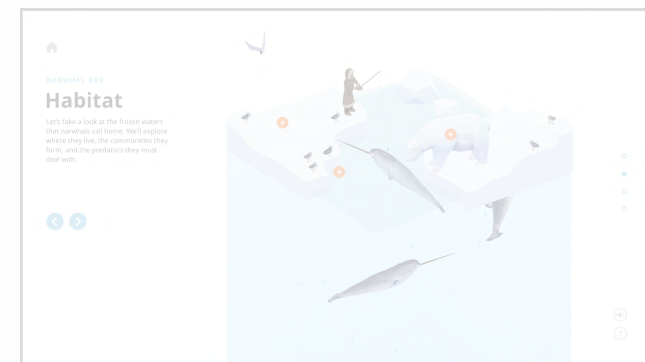
### Hotspot #3



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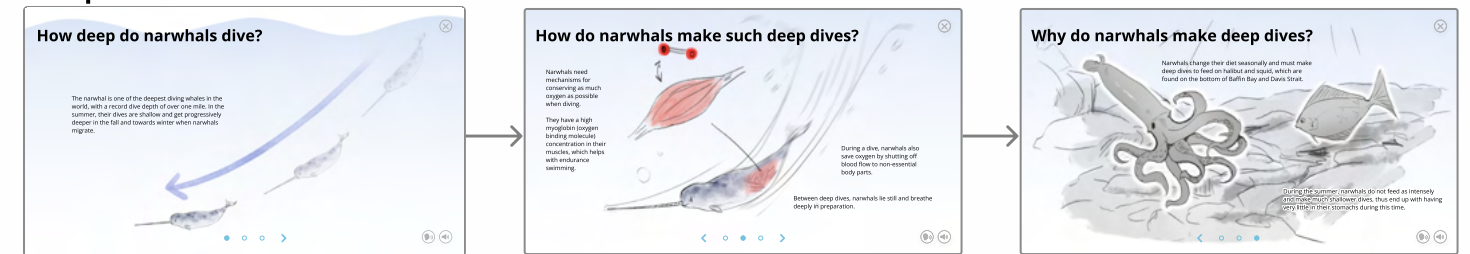
# User Journey

These are storyboards for hotspots in the Physical Features section.

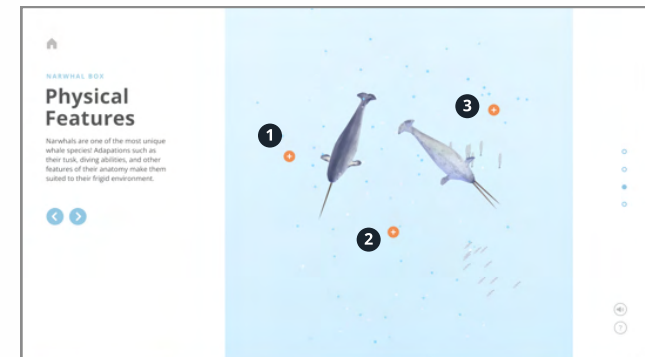


1

## Hotspot #1

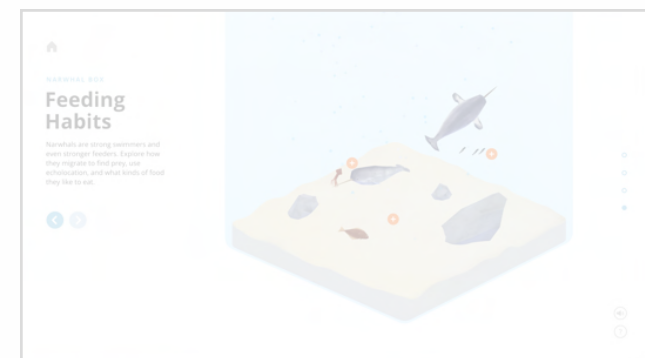
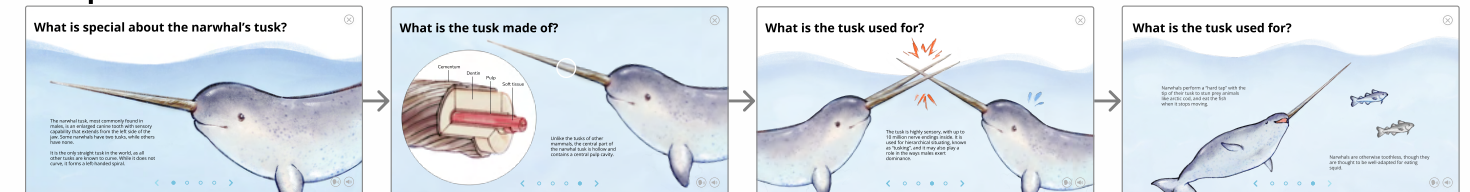


## Section #2



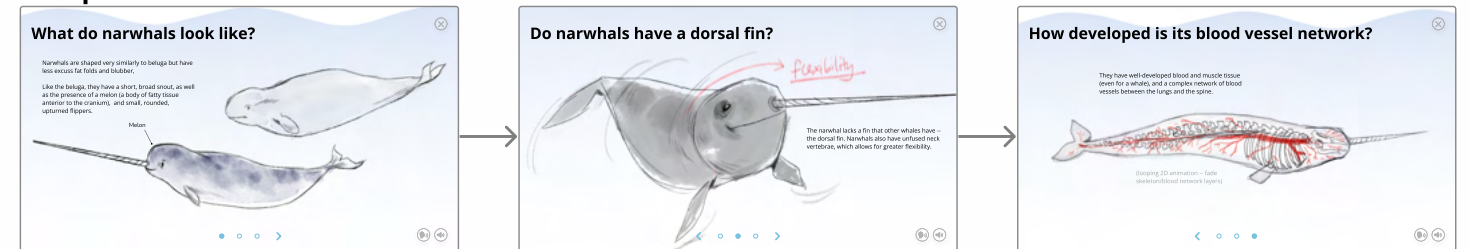
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## Hotspot #2



3

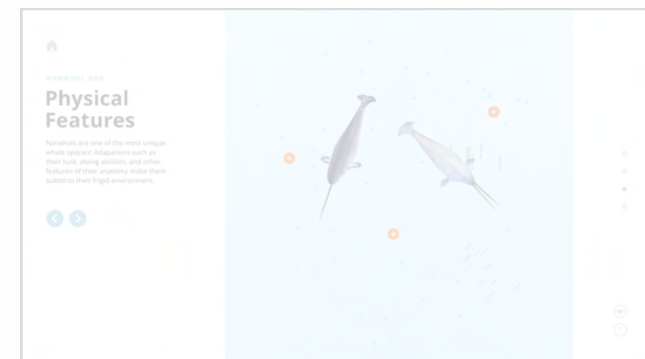
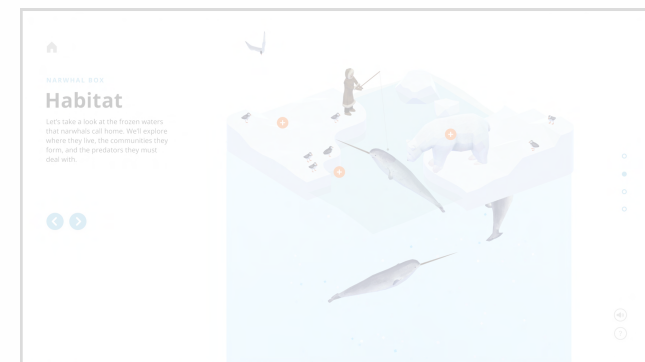
## Hotspot #3



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# User Journey

These are storyboards for hotspots in the Feeding Habits section.

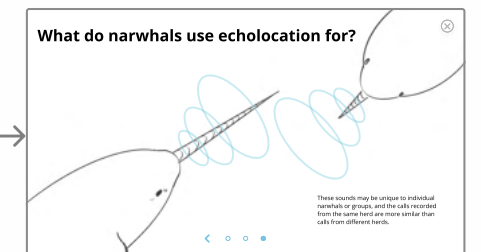
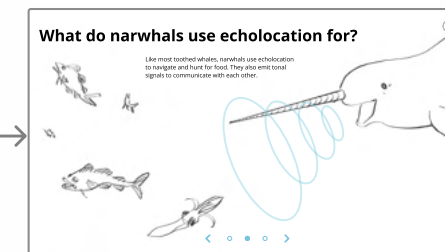
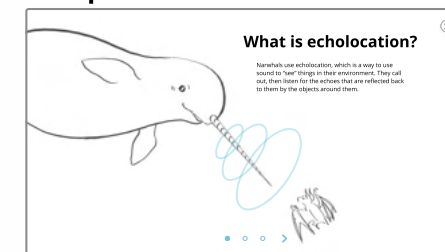


## Section #3



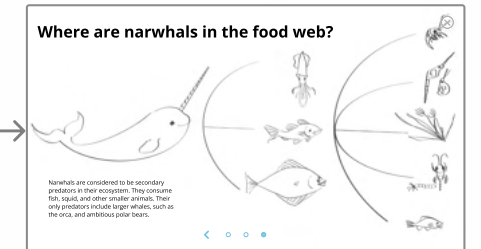
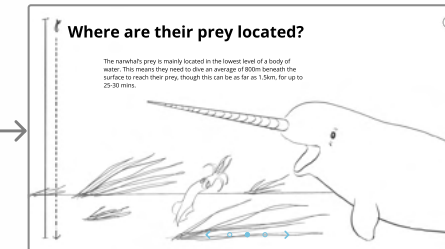
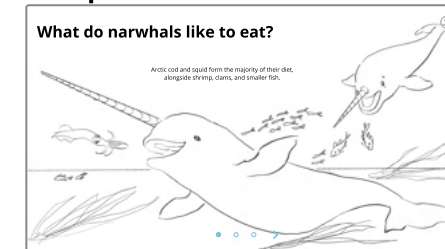
1

### Hotspot #1



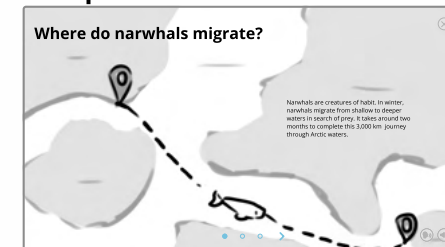
2

### Hotspot #2



3

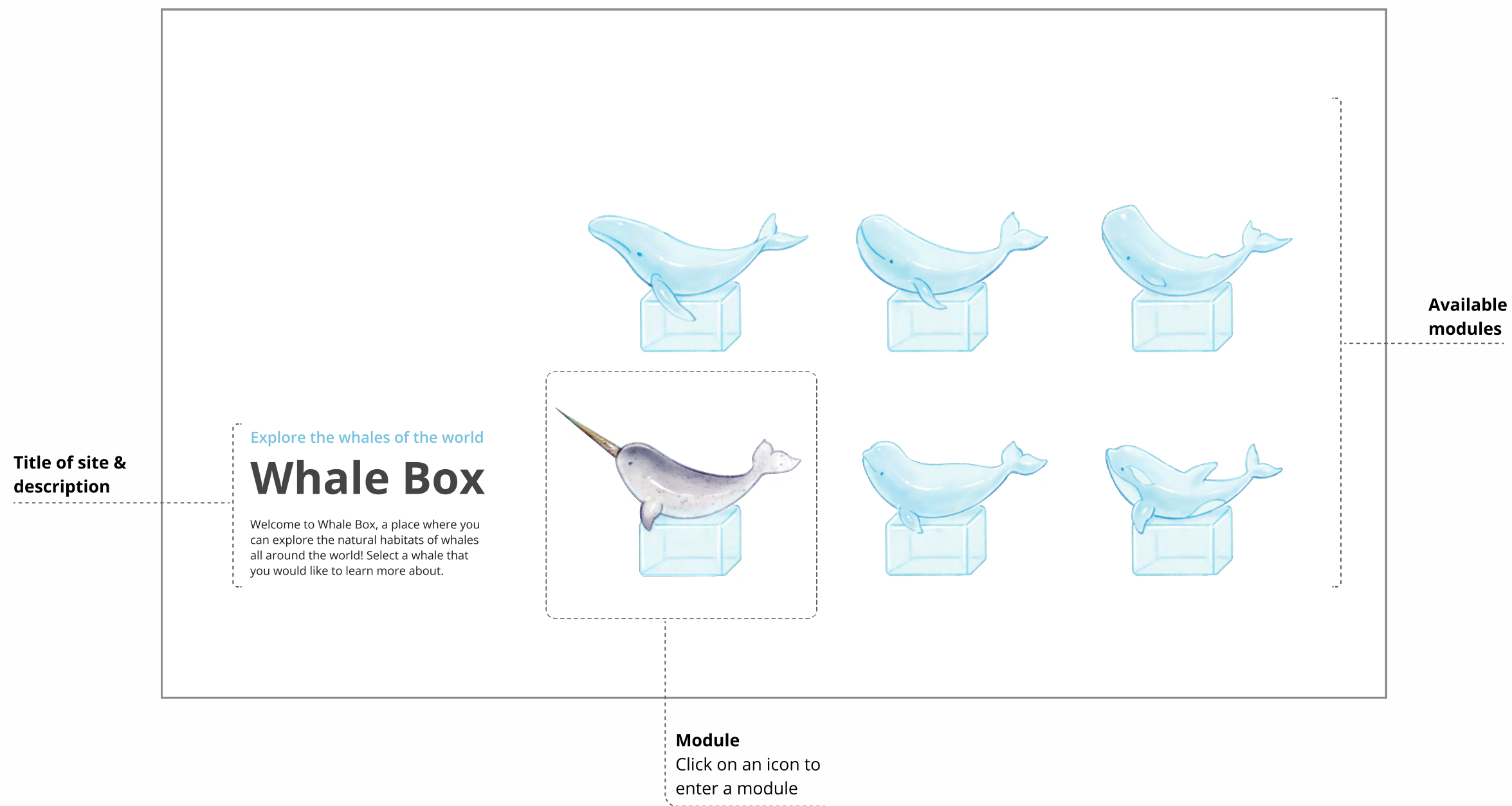
### Hotspot #3



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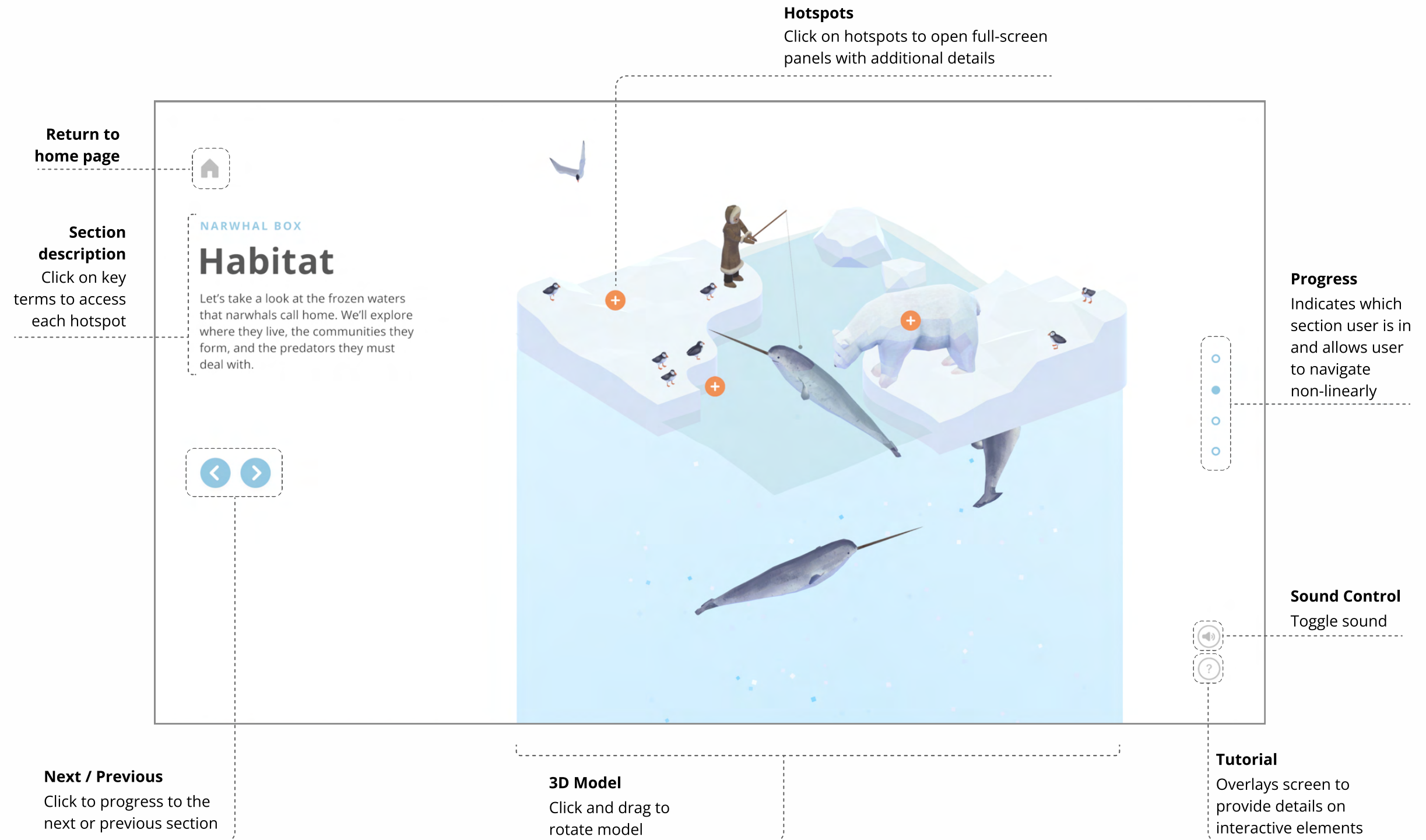
## Home Screen | Mid-Fidelity



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# UI Design

## Module Screen | Mid-Fidelity



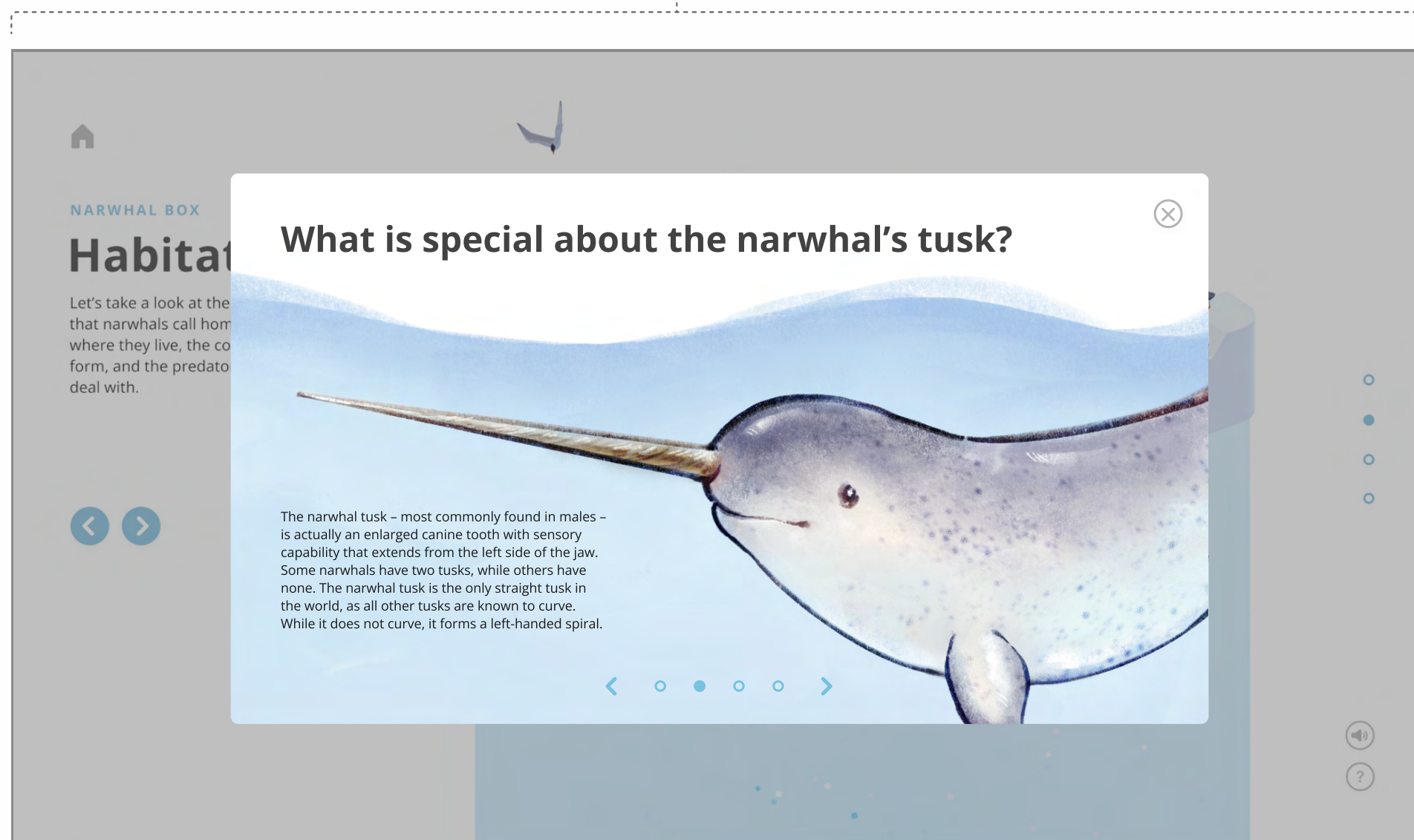
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# UI Design

## Pop-up Screen In-Context | Mid-Fidelity

### Background overlay

Interface behind the pop-up is darkened and unclickable.

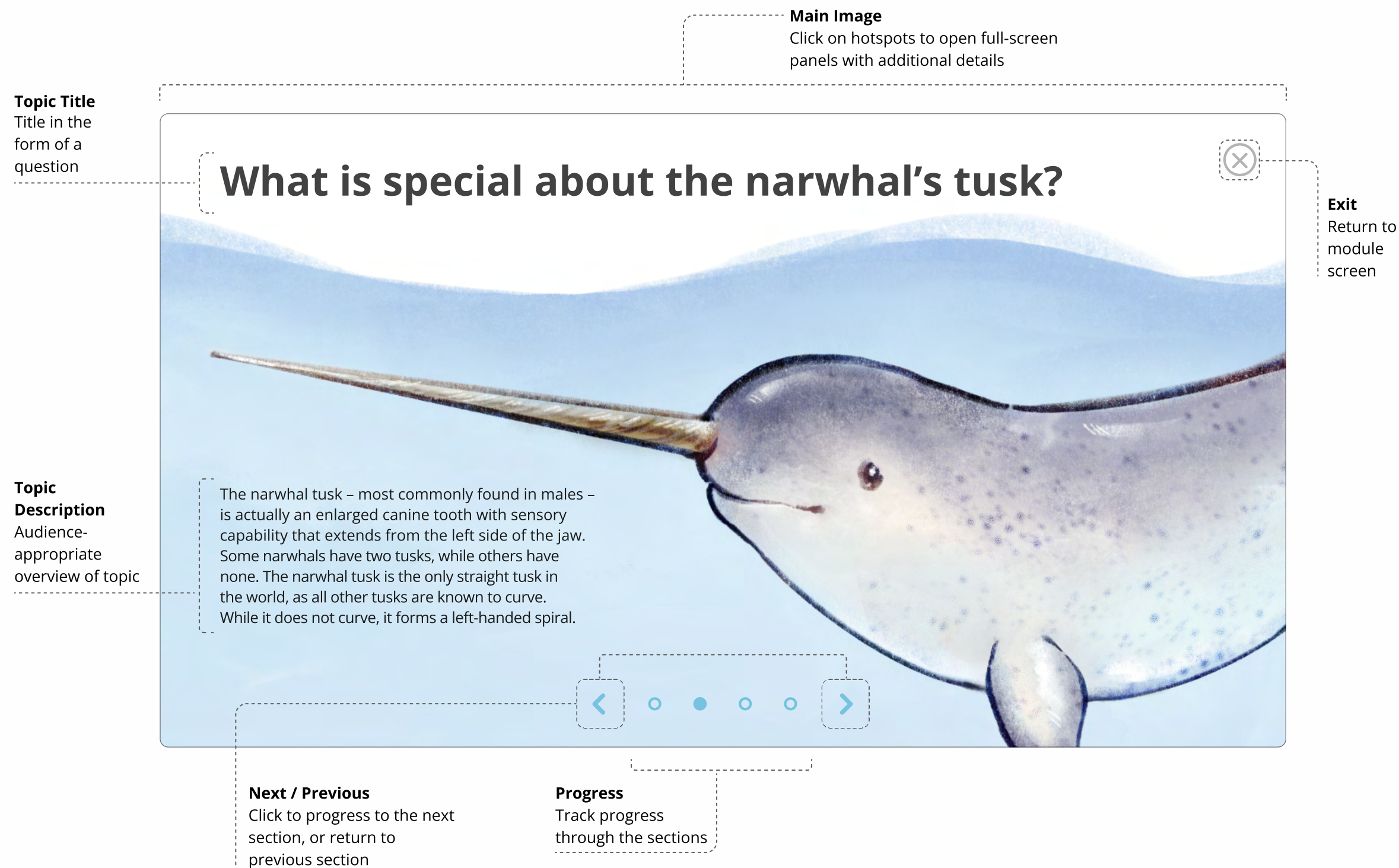




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# UI Design

## Pop-up Screen | Mid-Fidelity



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# UI Design

## General | Typography

The overall user interface is designed to be clean and intuitive. Blue coloured elements in front of a white background were chosen to complement the aquatic environment. Components were rounded for a softer aesthetic and to suit the typeface.

# title

open sans | bold | 75pt/auto | #595959

# section title

open sans | bold | 63pt/120 | #595959

# hotspot title

open sans | bold | 48pt/96.9 | #595959

## subtitle

open sans | semibold | 24pt/auto | #76C2DF

## body text

open sans | regular | 18pt/auto | #595959

## labels

open sans | semibold | 18pt/auto | #595959

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# UI Design

## General | Buttons

DEFAULT      HOVER      ON CLICK      INACTIVE

Forward / back



Main menu



Tutorial



Sound effects



DEFAULT      HOVER      ON CLICK

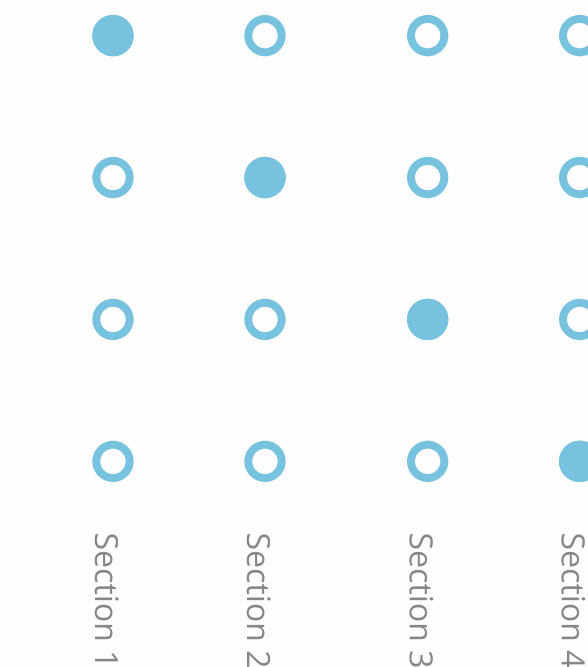
Hotspot



Progress dots hover



Section progress dots



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# UI Design

## Pop-Ups

DEFAULT      HOVER      ON-CLICK

Exit



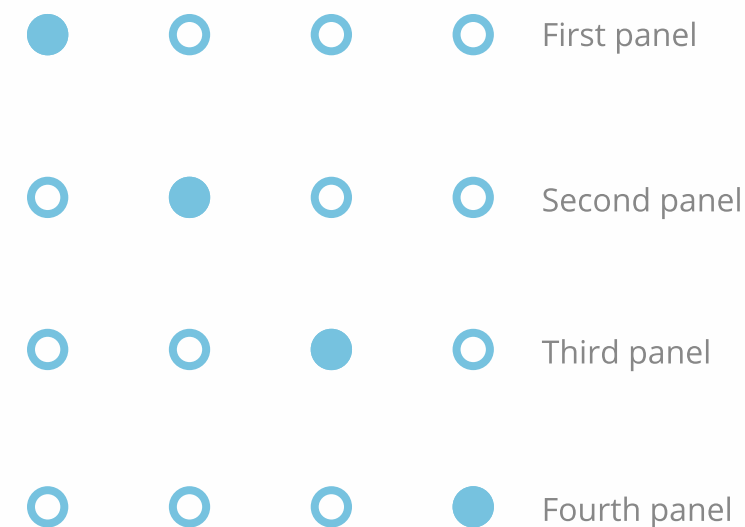
Forward



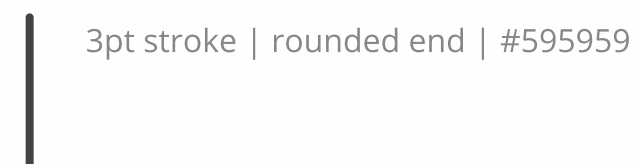
Backward



POP-UP PROGRESS DOTS



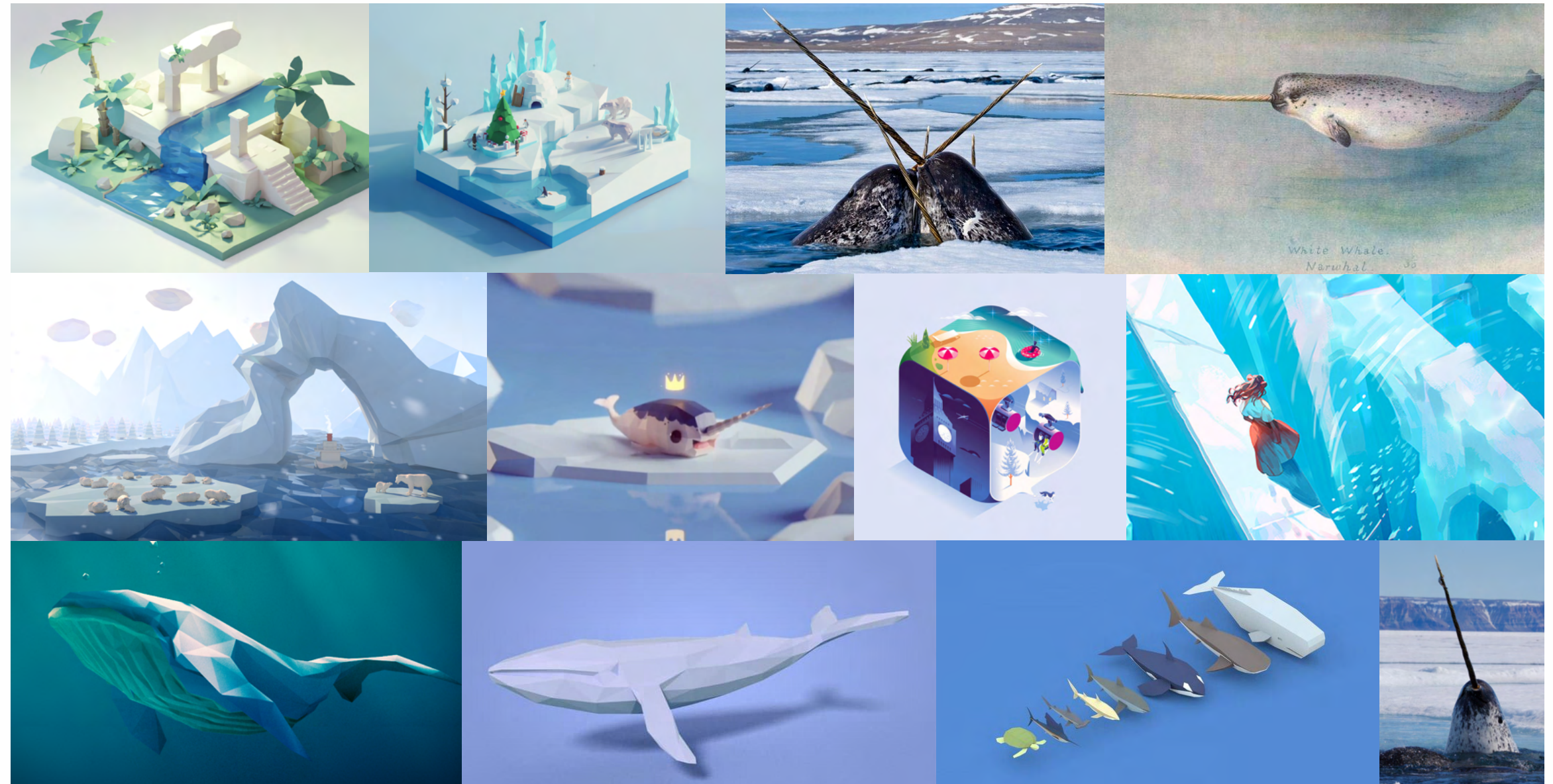
LEADERLINES



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# Asset Design

Minimalistic, low-poly 3D models of marine life and other animals were a key point of inspiration for this project. We used a similar style in Whale Box's 3D models and carried this style throughout the application.

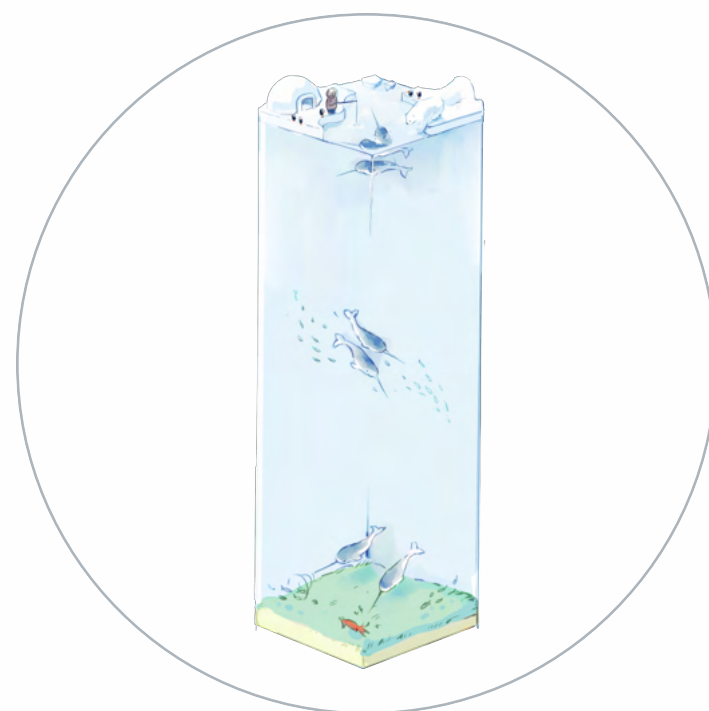


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## 3D Assets

The cube layout was created to reflect the topics of interest identified in our research. Each section of the cube contained a group of 3D assets that interact with one another to enact a story within each hotspot.

Orthographic views were illustrated, then the models were built, textured, and animated. We prioritized fun and comprehension by designing simplified, playful versions of real-life interactions.



### 01

Asset Layout



### 02

Texture &  
Render



### 03

3D Animation

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## 2D Assets

2D assets were created with clarity and appeal in mind. The final colour palette was chosen to complement the 3D assets while maintaining a distinct style. Subtle 2D animations enacted the story in the hotspot.

Both the 2D and 3D assets were designed to maximize understanding while minimizing cognitive load. View the full list of assets as well as the copy in the [content inventory](#).



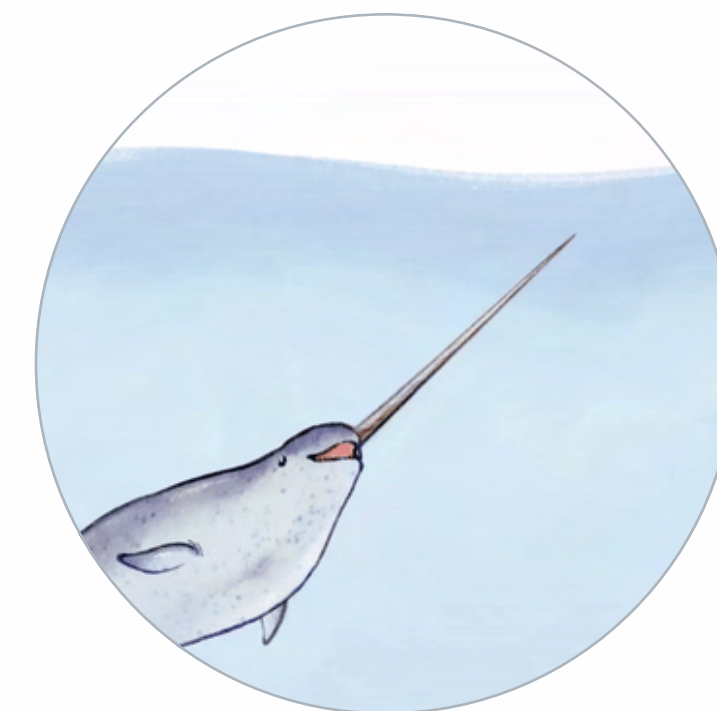
### 01

Storyboard



### 02

Style Test &  
Render



### 03

2D Animation

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# Sound Design

Music and sound effects were used to complement the look and feel, and enhance the interactive features of Whale Box. We designed four categories of sound to create a more immersive experience.



## Environmental

We chose environmental sounds, such as a quiet snowstorm, to simulate weather and immerse the user.



## Animal

Animal sounds, such as the chatter of narwhals, were incorporated to increase understanding and direct attention.



## UI (Earcons)

Soft sounds were applied to interactions to provide feedback and reinforce the aesthetic of Whale Box.



## Background music

We selected calm, gentle background music to create a relaxing atmosphere that was also non-distracting for users.

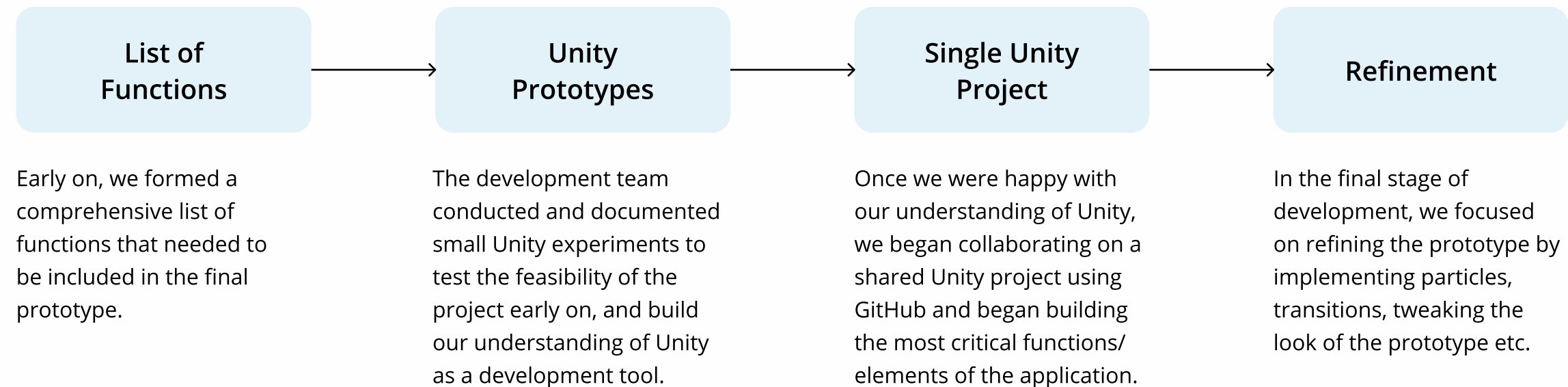


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# Development

The team decided to develop a prototype of the Whale Box in Unity (version 2021.2.12f1, built-in renderer). A stepwise approach was necessary to not only learn, but also develop a functioning prototype

within the compressed timeline of this project. Below, we have outlined our development process and steps as well as key takeaways.



## Key Takeaways

- 1** Documentation is key when working in a team environment and is especially important when sharing knowledge, as well as referring back to previous learnings.
- 2** Often times there are multiple ways of solving a problem, and in some cases the simplest solution is the best option; however, this isn't always the case.
- 3** When implementing an initially easy solution, it can later lead to more difficulty down the line when it comes to refinement. In some cases, the more complex solution can save you time at later stages of a project.
- 4** Many simple interactions are easy to implement; however to make them polished and feel good requires much more knowledge, understanding, and time.

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# References

1. Narwhal Tusk Facts: Did You Know? Arctic Kingdom <https://arctickingdom.com/narwhal-tusk-facts-did-you-know/> (2019).

This web resource provided insight on facts about tusk spirals.

2. Narwhal Facts and Pictures. Animals <https://kids.nationalgeographic.com/animals/mammals/facts/narwhal> (2015).

This source was used as a language reference on narwhal terminology.

3. Gonzalez, N. Inuit Traditional Ecological Knowledge of the Hudson Bay Narwhal (Tuugaalik) Population. <https://waves-vagues.dfo-mpo.gc.ca/Library/317649.pdf> (2001).

This report provided insight into traditional Inuit ecological knowledge of narwhals around the Hudson Bay area.

4. Fontanella, J. E., Fish, F. E., Rybczynski, N., Nweeia, M. T. & Ketten, D. R. Three-dimensional geometry of the narwhal (*Monodon monoceros*) flukes in relation to hydrodynamics. *Marine Mammal Science* 27, 889–898 (2011).

This publication provided insight into the methods of communication of narwhals.

5. World Wildlife Fund. Narwhal | Species | WWF. World Wildlife Fund <https://www.worldwildlife.org/species/narwhal>.

A general overview of narwhals for lay audiences.

6. Marcoux, M. Social Behaviour, Vocalization and Conservation of Narwhals. *ARCTIC* 61, 456–460 (2009).

This journal article provides information on the social behaviour, vocalization, and conservation practices for narwhals.

7. Kingsley, M. Underwater World | The Narwhal. (1990).

This document provides a general overview on the physical, social, and habitat information on the narwhal.

8. Marcoux, M. Narwhal communication and grouping behaviour: a case study in social cetacean research and monitoring. (2011).

This thesis conveys information on how narwhals communicate and their grouping behaviour.

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# The Team

