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Portfolio

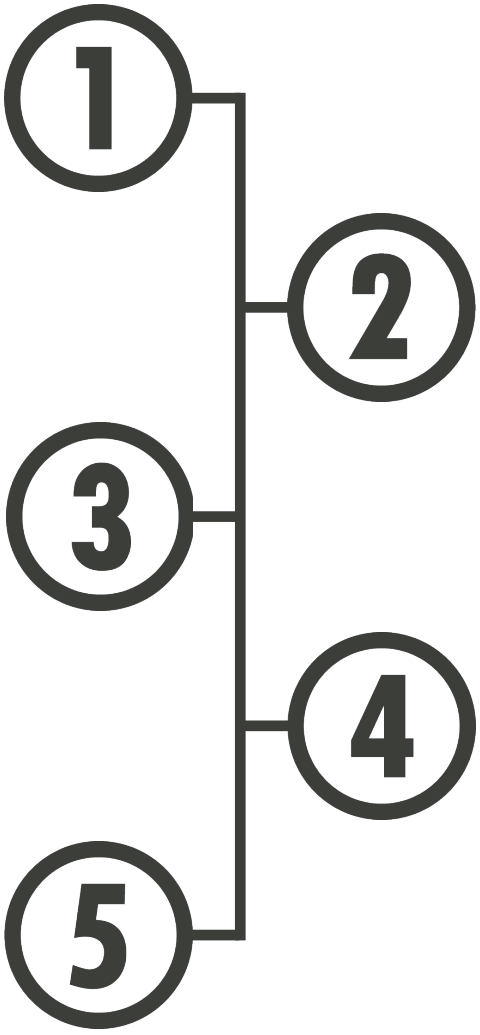
SELECTED WORKS

My Design Process

I believe in the importance of learner-centric design. My process always begins with understanding the situational factors and context in order to build a solid foundation for effective learning experiences.

Summary:

L. Dee Fink proposes a simple yet effective process through which one can design a fully integrated course that promotes significant learning. I have adopted this approach and mindset in my own design work, following his simple five-step initial design process. My goal is always to make sure clear and explicit intention drives the design while the learners' needs remains the singular focus. I do not begin outlining the course until this stage is complete and thoroughly reviewed.



Situational Factors

I seek to better understand the context for learning and the characteristics of learners. What is the nature of the subject? What are the logistical constraints? How can we better meet learners where they are?

Significant Learning Goals

I identify the long-term impact that the course should have on learners. How will learners be changed as a result of taking the course? Goals/Objectives are written as specific and actionable statements that can be assessed.

Feedback + Assessment

I determine, at a high level, the opportunities for feedback and assessment. How will the course ensure there are opportunities for timely feedback and reflection.

Active Learning

Once we have a clear plan for goals and assessment, I focus closely on the active learning of the course. What will students actually do, in the form of exercises and projects, in order to achieve the learning goals. I take the approach of first determining the project, then developing plans for exercises and activities that are closely aligned with the skills necessary to complete the project.

Integration

Once all of the previous steps are complete, I go through the design plan to ensure all pieces are integrated and remain true to the original intent. I always come back to the learners' perspective.

Course Design Document Example

Here is a modified version of a course design document I recently created for a non-credit/for-credit computational fluid dynamics short course. The course is part of a series that aims to democratize simulation.

Situational Factors	• CFD is often taught as a traditional engineering course, focusing heavily on mathematics and underlying theory. • Industry is looking for individuals that can run simulations and are able to validate and verify the results. • Learners do not need most of the math traditionally covered in order to effectively produce and validate simulations. • Individuals with high school physics and geometry experience will be capable of approaching simulation problems so long as we provide guided practice and fundamental concepts review.
Significant Learning Goals	• Construct the mathematical model underlying 2D incompressible laminar flows, including governing equations, boundary conditions, physical principles and assumptions. • Devise a solution strategy to solve the mathematical model and improve your results by reducing errors in your model. • Verify simulation results by comparing predictions of expected results obtained through hand calculations. • And more...
Feedback + Assessment	• Formative assessment: Check Your Understanding questions to follow each video, auto-graded with predetermined instant feedback. • Summative assessment: Project work to be auto-graded and manually reviewed by facilitator. • Office hours will cover conceptual and implementation questions or confusion.
Active Learning	• Learners will engage in activities that require solving governing equations in simplified scenarios in order to practice verifying and to build intuition around problems. • Learners will work through guided practice exercises in which <the faculty partner> will demonstrate how to construct the simulation. It is important that this is developed in a "pair programming" style, where learners will be working alongside the faculty partner's lecture/ demonstration. • Learners will conduct and validate a problem similar to that covered in the guided practice exercises. The project will be less scaffolded but will have auto-graded touch points that provide predetermined instant feedback and facilitator feedback upon manual review of learners' work.

Example: Computational Fluid Dynamics

Project Overview:

I designed a series of short courses in the industrial application of computational fluid dynamics. Using a simulation platform, learners are exploring a number of simulation problems and solving them using software.

Figure 1 Summary:

These courses were designed with a modular structure that mirrors the effective problem-solving framework for CFD problems. Learners work through each module alongside the faculty member's demonstrations in order to practice building the simulation. The course ends with a project that is designed to be near-transfer with less scaffolding, allowing the learner to put their new skills immediately into practice.

MADE WITH:
Canvas

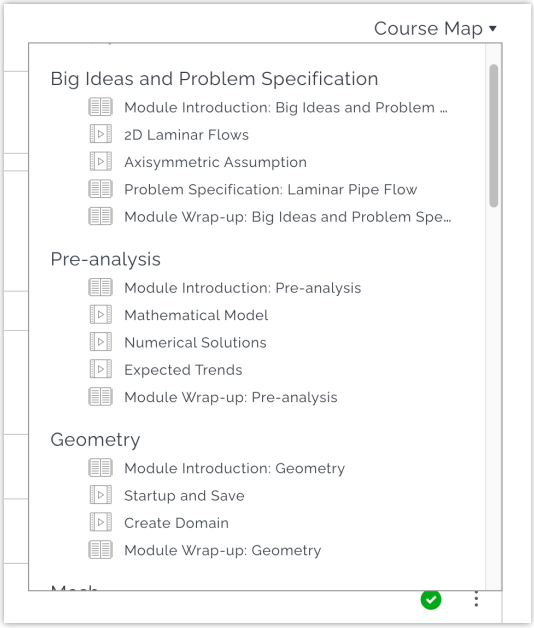
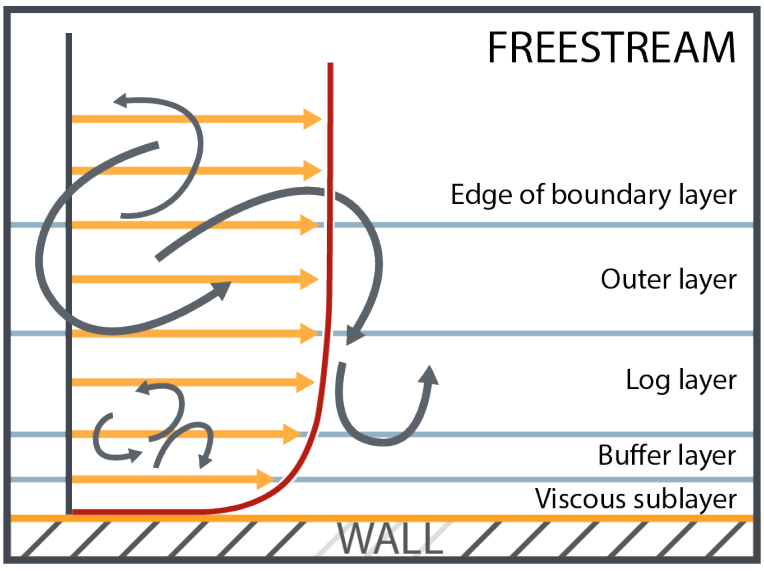


Figure 2 Summary:

The concepts covered in this course benefit greatly from clear illustration and animation. Working closely with my creative team, we developed a number of high quality visuals for this course. Given our very tight timeline, I also needed to develop some of my own illustrations, like the one you see here.

MADE WITH:
Adobe Illustrator



Example: Computational Fluid Dynamics

Figure 3 Summary:

The project in this course involves simulating laminar channel flow in a software program called ANSYS. This challenge description page lays out the full scope of the problem and helps learners started with their project. The subsequent project pages mirror the structure of the problem-solving framework (just like the module structure). The purpose of this is to provide a clear road map of the process while providing immediate feedback at each step via auto-graded questions.

MADE WITH:

Canvas + H5P

Challenge Specification: Laminar Channel Flow

For this challenge problem, you will

- Develop the numerical solution to a 2D channel flow problem in ANSYS Fluent.
- Gain fundamental insights into computational fluid dynamics by connecting the ANSYS steps to concepts covered in the first course.

Details and Specifications

Consider 2D, incompressible, steady flow in a vertical channel at a Reynolds number of 100. Please neglect gravity for the sake of simplicity. This channel flow is shown schematically in figure 1 below.

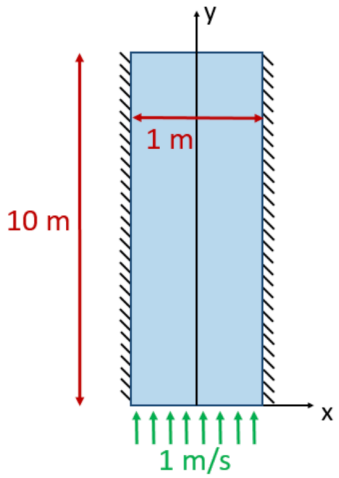


Fig.1 - Channel flow schematic *(not drawn to scale)*.

- Channel length l and width w are 10 m and 1 m, respectively, as shown in the figure.
- Assume thickness = 1 m in the z-direction.
- The velocity is constant at the inlet, in the y-direction and equal to 1 m/s.
- The Reynolds number is defined as:

$$\mathrm{Re} = \frac{\rho \bar{v} w}{\mu}$$

where $\bar{v}$ is the average velocity at any cross-section. Take ρ = 1 kg/m^3 and adjust μ to get the desired Reynolds number. The absolute pressure at the outlet is *1 atm*.

Getting Started

Note that the cross-section is a square of 1m by 1m. Contrast this to the laminar pipe flow considered earlier where the cross-section was circular. When the cross-section is square or rectangular, this type of a flow is referred to as a **channel flow**. When the cross-section is circular, the corresponding terminology is **pipe or tube flow**.

Example: Summer Faculty Institute

Project Overview:

I worked with Ithaca College to rapidly design and develop a five-week intensive faculty institute on designing flexible and inclusive courses. The institute was attended by 200+ faculty members.

Figure 1 Summary:

Each module was a week-long unit, broken into four topic areas. Those topic areas were organized on a single page with collapsible sections, including time estimates for each element. Learners were encouraged to engage with what they wanted in whatever order they found most useful. We prompted learners to reflect pre and post topic through an asynchronous forum. Synchronous sessions were also held on Monday and Friday for live discussion before and after the module.

MADE WITH:

Sakai

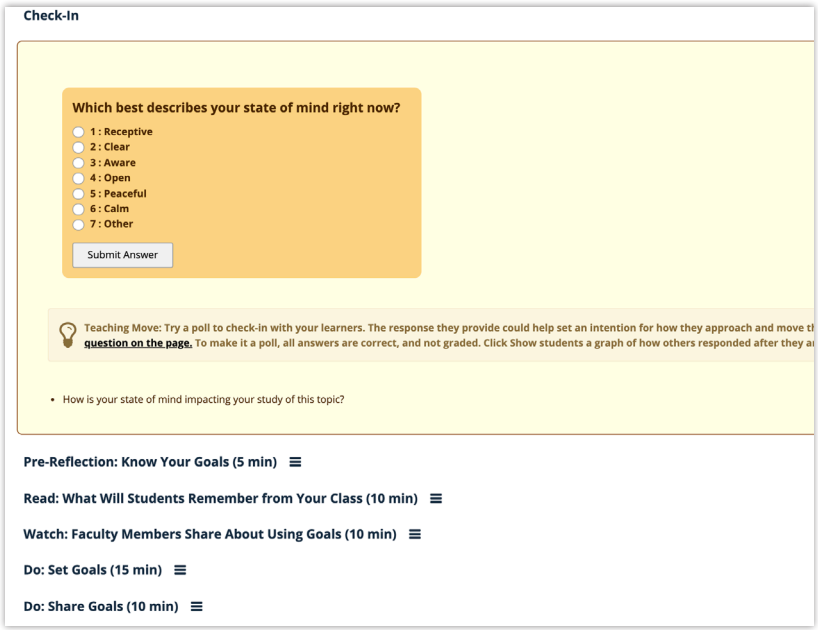
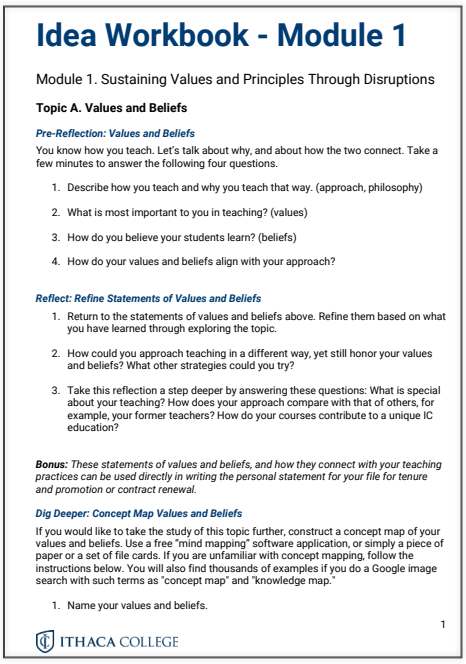


Figure 2 Summary:

The "Idea Workbook" accompanied the course as a way for learners to take their ideas with them as well as a tool to help stay organized and focused. We also recognized that some learners would not have consistent access to the internet, so the workbook served as an "offline" version of the course.

MADE WITH:

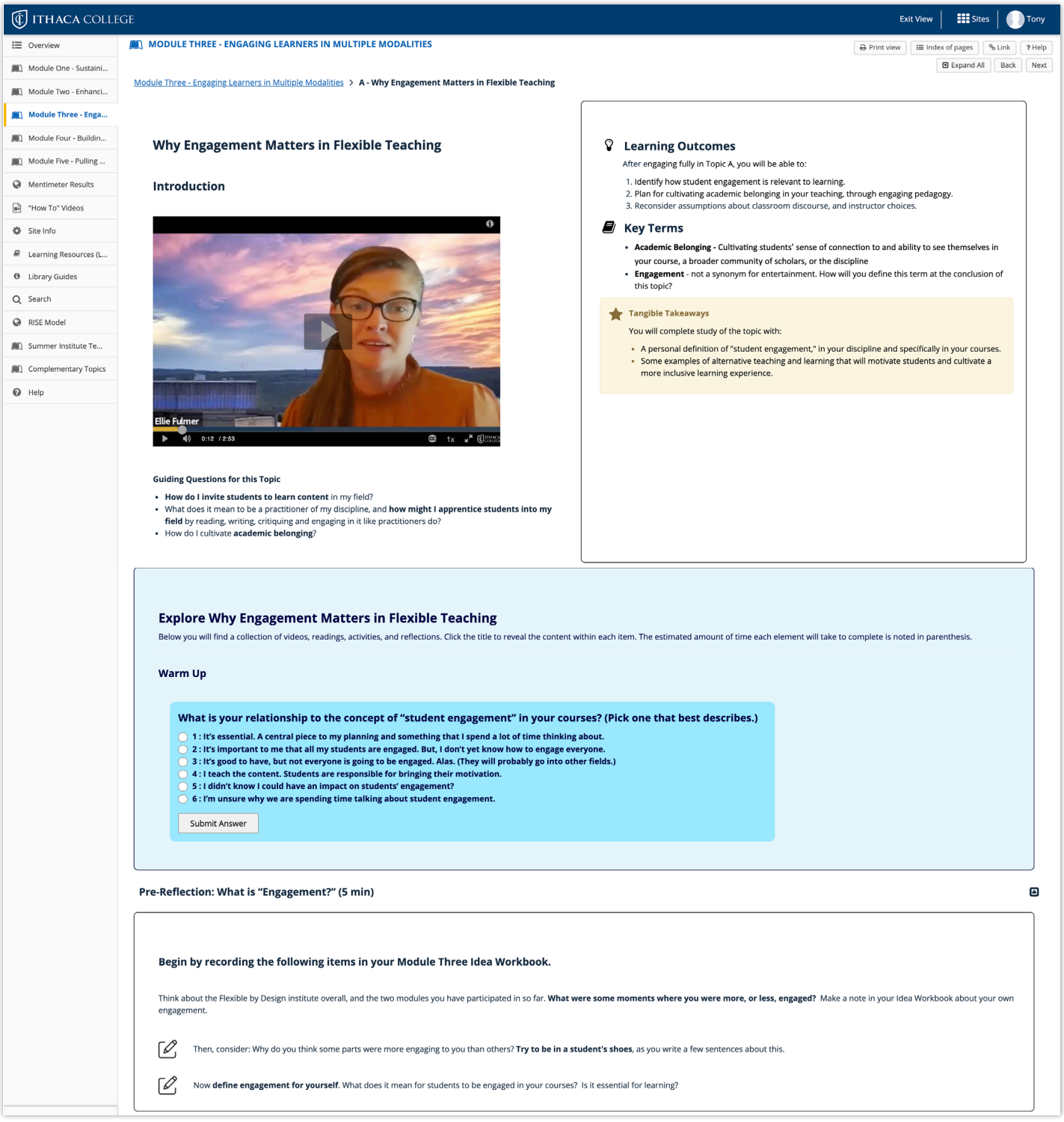
Microsoft Word



Example: Summer Faculty Institute

Figure 3 Summary:

I created a template in Sakai that included an intro video and featured a section containing learning outcomes, key terms, and tangible takeaways. Each topic was kept to a single page for simplicity and ease of use.



Example: Introduction to Programming in JavaScript

Project Overview:

I designed a series of short courses aimed at helping novices and end-user programmers practice the fundamentals of programming.

Figure 1 Summary:

Our "multifeed" video approach allows us to capture faculty video, live computer feeds, and other camera feeds as needed. For this series, I capture the faculty video and live demonstrations of code development and execution. I then provide annotation and direction to the video team for post processing and final rendering. Here you see my faculty partner in the left 1/3 with his live code demo happening in real-time on the right.

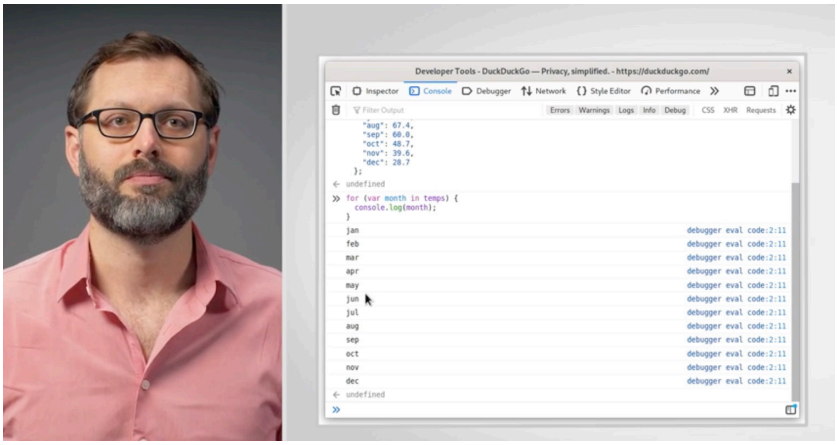
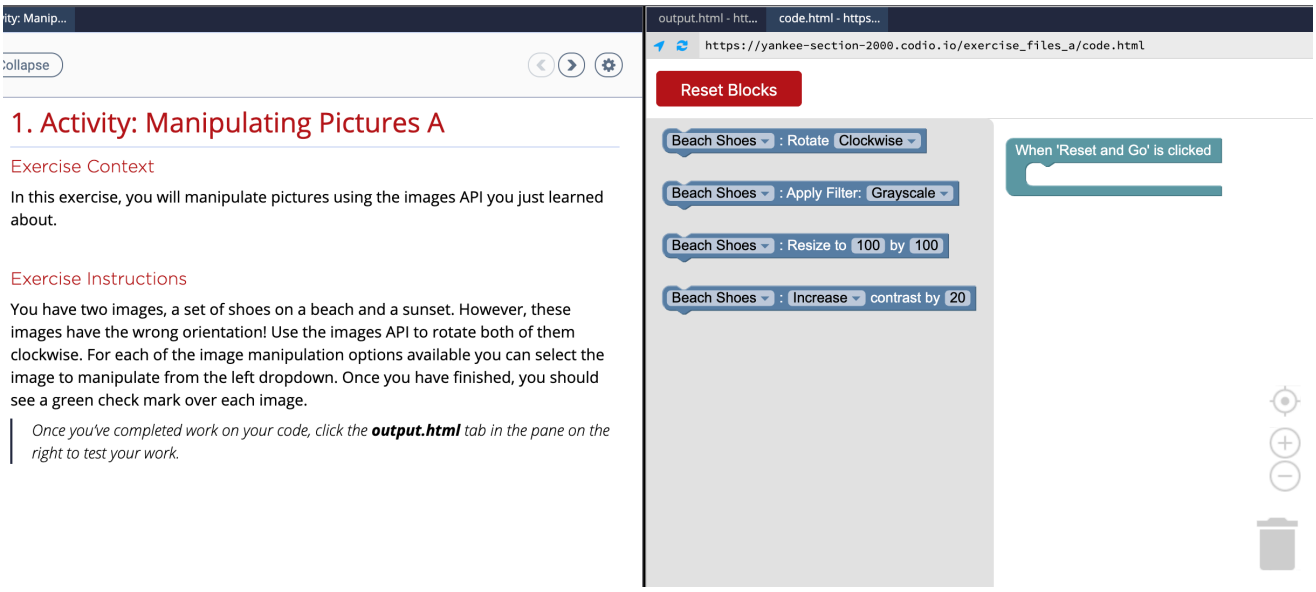


Figure 2 Summary:

In order to meet our novice programmers where they are, our courses start with a block-based environment called Blockly. The exercises in these first courses use the visual programming interface to practice basic programming constructs without the complexity of syntax or the intimidation factor of many lines of unfamiliar code. Rather than taking the "bootcamp" approach of syntax first, we designed a sequence that uses Blockly to take the construct-first approach to learning code.

MADE WITH:

Codio + Blockly



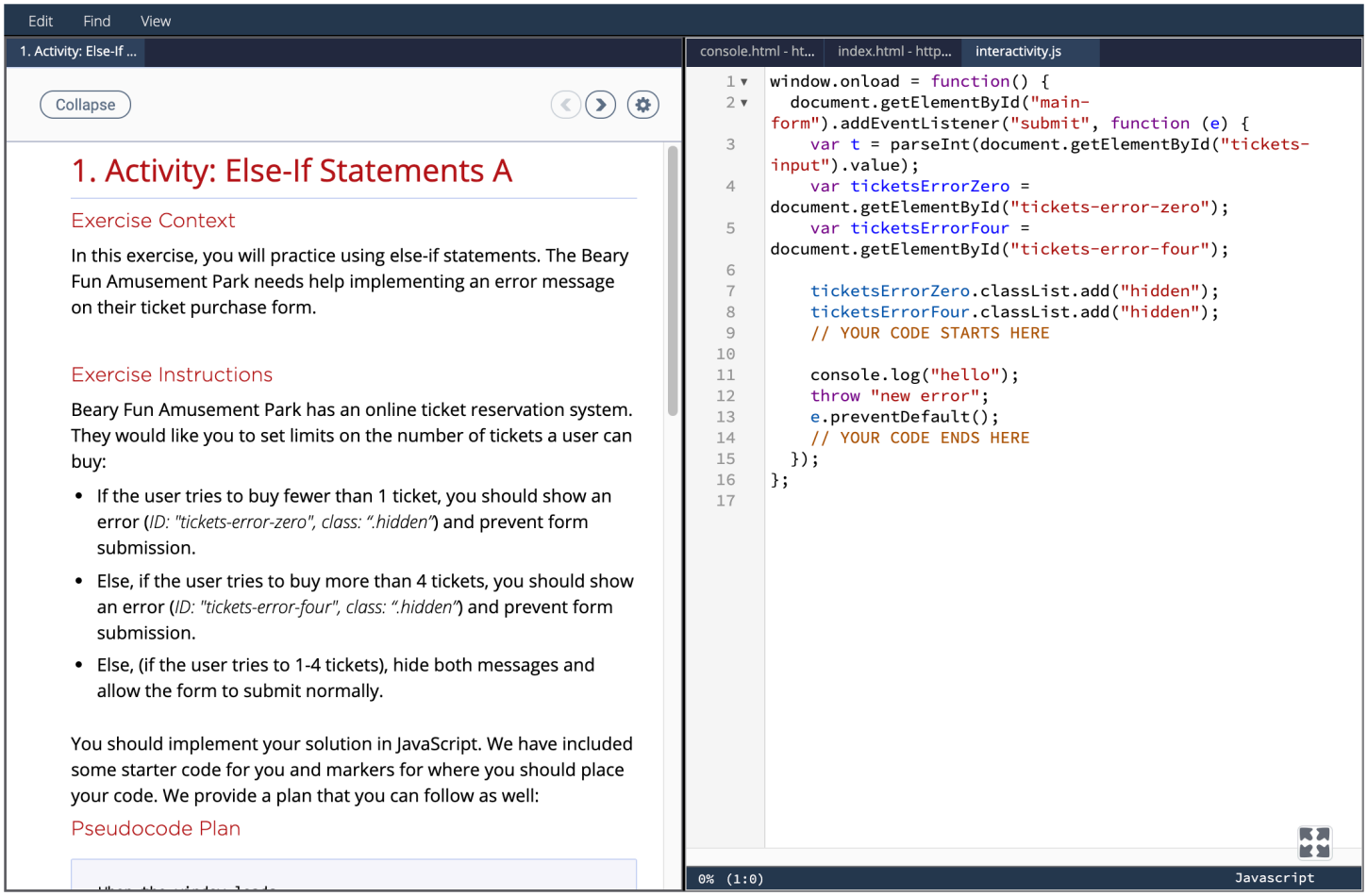
Example: Introduction to Programming in JavaScript

Figure 3 Summary:

Once learners transition into writing JavaScript without blocks, their exercises look like the example below. The goal here is to make the task explicit, provide the necessary scaffolding to help learners at all levels succeed, and provide immediate feedback through the use of rendered output and predetermined hints.

MADE WITH:

Codio



INSTRUCTIONAL DESIGNER

Hello, I'm Tony.

I love all things teaching and learning. My passion for and curiosity about how people learn drives me to seek new projects and challenges. I am fascinated by new research that continually reshapes our understanding of the mind. I think that technology and innovation will continue to create new opportunities to build more effective learning experiences. My goal is to be at the forefront of the future of learning.

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