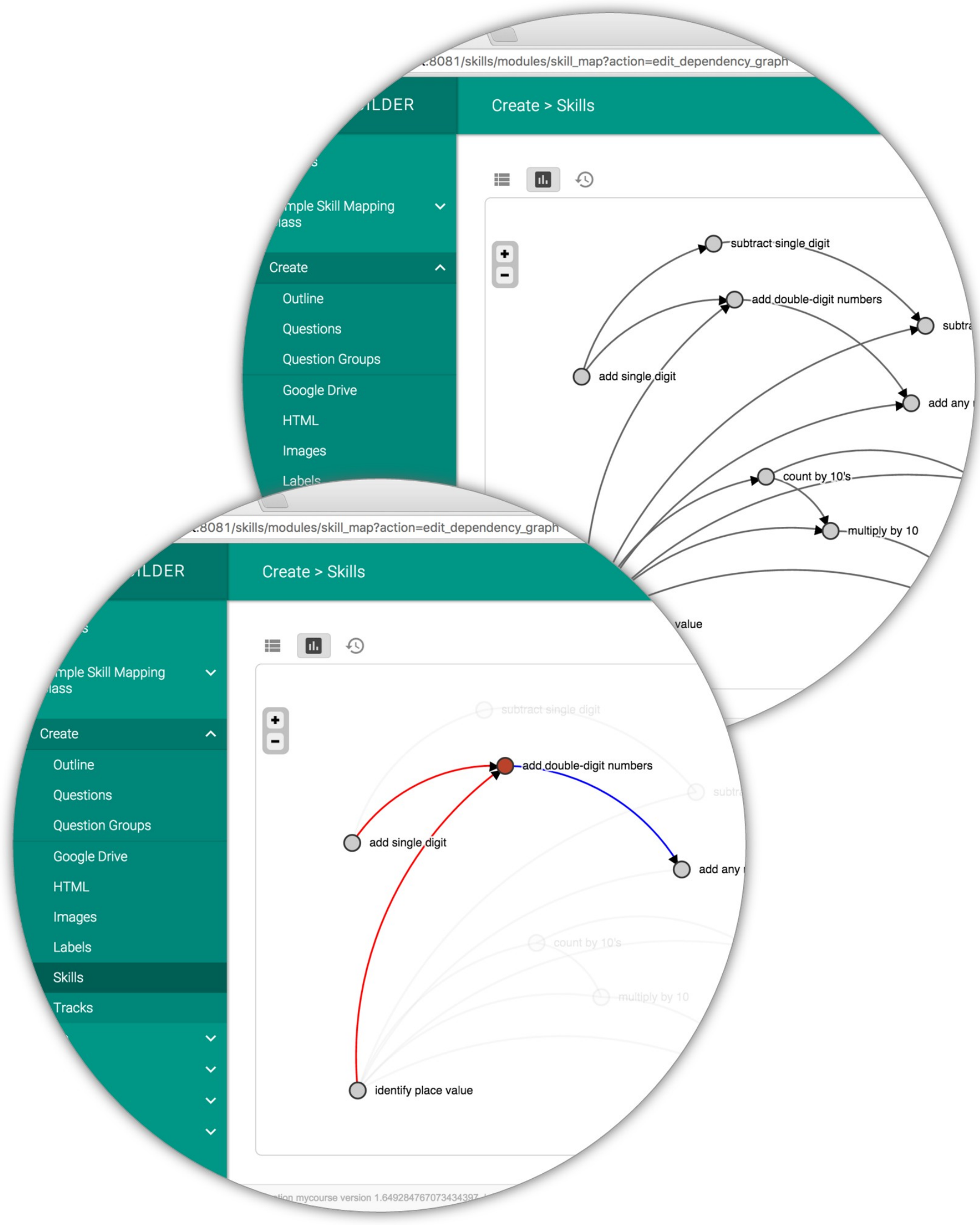# Course Builder Skill Maps

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Introduction

On-line learners need up-to-date information on their progress, areas of strength and weakness, how to adapt their learning behavior, and personalized paths through the material they are learning. And instructors need deeper insights into student learning than summative scores.

Skill mapping provides fine-grained information about the content and the structure of the couse which can guide student and inform instructors.
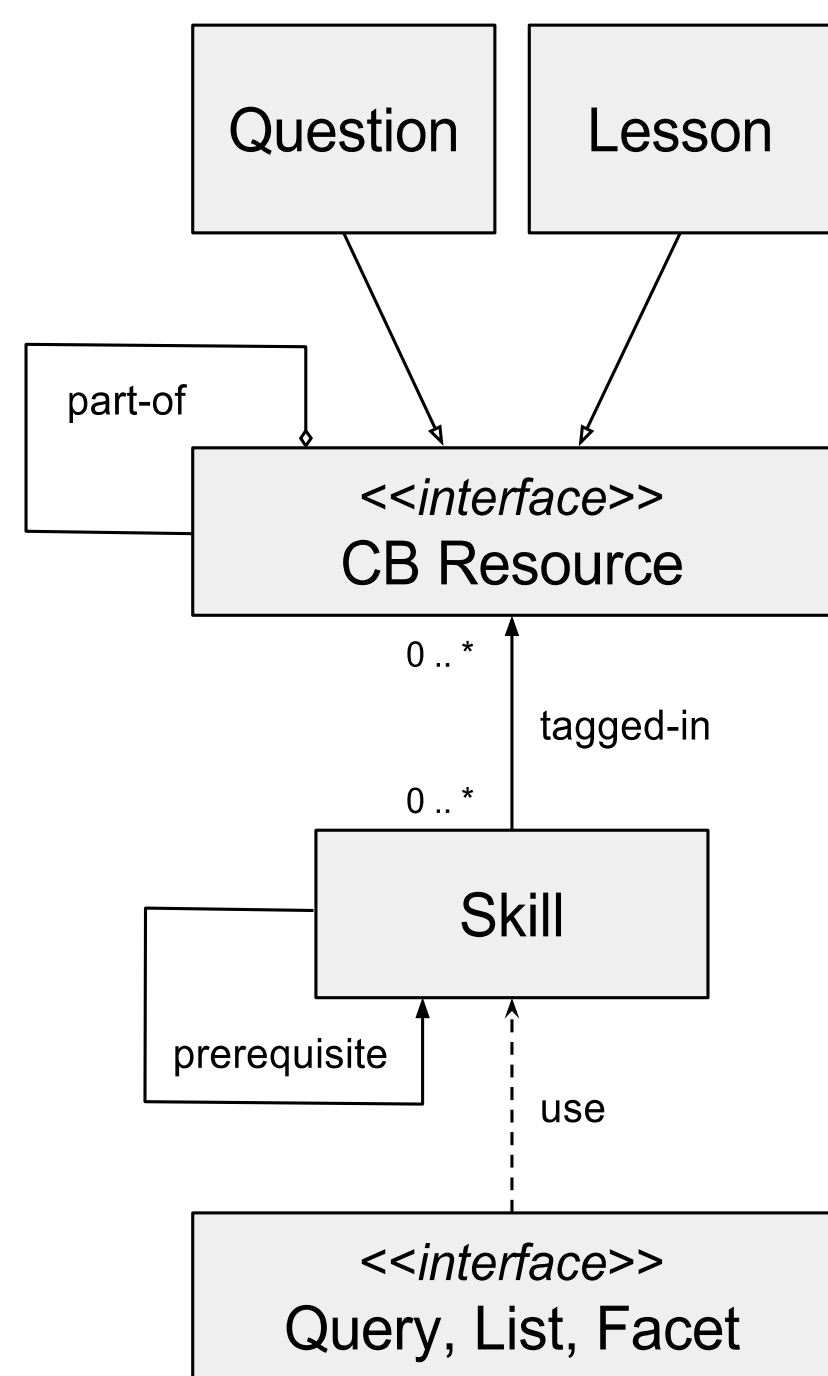
The CB Skill Map Model

In our model a **skill** is an unit of knowledge which can be **taught** or **assessed**.

Lessons contains videos, text, and interacfives, and are tagged with the skills they **teach**.

Questions in assessments are tagged with the skills they **assess**.

Skills depend on other skills and form a **directed graph** of prerequisites and follow-ons.

We implemented this skill map model in CB 1.10 and added a **collapsible knowledge panel** to show the student the skills taught in each lesson.

The knowledge panel shows the student which skills they are building on and which skills follow on from the current lesson, as well as their **proficiency** level at these skills.
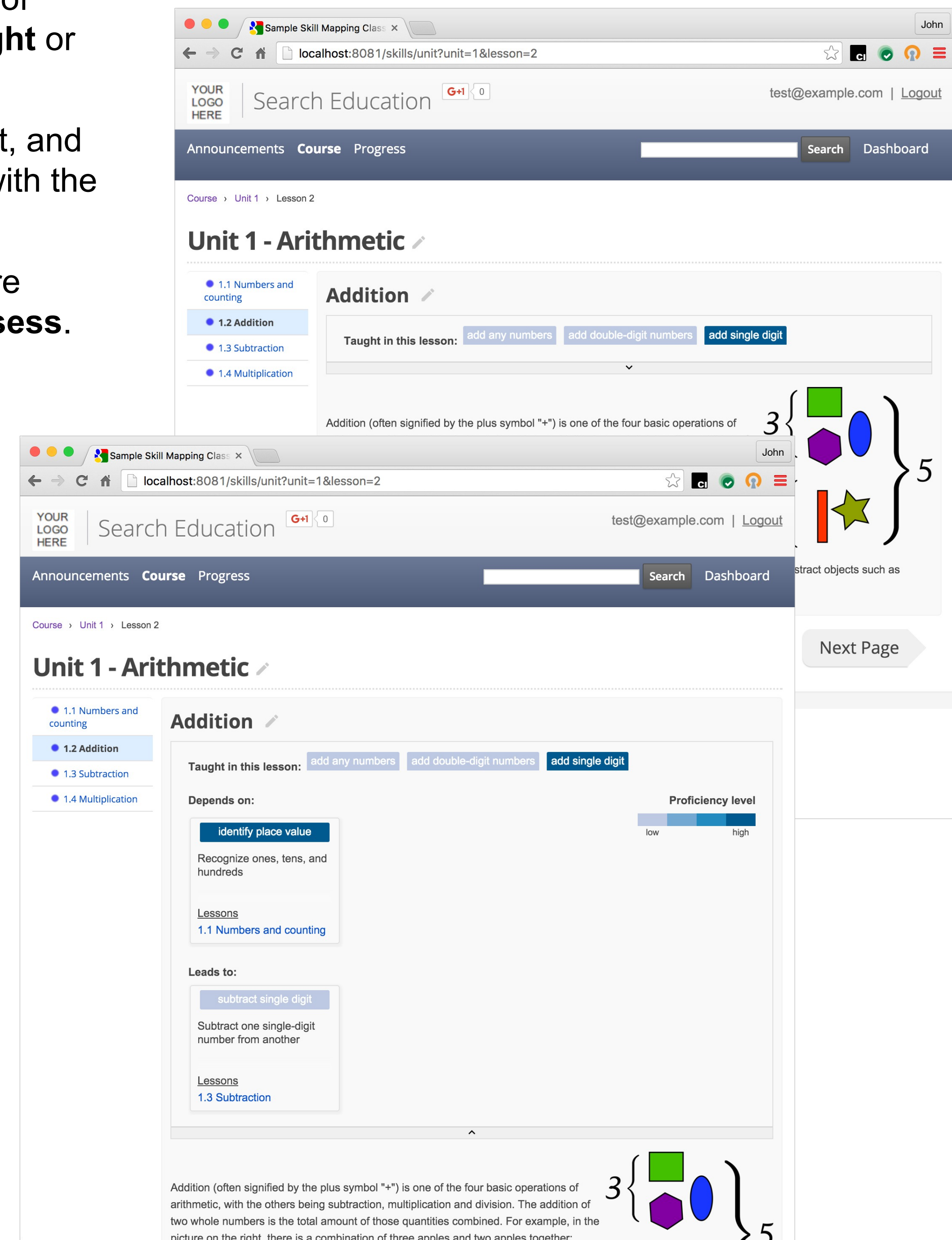
About Course Builder

Course Builder is an open-source platform developed by Google for delivering online courses at scale. Over the past four years, Google, nonprofit organizations and universities have used CB hundreds of courses in multiple languages reaching millions of students worldwide.

https://www.google.com/edu/openonline
https://github.com/google/coursebuilder-core

Related Systems

The CB skill map model is related to the approaches of the **Open Learning Initiative** (OLI) and **Learning Space Theory** (ALEKS).

Unlike OLI, our model is **single-tiered** and adds the **prerequisite relation**. OLI uses a second level of tagging ("objectives") for roll-ups. We anticipate a faceted approach to aggregating skills based multiple dimensions. The prerequisite relation enables us to make stronger inferences about the student learning state and could be used for efficient adaptive testing.

Unlike LST, CB explicitly defines the structure of the knowledge domain with the prerequisite relation. This is limited in some ways, but is less expensive to validate. Our map is designed by domain experts and so is assumed correct but possible incomplete ("expert blind-spot") and so can be validated more efficiently.

Using Skill Maps

Skills are shown on the instructors **course outline view** and there's a dedicated skill dashboard to create and edit the skill map. The dashboard includes a graphical view showing the skill map as a **directed graph.**
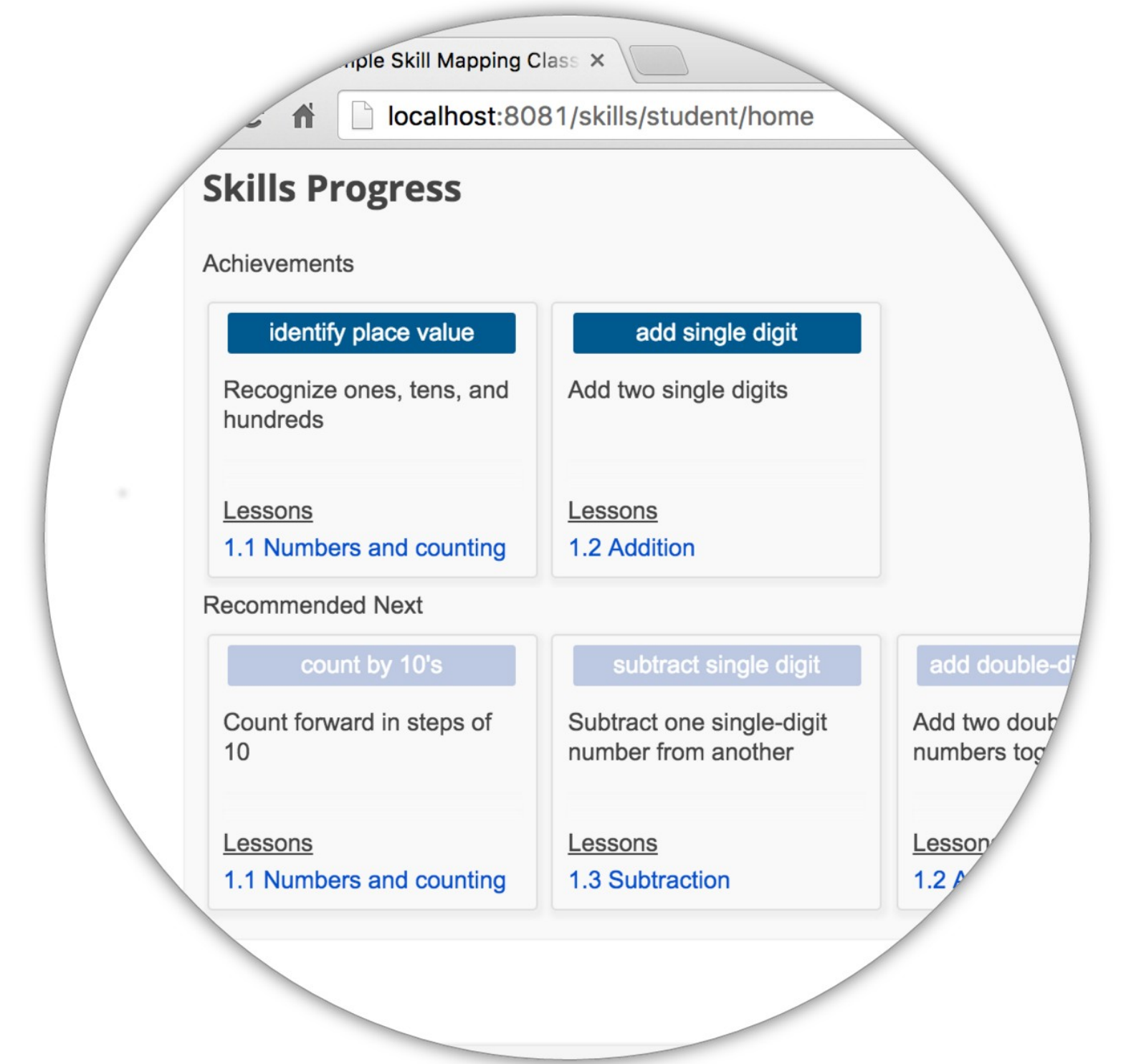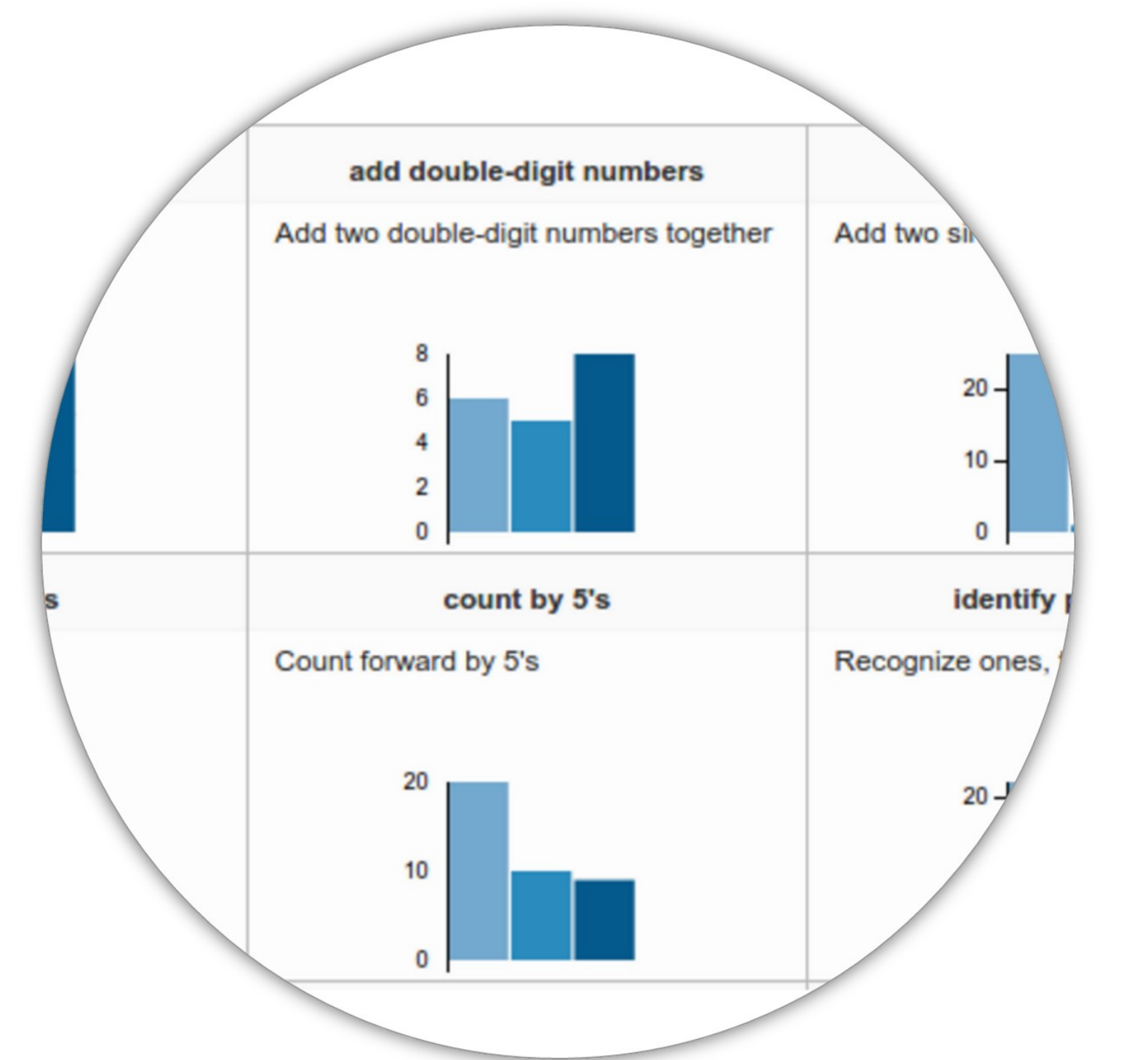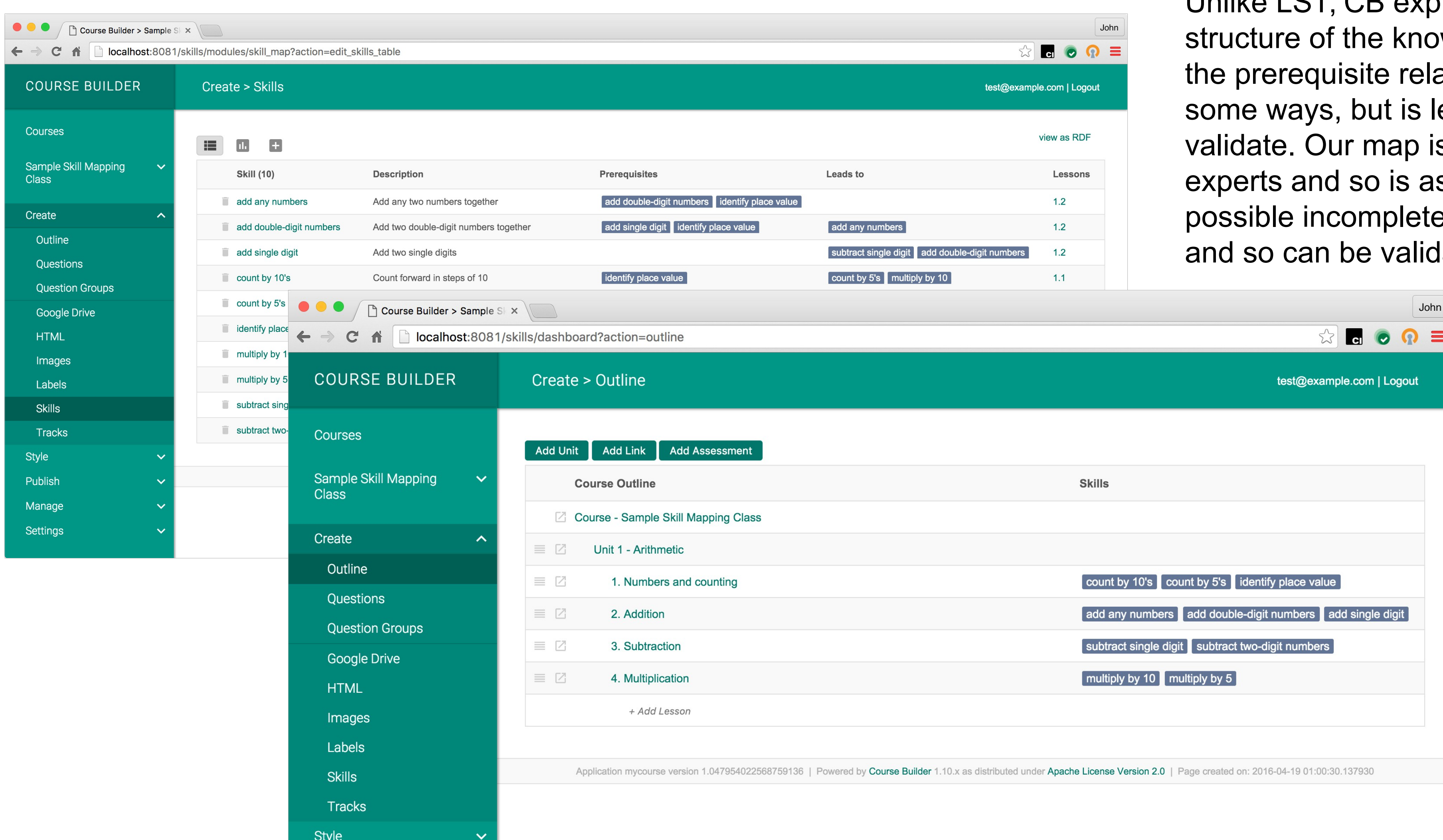
The skill dashboard encourages **objective-oriented** course design, where content creation starts by identifying the objectives (skills) to be learned.

On their profile page the student sees a summary of **achievements** and **recommendations** based on analysis of their progress through the full skill-map

The skill map opens up interesting new **analytics** information. New dashboards display student **proficiency distributions** on the skills and visualizations of student progress through skills.