

So how do I use this thing?

At EDesign Lab, we keep a vigilant focus on designing digital learning **experiences**, or activities, not just technological **tools**. This distinction between experiences and tools is an important one: by learning experience, we mean a larger activity that allows students to take agency over their own learning. This prototype is a tool to help you create that experience!

Experience vs Tool: Educator as Designer

A learning experience is a way to frame an objective or need within a compelling, authentic context or narrative. Learners use a tool to problem solve, try out certain skills, reinforce knowledge, create content, and more. A tool in its purest form doesn't tell learners how to use it; the experience of using it is designed. This is where you come in – as an educator, you design learning experiences around learning objectives everyday. This guide will walk you through designing an experience through Because. Put on your designer hat and let's get started!

Let's recap.

A learning experience...

- **frames learning** by **making connections** to the relevant objective or need
- **facilitates learners to activate skills and knowledge** from one context to another
- **makes it meaningful**: scaffolds context that allows students to sense-make by forming opinions, trying out strategies, and creating meaning
- **blurs the boundary** between the classroom and the real world, interests and other disciplines

Resources

- Prototype Overview** <http://edesignlabs.org/prototypes/breadcrumbs/>
- Prototype Walkthrough** <http://vimeo.com/78378071>
- Download the App** <http://bit.ly/1ay3tY0>

STEP 1: Consider the learning objective.

META-REFLECTION

Reflection and meta-cognition are critical elements that allow a learner to explore and refine their own problem-solving strategies. Learners often focus solely on reaching the right answer and not how they got there. In Breadcrumbs, data about one's own problem solving journey becomes visible and can be examined. The "heart beat line" shows where there are spikes in actions and where there are long pauses while solving a problem. Learners gain insight on the frequency of their reflection tags and notice if they are skipping useful procedures like verifying their answer.

Journey

Mechanics:
Writing, Drawing, Erasing,
Modeling, Diagramming

Breadcrumbs

Mechanics:
Tagging, Highlighting,
Reflecting

Storyteller

Mechanics:
Justifying, Describing,
Presenting, Reflecting

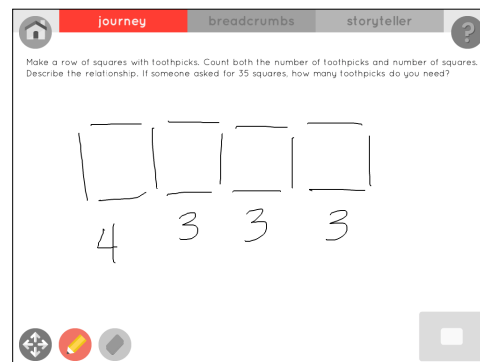
There are various journeys learners can take to arrive at a solution. Breadcrumbs enables learners to embed reflection and sharing in the process of problem solving, specifically when doing math. The overall goal of the experience is to have learners actively engage in self-reflection: to think about what they are thinking about as they solve the problem. Think about how you will employ each stage of Breadcrumbs to service your domain specific learning goal.

Questions to ask yourself

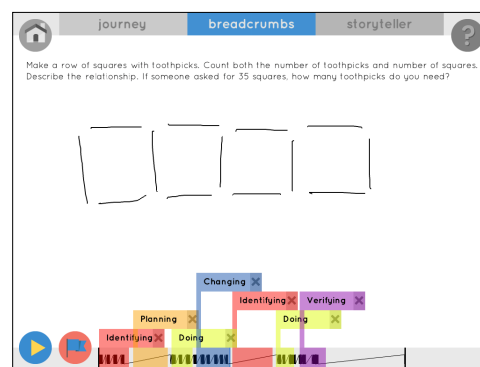
- What patterns do you want them to notice, both in their process and in the math?
- What big idea should learners take away? What should they discover?
- How will you differentiate learning styles and levels?

BREADCRUMBS: The Stages of Problem-Solving

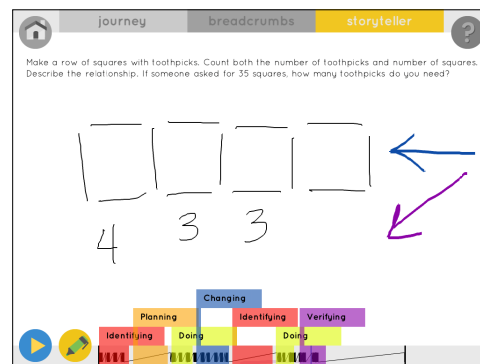
The **Journey** is the space where learners work to solve the problem. Using the pen tool, learners can draw diagrams and write equations. They can deploy the eraser for any mistakes or the can move the entire screen for a completely fresh start. The app records the learner's process in the background, capturing all erasures and markings.



In the **Breadcrumbs** stage, the learner watches the recording. The timeline allows her to tag moments when she was engaged in Identifying, Planning, Doing, Changing or Verifying.



While the first two stages are can be done individually in a classroom or at home, the **Storyteller** stage invites learners to share their process with someone else – a classmate, teacher or parent.



STEP 2: Plan the activity.

CONTEXTUALIZING + COMMUNICATING

Contextualizing and communicating are two other competencies to consider. During the Breadcrumbs stage, learners must assign tags to the stages of their process. Before incorporating it into a learning space, define each stage as a class. What are we doing when we are Identifying, Planning, Doing, Changing, and Verifying? Why do we need to do them? This will also help learners better explain the reasoning behind their chosen strategy.

Since the real goal is to have learners reflect on their mathematical process *all* the time, use these stages as a framework to approach problem-solving in the classroom and beyond.

There are multiple scenarios in which you can employ Breadcrumbs to facilitate learning, both in and out of the classroom. It is important to consider how you can build Breadcrumbs into a unit or larger activity, instead of thinking of it as a discrete, one-off lesson.

Breadcrumbs is an extremely versatile tool that you can use to facilitate various learning experiences. There are two major affordances of the app that to consider in designing the task. First, learners and teachers have the ability to design and enter their own problems. Secondly, it was designed to promote independent and group learning. Learners can complete a problem alone or with others, then share their work. From these two variables, there are infinite combinations of interactions you can choose to support the learning goal.

Below are some ideas for ways to incorporate Breadcrumbs into your learning space.

Place learners
in the role of
teachers

Create your own Khan Academy!

Assign learners a specific topic and set of problems. Record the presentation section and upload it to your school's video sharing platform.

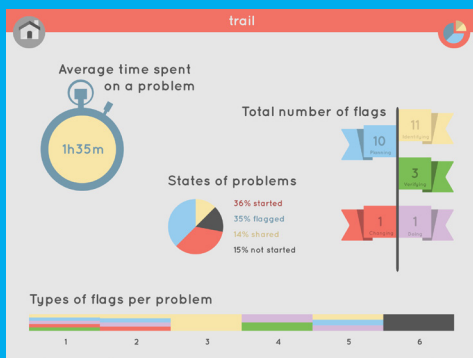
Design Challenge: The Perfect Problem

Have a design day in which learners create problems for each other. Have learners playtest each other's problems, then present on the evolution of their problem-creation process. Submit the problems to a class library.

LEARNER-CREATED
PROBLEMS

ACTIVITY
DESIGN

TEACHER
AUTHORED



A TRAIL OF DATA*

A learner's "trail" visualizes her activity during the problem-solving process. Learners gain insight on the frequency of their reflection tags and notice if they are skipping useful procedures like verifying their answer.

Formative Assessment
Teachers can use presentations to gauge learner understanding. This type of data allows teachers to find trouble spots and adapt their own pacing and approach.

**Personalized learning +
Differentiation**
Teachers can design problems for different levels of learners. Students can share problems with each other to compare strategies.

Gather data
to empower
learners

*This functionality will be available soon!

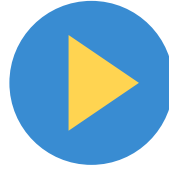
STEP 3: Design the content.

Breadcrumbs comes preloaded with five problems, but you can also design your own. As you begin to collect and design problems, here are a few elements to consider building in:

DEFINE YOUR PROCESS

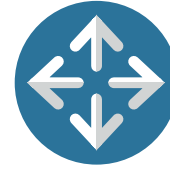
Give learners questions they can pose to themselves to see which stage they are in.

Identifying	X
Planning	X
Doing	X
Changing	X
Verifying	X



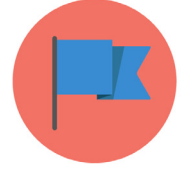
Content + Engagement

Does the content of the problem engage learners? Do they find it relevant and interesting? Does it incite a "need to know"? Ideal problems challenge learners by creating the right amount of difficulty. Greater familiarity with the problem helps make patterns visible and strategic.



Scaffolded Problem Sets

A scaffolded problem-set allows learners to find unexpected patterns. Leveling up to harder problems will reinforce pattern recognition thereby increasing comfortability with complexity and abstraction.



Multiple Pathways to a Solution

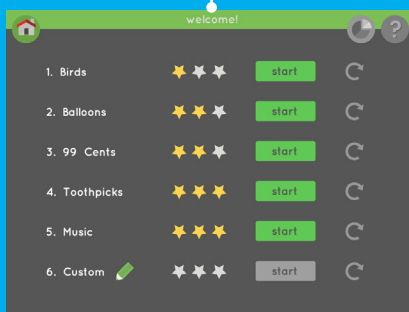
Difficult problems with multiple solution pathways will empower learners to hone a personal process and develop the skills needed to execute it. Giving learners a framework to attack a problem reduces anxiety when confronted with the unknown.

STEP 4: Create the Doc.

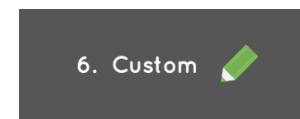
Creating a custom Breadcrumbs is super simple. Follow the instructions below to make your own.

TO GET STARTED

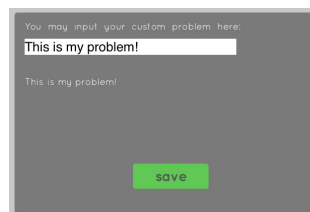
On the home screen you will see a set of pre-populated problems, along with a space for a custom problem.



1 Click the pencil icon.



2



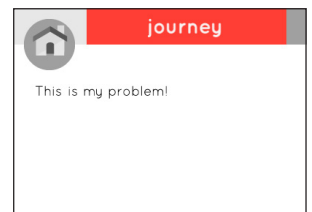
Enter your problem and hit "Save."

3



Click "Start" to begin your problem.

4



Solve it!

At the moment, we are working on a network functionality that will allow teachers to design and distribute problems to an entire class at once. Currently, problems must be entered manually for each iPad. Visit the Breadcrumbs page on the EDesign Lab website for the most current version!

We want your FEEDBACK!

Breadcrumbs is a growing project that was designed with input from teachers and students. Take a sec to fill out this quick feedback form to make the next version even better!

<http://bit.ly/18DXjWJ>