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## A SUMMATIVE BRIEF

USABILITY

LEARNABILITY

EFFICACY

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# INTO THE RIFT

Take an interactive journey to Lake Tanganyika in the heart of Africa's Rift Valley. Witness one of the world's biological wonders and meet scientists unravelling its mysteries.

# Into The Rift Summative Report

## Summary

Edu ran a **qualitative study** with **twelve participants**<sup>1</sup> in order to determine the overall usability and learnability of [IntotheRift.org](http://IntotheRift.org) – an online textbook offering a virtual field trip to Lake Tanganyika in East Africa.

The goal of the study – identify usability issues and also what currently works well. A learnability study focused on learners’ increase in awareness of ecosystem concepts and research scientists working in Lake Tanganyika. An efficacy study evaluated learners’ engagement with the online virtual field trip.

## Primary Findings

### EFFICACY

Testers describe the site as “beautiful”, “striking”, “contemporary”, and “clean”. It is highly engaging as a mediated learning experience for high school students. Informal science learners moved through the site spending time on videos or topics they found interesting.

*“I would welcome doing this in class. As soon as you see it you know it’s going be fun.”*

### LEARNABILITY

Most adult testers and all students accurately described the site’s main ideas in general terms. High school testers clearly explained ecosystem concepts and scientists’ research.

Middle school students found some concepts too advanced, as they had not studied ecology. The reading level tested as appropriate for a student finishing the 10th grade.

The video script was understood by both middle school and high school students.

### USABILITY

Navigation is the main challenge. Two of 12 testers found the navigation accessed through unlabeled tabs at the top of the site. Most used side arrows to navigate. The side arrow on “Renalda’s page” is barely visible preventing testers from accessing the Scientist section.

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<sup>1</sup>Sample of 12 consisted of: six adults, two middle school girls, one high school girl, one high school boy, an instructional designer, and a teacher from a large and diverse urban school district. Findings were strongly consistent across age, gender, and location.



## Takeaways

Into the Rift is an innovative, effective, and positive proof of concept of an online virtual field trip. The site is best suited for high school or upper middle school students based on reading level and science content. When testers were made aware of the top navigation tabs they moved easily between chapters. Most testers were excited, engaged and wanted to learn more.

Into the Rift is a small and positive advance to improve science literacy in the United States.

## Objectives

What is the efficacy of a documentary-based online textbook offering a virtual field trip?

To what extent through the online experience do learners increase their awareness of:

- ecosystem-scale processes that support life in lakes
- the importance of natural ecosystems for human wellbeing
- Research scientists and how they study the lake's ecosystem

## Methods

Evaluators asked learners to think out loud as they used the Into the Rift website on a desktop computer using a current version browser. The study documented learners' impression of the site, ability to navigate the site, and conceptual awareness. Evaluators also asked about engagement - defined as excitement, inquiry, and interest in learning more.

## Testers

To test usability six adults answered scripted questions during unmediated remote online testing sessions averaging 15 minutes. To assess learnability evaluators conducted in-depth interviews with two middle school and two high school students as they used the site. Evaluators also interviewed a teacher from a diverse urban district as she used the site. Sessions lasted 30 to 45 minutes. An Instructional Designer did an expert review.

Six females and six males tested the site. Findings were strongly consistent across age, gender, and location.



# Observations and “Top Findings”

## Usability

The Introductory page is enticing, visually stunning and immediately immerses the viewer within the content. The initial video displayed in the background of the opening page grasps viewers’ and invites them to “Dive Into The Rift.”

## IMPRESSION

Users said that the site evokes the feeling of “Travel” and “Adventure,” allowing the user to go on a visual and informational journey into the Rift. All testers were positive and excited about the site based on the home page. Adults said: “This is an education webpage that virtually lets you explore this lake in Africa’s Rift Valley.” “I think the site is a 10. It looks like they are trying to educate the world and make a positive change.” A student said: “Cool. This is a virtual journey diving into a lake or exploring an underwater cave. I’m in.”

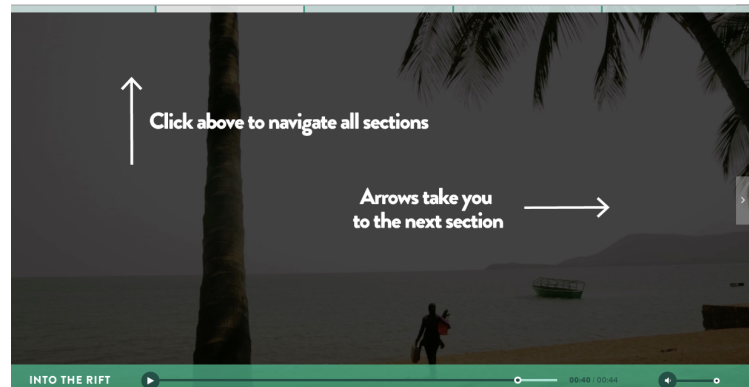
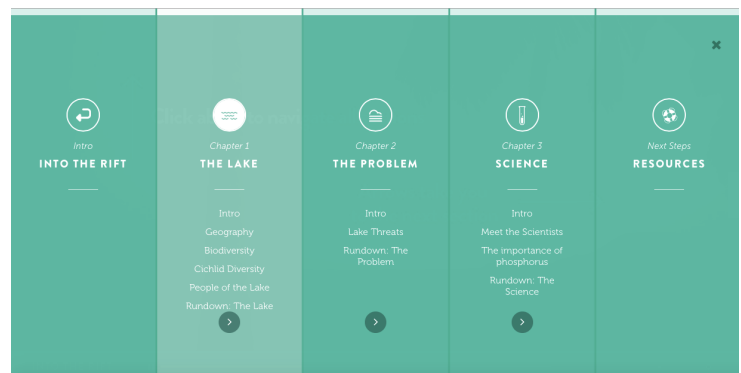
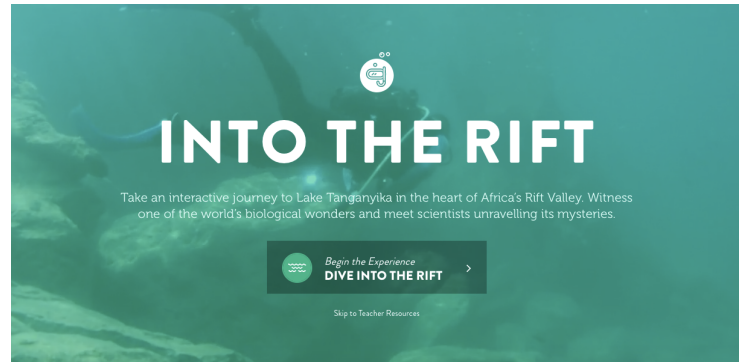
## NAVIGATION

The design intends to present a clear flow and progression of information. The content is organized into a textbook-like format, including the Introduction, Chapters, and Next Steps/ Resources. There is a wealth of content throughout the site.

**Navigation is the main challenge. It confused users and hindered the site’s overall functionality.** The main

navigation is accessed through unlabeled tabs at the top of the page. A navigation tutorial appears after the initial video is finished playing. If a user does not finish the initial video, they may not understand how to navigate the site effectively.

Ten of 12 testers never found the navigation tabs on top. One user found the tabs after 10 minutes and was angry. Users said: “It’s a bit confusing not knowing which chapter I have already watched,” “It needs a more common sense direction of how to navigate,” and “This is not tech savvy.”



## SOME VIDEOS LOADED SLOWLY

**About one third of testers experienced slow loading video particularly Chapter**

**Three Intro.** Loading makes it difficult for some viewers to see all visual elements. This could be a result of a user's computer, browser or Internet connection. Regardless, those who experienced slow load were extremely frustrated. When the videos loaded slowly two users became lost and significantly frustrated. One user who experienced slow video load abandoned the site at the beginning of Chapter Three missing the Scientists section.

Users experiencing slow load said: Adult – “Loading is taking a very long time now.”

Student – “It's choking. If this weren't an interview I would leave now.”

## AESTHETIC

**Testers agreed the site design is modern, clean, and visually appealing.** Testers described the site as attractive, contemporary, beautiful, and a very modern design. Two users were not fond of the green color palette. Users said: “The site looks well made and top quality.” “Overall look and feel, color scheme was visually pleasing. Interactive.”

## VIDEOS

**Most users, especially students, valued the video.** The site's sidebars achieved a balance between written and video content to engage users with varying learning styles.

## POP-UPS

**Pop-ups were appreciated.** During videos viewers can “roll-over” and initiate pop-ups which reveal additional content. A student said: “I like it (pop-ups). They don't distract but help you if don't know something or want to know more.”

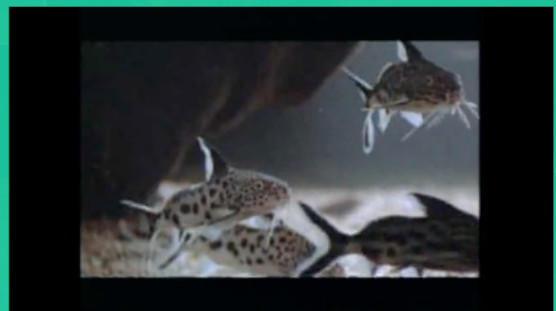
## IMAGE COLLAGES

**Students liked clickable images.** The images allowed learners to graze bite-sized learning by clicking images that reveal content. Students said: “I can learn more and choose what to learn.” “The images and text are right to the point without giving too much information to confuse you.”



### “GET IN MY MOUTH!”, SAID MOM –

Some cichlid parents protect their newly hatched young by hiding them in a safe and...unexpected place. Parents defending their babies isn't behavior we'd expect of a fish, but many cichlids do. And one of the best ways to protect your babies in a lake full of dangerous predators? Hide them...in your mouth. dad's mouth could act as a protected nursery, allowing their babies to grow bigger and stronger before they brave the lake on their own. Check out the National Geographic video below to see mouth brooding in action.



## Learnability

Evaluators shadowed four students using the site asking questions to probe content awareness and to document learning outcomes. Sessions lasted 30 to 40 minutes.

Most users quickly understood the site was about the environment and showed increased awareness of ecosystem topics. A few were so focused on trying to navigate the site they that were unable to focus on absorbing ecosystem content and learning about the scientists. If evaluators showed students the top menu the navigation problems went away.

## FREE RANGE LEARNING

**The design allows the learner to explore.**

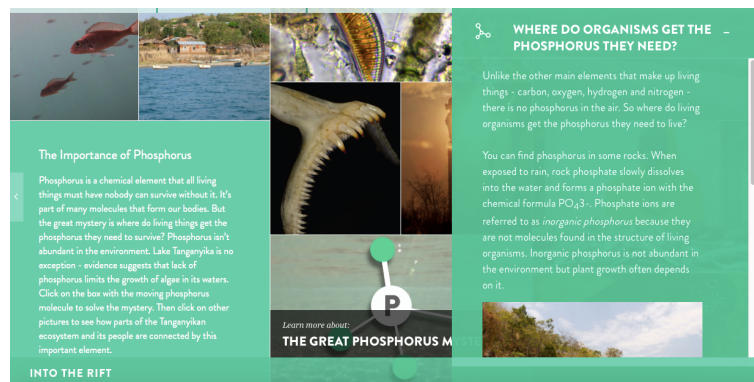
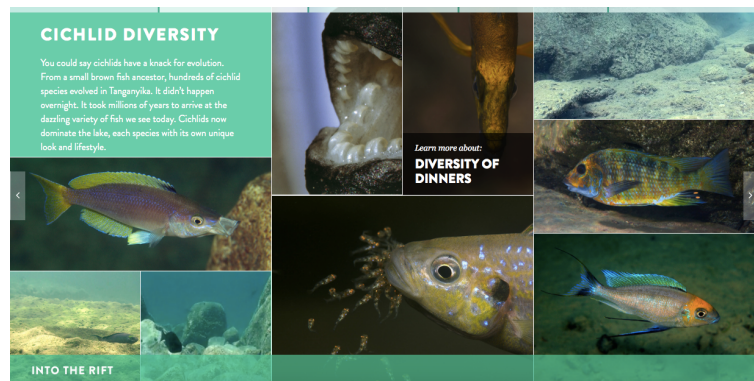
Clickable content allows the user to choose promoting free-range learning and exploration. The design allows learners to absorb content while accommodating their learning style and ability. The images are visually attractive and entice the viewer to click on the different content areas. A pop-up side bar appears when an image is selected presenting written content, charts, a video, or a combination of two or more.

As an example a feature on the Importance of Phosphorous is content rich and technical. Learners—high school students in particular—said that copy is well written and illustrated. But there is a lot of information. A student said: “There are nine phosphorus choices. I would need to pick and choose what I want or be forced (by an instructor) to read them all.”

Another student said: “I like the design. It inspires initial interest followed by quick brief information and examples.”

## ECOSYSTEM PROCESSES

Evaluators asked intentionally general questions about the STEM content then followed up with increasingly specific probe questions to test content understanding. Most students got the general ideas. All reported and demonstrated increased awareness of ecosystem concepts. Depth of understanding increased with age or interest. High school students consistently cited examples of concepts from the site. Sample answers follow.



### **What do the designers want you to learn about?**

“Different species in different habitats.” Female Grade 7

“This is about Africa. I get it. This is a lake in Africa and were going to learn about the environment.”

“Scientists who do underwater research to understand about the lake and everything that lives there.”

### **What do you see about ecosystems?**

“Human biotic factors - human interaction with lake and how humans benefit.”

“This is mostly about fish, not a lot about other animals or plants.”

“Oh... This is about Africa. A lake! At first I thought it was the ocean.”

### **Why are intact ecosystems important?**

“The lakeshore is kind of busy. There’s a lot going on. That could affect the lake.”

“What the scientists are learning about will help protect the lake for fish and humans.”

## **RESEARCH SCIENTISTS**

### **Vital information about scientists is difficult to find.**

Almost half of users had difficulty finding “the scientists” or getting back to “the scientists”. Especially those who didn’t finish watching the Chapter 3 Intro video.

“They should make it obvious how to meet the scientists.” (Note these users had not discovered the main navigation menu at the top.)

### **Side navigation arrows between Meet the Scientists are translucent and hard to see.**

Two thirds (8 of 12) of users didn’t see the side arrow on Renalda’s page effectively closing off access to the other three scientists. Some found it by accident. Others were cued.

### **What do you see about scientists doing research?**

“Why each one wants to do it. What their role is.”

“Showing the process of the scientists. This site is more about the scientist than the lake!”



### **What kinds of research are the scientists doing? Why do you think it is important?**

“It shows their nationality – how their research is important to the economy.”

“Their work is important because it is research and that’s how we learn about and fix problems with the environment and the lake.”

### **What do you see about science jobs?**

“In the lake working with fish. This is a STEM job because research and animals all fall under science.” Grade 7

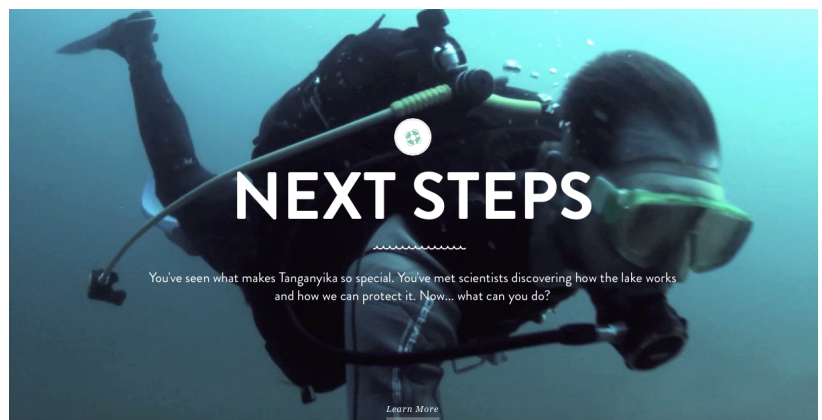
“Renalda looks really cool. She has swim fins AND a clip board. I didn’t know that was a kind of job a scientist can have. Makes me want to be her.”

“Shows what they do but doesn’t explain it. *I’m a Fish Head* – that’s about a STEM job.”

“All of the scientists have STEM jobs.”

## **NEXT STEPS**

The “Next Steps” resource page provides further information on the role of science in promoting sustainability and resources for environmentally conscious lifestyle. The design is an example of an effective vertically scrolling content page. This is a user-friendly design concept, and it enables the viewer to access sections of information without being overwhelmed. The content in this area is effectively organized as well as visually appealing. All testers immediately understood they were to scroll down.



### **What can you do the Next Steps page?**

“There is a lot to learn on the resource page about science and protecting the environment.”

“Be careful using the word ‘Resources’. For struggling readers it is a hard word and in an urban school setting Resource often means the library or “special help” room. Not fun.”

### **What else do you notice on Next Steps page?**

“It’s weird ‘arrow to the right’ then all of the sudden Learn More and you have to scroll down.”

“Next Steps is a big jump. It doesn’t tie well to the main topic. It’s almost generic like it was crammed in there. Not connected to the lake in anyway.”





## READABILITY

The average reading level of copy on Into the Rift is the end of grade 10.

A middle school girl in grade 7 read and understood the content but more slowly and with less complete explanation than high school seniors.

Science content is typically written one year below grade level. Two years below for English As a Second Language (ESOL) learners.

Readability metrics evaluate the ease with which readers can understand written text and roughly correlate to reading grade level. The metrics use various formulae to generate a score based on characteristics such as word length, sentence length, and number of syllables. There are several popular and tested readability formulae.

### Readability Grade Level

Readability Formula	Grade Level
Flesch-Kincaid	9
Coleman-Liau	10
Gunning Fog	12.5
SMOG	11.5
Average Grade Level	10.75
Number of "Print Pages"	14
Word Count	7,250

## Efficacy

Efficacy in this case is defined as meaningful engagement as evidenced by learners' interest, excitement, investigation, questioning, explanation, and inquiry. Inquiry is based on student led learning as opposed to transmitted information.

Into the Rift is extremely effective. Testers in general and students specifically indicated it inspired interest, generated questions and made users excited about learning more.

A family member texted evaluators: "I thought that you should know that [name] is still on the site learning! She really enjoys the videos with the scuba diving and marine biology."

"I think my class would like it because we usually read a lot. Watching a bunch of videos is easier and more exciting."

"This site is way more up to date than most education websites we use in school. This is like a virtual lab. The sites we use are circa 2000 web pages with multiple choice questions and bad clip art. Not as clean looking as this and the information is not presented well as this site."

"I would give this a 5-star rating. A typical generic school lab is often incomplete. You have to go to an alternate source to get all the information. With this website it's all there."



## EFFICACY SUMMARY

Overall the site is visually appealing, informative, and promotes a fun interactive online field trip. The viewer is able to explore the content at their own pace from chapter to chapter, watch videos, scroll through text, and view charts and resources on science and sustainability.

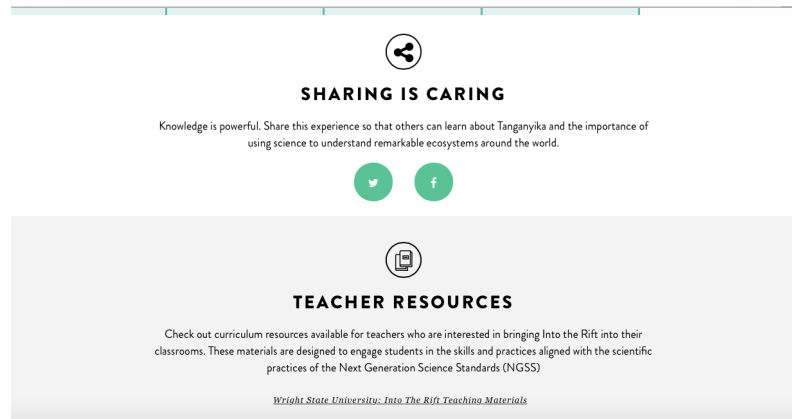
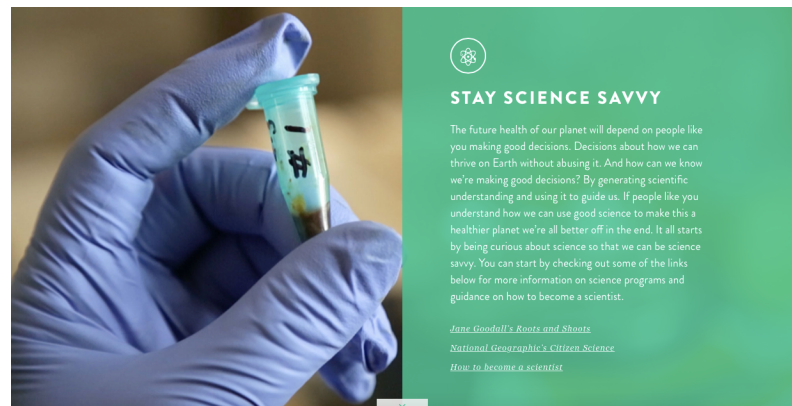
The Chapter 3 content introduces the viewer to the scientists enabling the user to interact with the content on a personal level, developing an intimate connection with the featured scientists. Images, videos, and the information presented from the scientist's perspective allow the viewer to develop a relationship with the scientist and thereby deepen their understanding and connection with the content.

The scientists are a key feature of the site and should be easily accessible. A strategy to allow the learner to easily access information about the scientists throughout different areas of the site would enhance the overall personal experience and increase the meaning and purpose of the interactive virtual field trip.

The Intro areas provide an effective summary of the chapter contents, as well as introduce the chapter topic sparking interest and promoting discovery. The content in each section increases the knowledge of the viewer and promotes exploration through links, videos and other interactive media. The Rundown section provides a summary of the content and assists with solidifying knowledge and reviewing the content from the chapter.

**All students who tested the site gave effusive praise to the topic and presentation.**

**All testers strongly preferred this site over educational media currently used in their school.**



# Recommendations

Into the Rift is an engaging and effective educational media.

The online virtual field trip format has great potential in informal science learning to provide a platform for free choice self-guided learning.

In formal science classrooms the virtual field trip can be used as a guided activity, support independent research projects, group learning, or flipped classroom assignments. It is especially suited for upper middle school or high school level.

Girls were highly engaged with Into the Rift. Girls found the topics appealing and the female scientists motivating. Girls took an analytical, thoughtful approach to the content.

## Critical Needs

- Enhance Navigation – Enable the user to access navigation menu at all times
- Make “Meet the Scientists” section easier to find. Make the right arrows more prominent within the section.
- If possible adjust media for more effective loading and less technical glitches which can detract from the overall user experience.

## Urban Students

- **Lead with the inquiry question** – In the *Cichlid Diversity* of Chapter 1 *Learn More About Cichlid Teeth* question on Cichlid Teeth. “I’m looking at it from the point of view of the student who is not very into learning - lead with inquiry. Ask the question first ‘Can you guess what kind of food these teeth are adapted to eat?’ That gives the student a challenge and ties into common core critical thinking.”
- **Go for middle** – In an urban school a teacher is faced with students poverty through affluence. A mix of basic to advanced. Students greatly vary between vocabulary and interest. Teachers go for something that hits the middle.
- **Video and audio helps** – Kids who struggle with reading find it complex, repetitive, and dull. Video and audio helps a great deal assuming kids understand vocabulary.

**About Edu** – Edu is an education research and evaluation firm specializing in evaluating STEM education and digital media.

