



Final Project Report

UC Berkeley School of Information

Advised by Prof. Zach Pardos

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1. Introduction

a. The Problem Space

In 2009, state commissioners of education and governors from 48 states came together to develop the Common Core, a set of educational standards for students in Kindergarten through 12th grade in English Language Arts and Mathematics¹. As of May 2014, 44 states have adopted these standards in an effort to have clear and consistent standards for students across the United States. The hope is that a common set of education standards will help prepare students for success in college and in their future careers.

With the implementation of the new standards, teachers face a deluge of information, which they are having trouble translating into their curricula. They need easier access to teaching materials aligned with the Common Core, and avenues for collaboration with other educators in order to prepare their students for upcoming assessments.

b. Main objective

We aim to address the aforementioned problems teachers face by creating a platform that supports the sharing of Common Core-aligned resources. Our tool will help teachers align their existing teaching materials, find new content, and organize these resources.

2. Team Members and Roles

Sophie Barnes - UX Researcher and Designer

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Jenton Lee - UX Researcher and Engineer

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¹ "Development Process". Common Core State Standards Initiative.
<http://www.corestandards.org/about-the-standards/development-process/>

3. Exploratory Research

We began our project with a vague idea of the problem space we were interested in. We knew that we wanted to focus on education, and that we wanted to facilitate some task that would allow teachers to better align with the new Common Core State Standards. To better narrow down the focus of our project, we began by conducting exploratory research, which consisted of three segments: collage studies capturing the daily tasks of teachers, interviews with administrators who play supporting roles in Common Core implementation, and a competitive analysis of existing tools used by teachers.

a. Collage Study

In order to understand the classroom learning experience from the perspective of teachers, we decided to conduct a collage study². This exercise would not only help us gain an understanding of the technological resources being used in the classroom, but also of the daily activities which influence the tools teachers use, how they manage communication flows, which resources they use regularly, and where pain points disrupt their ideal experience.

Before conducting our study, we started with a few hypotheses:

- Teachers are already using a series of apps/technical tools to manage various classroom processes (communication, classroom management, lecture preparation, etc).
- Teachers are unclear about exactly how to comply with Common Core standards.
- Teachers are dissatisfied with the tools currently available to them.

In order to test these hypotheses and also gain a deeper understanding of the problem space, we decided that understanding their daily activities on a typical week day, and a typical weekend day would be helpful. Prompting participants to create a collage would help them immerse in their own experience, and enhance our ability to ask more effective questions about specific instances.

We provided teachers with the materials to create their collage (poster board, markers and stickers) and asked them to use image and verb stickers to lay out their experiences on a typical weekday and weekend day. We also provided different colored dots for them to place on moments throughout the day when they used technology, moments when they collaborated with other educators, and moments they felt were pain points. When going through a typical workday, one teacher discussed issues with bookmarking resources:

² The collage study discussion guide can be found in Appendix A.

"I created one folder, my digital folder, and put all my bookmarks in there. But that's not conducive to finding things easily because when you open that folder, it's just everything."

Next, we provided participants with post-its, and asked them to write down ideal solutions that could alleviate the pain points they had marked on their collages. The point of this exercise was to co-create the ideal experience. One participant expressed his ideal solution to be,

"A website with aligned curriculum, lessons, videos, photos, current events and social media aspect and lets you communicate with teachers and students."

After conducting three collage studies, we found teachers spent the most time doing the following:

- Organizing web resources
- Creating their own resources or finding their own aligned resources
- Sifting through bad resources to get to the good ones
- Learning about Common Core through online resources

Figure 1: Interview with a teacher



b. Interviews with Administrators

In addition to understanding the daily tasks of teachers, we also wanted to understand the existing infrastructure supporting implementation of the standards. In order to do this, we conducted interviews with a range of administrators³.

We heard a range of emotions about the implementation of Common Core. Most administrators could see the value in implementing new state standards, but also spoke to the daunting task of implementation particularly when resources to schools are being limited.

One administrator pointed out that Common Core is not about creating new content, its just a new organizational system. Teachers have to understand the new structure and align their resources with it. She explained to us that Common Core allows her to label content a certain way and then communicate that content with teachers across the states; Common Core is a great way to organize material so everyone can use it, but now people are scrambling to find content aligned with the Common Core.

We also heard that not many teachers are familiar with how to use technology in the classroom; however Common Core assessments will be computer based, so teachers have to become familiar and schools have to update their technology to make sure students can take the tests properly.

From most of the administrators we heard a need for finding trustworthy aligned resources. The Common Core Systems Implementation Office, of the California Department of Education, spoke of the state's efforts to curate approved resources, while another administrator in New Mexico explicitly mentioned a need for "a library of digital resources aligned with the Common Core". As we wrapped up our interviews it was clear that there was an apparent need for discovering and organizing Common Core aligned resources.

c. Competitive Analysis

Throughout our exploratory research, we kept track of the online tools mentioned by teachers and administrators. We found that many tools designed for educators were often provided by companies that tried to fulfill multiple needs such as expert-curated resources, community forums, collaborative interfaces, and advisory services. Their strengths were that they were founded by long-time experts in the education space, but were not necessarily representative of good interaction design. Because these sites attempted to provide multiple services most were hard to navigate, and had a steep learning curve.

³ Administrator interview questions can be found in Appendix B.

Our survey of the various existing services helped us better understand that the value we bring lays in our collective expertise in technical nuances which improve upon the user experience. In addition, this knowledge greatly contributed to our synthesis process, particularly in scoping our product to serve a particular task.

d. Analysis and Synthesis

We conducted a structured process of analysis and synthesis to translate our research into findings and a final product plan. This process consisted of three steps: **affinity diagramming** to analyze the data points from research, **modeling** to summarize the patterns found through affinity diagramming, and finally, **synthesis** to turn the research findings into a product concept.

Through affinity diagramming, we identified some key patterns about the daily lives of teachers, and found three main pain points:

1. Teachers have many demands on their time. They already work 60-80 hours a week, and the implementation of the Common Core Standards is only adding to their workload.
2. There are too many existing resources available online, and teachers struggle with organizing them in a way that makes later access easy.
3. Teachers don't know which resources to trust. They need high quality resources from reputable sources, but conducting a thorough review of each resources takes considerable time and effort.

Our analysis of patterns from interviews and our competitive analysis led us to developing four main values that should guide our design:

- **Easy** (because teachers don't have time to learn a confusing new interface)
- **Reputable/Trustworthy** (because they need quality resources from a source they can trust)
- **Community** (because teachers already seek and trust collaboration from other teachers like themselves)
- **Common Core-only** (so that teachers will know exactly what we offer)

With these problems in mind, our team brainstormed tools that might be useful for teachers. We followed a two-stage divergent/convergent synthesis process. In the "diverge" stage, we collectively generated a long list of useful tasks our tool could support. No ideas were rejected, and everyone built upon each other's suggestions. The list of ideas is shown below:

- sharing and reviewing existing apps for educators
- organizing teachers' bookmarks

4. Interface Design

a. Approach

We closely followed an iterative, user-centered design process. The values framework generated by our exploratory research informed all design decisions made in our initial prototyping. Because implementation and usability testing occurred in parallel, our process involved continuous iteration based upon user feedback to incorporate and adjust the interaction flows and features.

b. Assumptions

We made two main assumptions: first, that teachers are willing to upload their teaching materials; second, that teachers find resources addressing individual standards useful. We felt comfortable moving forward with these assumptions for several reasons. Currently there is a movement towards open education resources, and many existing sites that support sharing of resources in this manner, and the teachers we interviewed often cited their own searches for resources online. According to one participant, teachers will always have to “tweak” online resources to fit their classroom and syllabus, but despite that, there is still value in other teachers’ material.

c. Target Users

Although our research and interviews showed that not all teachers are tech-savvy, we chose to focus on teachers who are fairly comfortable using technology, and who are already seeking out resources online. Since these users have existing mental models of online interaction design, we modeled many of our tasks on flows, structures, and vocabulary of existing services. Further testing allowed us to iterate on these designs.

d. Organization Principles

An early task in our design process involved defining the vocabulary we would use as we designed and implemented our product. Some of the main questions we had were basic information organization questions:

- What is the granularity of the “things” we are organizing?
- What should we call these “things”?
- What are the organization principles of the system?
- What should we call the groupings in which the “things” would be placed?
- How should we visualize the organization system in a way that would allow teachers to view their resources on a high-level, as well as on the most granular level?

We knew that we would need to use the vocabulary of the Common Core Standards, which presents the standards in a hierarchy of domains, broken into clusters, broken into the most granular standards. However, we needed to decide how we would visualize the organization system, and also generate the vocabulary for organization. Would teachers put their resources into buckets, into folders?

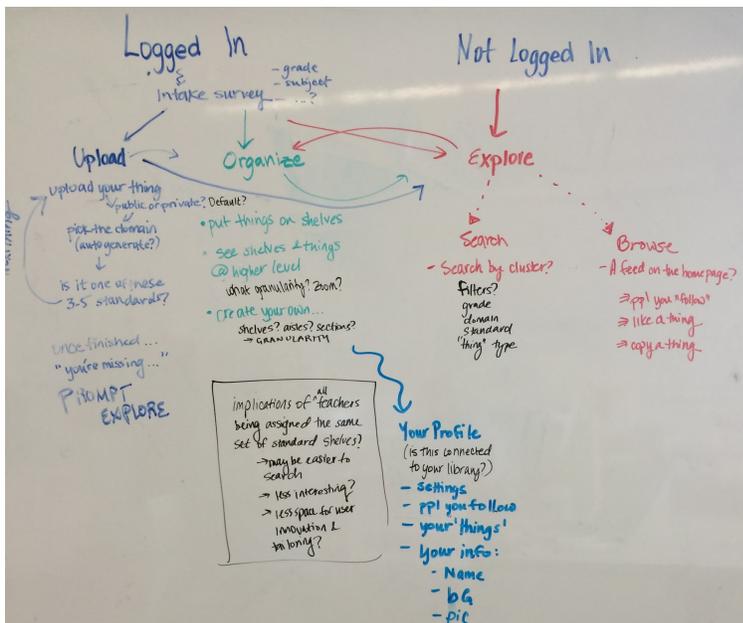
We started by brainstorming metaphors that could generate the visualization and vocabulary. We played with ideas like a "map" of resources, where teachers could zoom into their resources like we zoom into streets and buildings on a map. We also considered constellations of stars, bookcases and shelves in a library, folders and binders, and many other possible systems.

Finally, we decided to keep it simple, by organizing resources into the standards directly without any extra jargon. The tool would not only help teachers find and organize resources based on the standards, but it would also help them learn the vocabulary of the Common Core. We decided that each resource would be visualized on notecards, as they are on other sites supporting visual discovery, to facilitate easy exploration. Once we made this decision, we were ready to being prototyping.

e. Wireframing

Our prototyping process began with a few low-fidelity paper and whiteboard sketches (Figure 3). These sketches helped us quickly visualize the basic tasks our tool would support and helped us better understand our interaction flows.

Figure 3: whiteboard sketch of interaction flows



We then moved to using Balsamiq, a wireframing software. Balsamiq allowed us to rapidly iterate on our designs and allowed for the development of some basic interactive functionality that could be tested on users. We created flows for four basic tasks: exploring the system for resources, uploading a new resource, adding a resource to “My Library,” and finding a resource in “My Library.”

As we moved forward with creating a Common Core only site, we discovered that not all teachers are familiar with Common Core terminology. In order to help educate teachers on Common Core we decided to add in features that would act as help both in the context of a task, and on a separate help page. We decided to add question marks in various places of our wireframe to test if teachers would try the hover feature to clarify their confusion.

We also faced challenges trying to maintain simplicity in our interaction design. For example, we wanted the act of tagging resources to be as easy as possible. However, in order to align a resource, teachers need to know the domain/strand, cluster, and the standard. This can be a daunting task to repeat for each resource, so we decided to divide the tagging process among the user who uploads a resource and the users who save it to their libraries. Being tagged by multiple people also allows for a crowdsourced wisdom, which can create more accurate results than relying on a single user.

Our final Balsamiq wireframes⁴ feature two main pages: “Explore” and “My Library”. “Explore” displays all of the resources on the site, surfacing the most recently uploaded to the top, with the ability to filter based on grade, resource type, common core domain/strand, cluster, and standard. A user can also toggle between Math and English resources. “My Library” displays the user’s uploaded and added resources with a similar filtering feature. In addition, users can toggle to a “CCSS (Common Core State Standards) View” to get a quick overview of the standards and how many resources they have for each.

f. Usability Testing and Iteration

After designing prototypes which laid out the flows of our tool’s four main tasks, the next step was to plan and execute usability tests⁵ on the interface. We conducted a cognitive walkthrough of the four tasks, which means that we led each user through the tasks while asking them before each step to explain the following:

- What do you see on this screen?
- What would you do next?
- What would you expect to happen?
- (And, after carrying out the action,) Was this what you expected?

⁴ Screenshots of all wireframes are in Appendix C

⁵ Usability test questions are in Appendix D

Along with the basic cognitive walkthrough procedure, we also added specific questions about the interface, particularly regarding placement of buttons, expectations for functionality, expectations of help features, and wording of buttons, help text, and drop down menu options.

We conducted usability tests with four users: two of whom were I School students with a background in teaching, and two of whom were teachers with limited familiarity with technology. We hoped this would help us get feedback that would achieve two purposes: informed critiques of the interface, and teacher perspectives on the tool.

After each interview, we listed the design implications of the participant's feedback. At the end of the four interviews, we conducted an overall analysis and synthesis to prioritize feedback (based upon how many participants made the same observations) and to create a finalized list of design implications⁶. Because user testing occurred in parallel with implementation of our tool, we were able to continuously discuss feedback on the tool and propose changes in the functionality. By the time our research report was finalized many of the changes had already been implemented. There were a number of changes which were tabled for the next iteration due to time limitations, but we will discuss these in future plans.

In addition, we also presented our prototypes in an interactive forum at the UC Berkeley Graduate School of Education Research Day. Here we were able to get informal feedback on our prototypes from a number of educators.

Overall, the participants gave us a better understanding of how teachers might respond to the interface, the changes they would need in order to better navigate the site's functionality, and the information they would want about the resources.

Figure 4: Usability test



⁶ A comprehensive list of usability test analysis and design implications is included in Appendix E.

5. Implementation

This section contains a description of the architecture for Common Ground and the main technical features of the site. The site is currently hosted on the School of Information servers.

a. Site Architecture

Common Ground is built using the WordPress content management system (CMS). We decided early on to use a CMS for the site in order to leverage the built-in features of most CMS tools such as user registration, post organization, and post tagging. The Wordpress community has created many open-source themes and plugins which we hoped to be able to use in order to speed up development. The development team also had some web development experience using PHP and MySQL which is what Wordpress is based on. We used a "Pinterest-like" WordPress theme (iPin Pro) as a template for our site which allowed posts to show up as notecards in an "infinite scrolling" grid.

We made many additions and customizations to the template to implement the features in our prototype, including code for the upload process and saving resources. Our main filter was created by using the Taxonomies Filter Widget plugin and also by creating custom WordPress taxonomies.

The front-end architecture uses the jQuery library for manipulating the DOM, the Bootstrap library for styling, and the Masonry library for displaying resources in the grid-like format.

b. Main Features

This section describes the main features we have implemented on the Common Ground site.

Upload a Resource

Users are able to upload either URLs or files (e.g., pdfs) to the site. When a user adds a resource, the following processes are executed:

1. Generate screenshot image for the resource and associate the image with the post. Images are generated using the wkhtmltoimage utility.
2. Store resource name, description, type, implementation information, and additional metadata into the database.
3. Store common core tags in database. The user is presented with options to select subject, domain, cluster, and standard. The options are updated using AJAX.

Save a Resource to "My Library"

When a user clicks to add another user's resource to their own library, the original subject, domain and cluster are shown and the user is asked to select a standard. The following processes are executed:

1. Get CCSS tags from database associated with the resource.
2. Store selected CCSS standard in the database. Hovering over the standard name will show the standard's text description.
3. Update CCSS tag count for the resource.

Explore Resources using Faceted and Keyword Search

The Explore page is the main page of the site and contains all of the uploaded resources displaying the most recent resources first. Not all of the resources are loaded at once and the infinite scrolling feature loads additional resources as the user scrolls down the page. The filter in the left side bar allows the user to browse the content on the site. The user can select subject, domain, cluster, standard, resource type, etc. and can also search for keywords in the resource's name and description.

My Library

Each user has a My Library page where uploads, saved resources, and resources from followers and those the user is following can be found. When a resource is saved to a user's library, the original resource is preserved and along with it any comments and ratings. We implemented this as a modified version of the My Library from the wireframes due to time constraints and the need to further explore how best to display helpful statistics to a user who has multiple subject or grade interests using our current WordPress architecture.

Registration/Login

When visitors sign up for the site we ask them to provide the following information:

- First name
- Last name
- Email address
- Password
- City
- State
- Grade
- Resource Interest

Comment on Resource

Signed in users can comment on a resource. The user who originally uploaded the resource can receive email notifications when other users leave comments. Comments are visible on the expanded card view.

Rate Resources

Signed in users can rate resources thumbs up or down. We collect this data and future features would be to allow users to sort our resources based on ratings. The Common Ground site administrators can also use this feature to search for highly and poorly rated

content and possibly promote highly rated content and decrease the ranking of poorly rated content.

Interactive Visualization for Explore the Standards

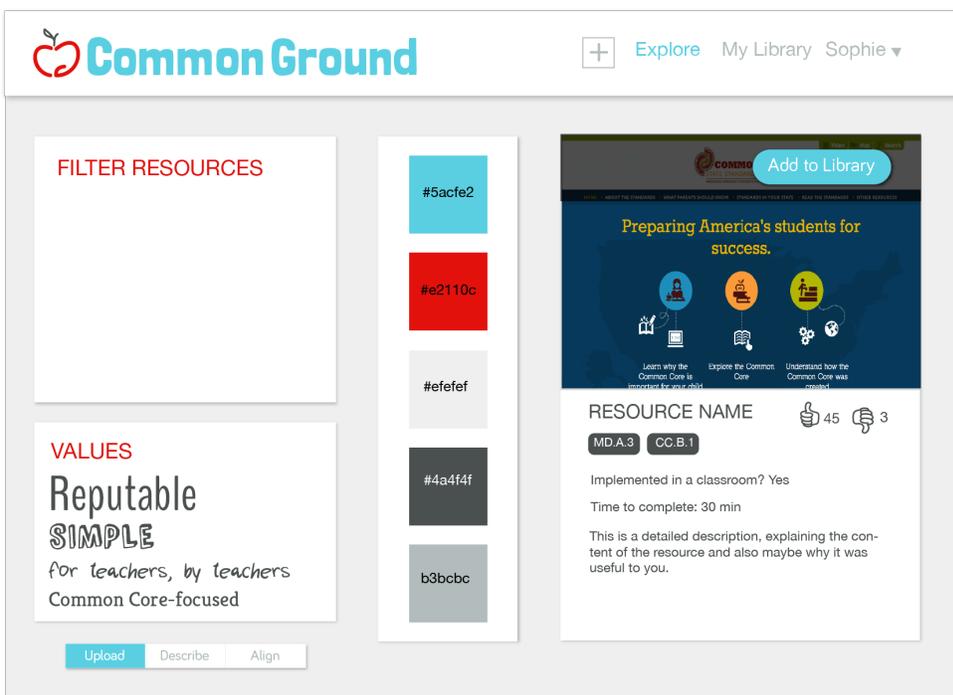
If users have trouble while tagging a resource, or want to explore the standards in general, we developed a visualization that supports both tasks. Teachers can view the standards in each subject by breaking them down by domain, then grade, or first by grade, then domain. We found that English Language Arts standards are more easily viewed domain-first, and Math standards are more easily viewed grade-first. The visualization was created using the D3 JavaScript library.

6. Final Design

a. Style Tile

We followed a fairly standard design process by starting with a style tile. By laying out the colors, fonts, logo, and general visual principles from the start, all four team members were able to work on different portions of the project and yet create a consistent look and feel. This style tile, as well as our logo, went through several iterations before we finalized the look. The final tile can be seen in Figure 5 below.

Figure 5: Common Ground Style Tile



b. Common Ground Screenshots

This section contains screenshots of the final design.

From the splash page shown in Figure 6, users can sign up or start exploring the Common Ground website as a guest. They can also watch a demo video of how to navigate our site.

Figure 6: Common Ground Splash Page

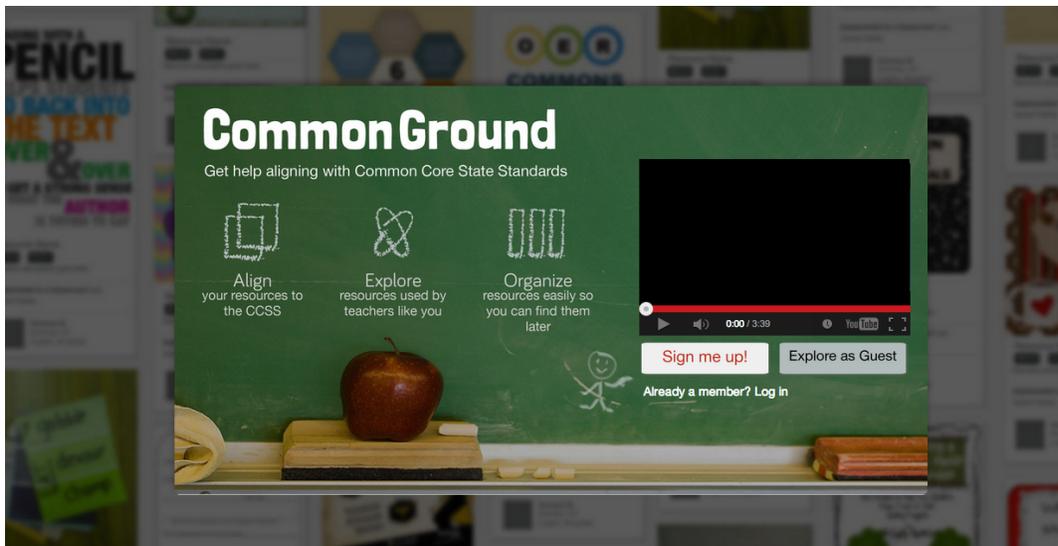
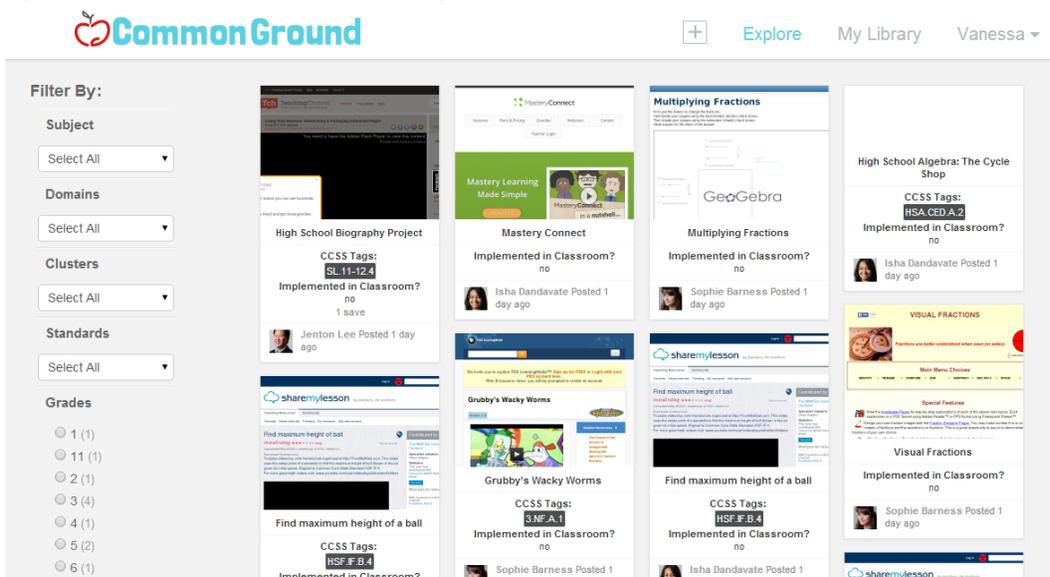
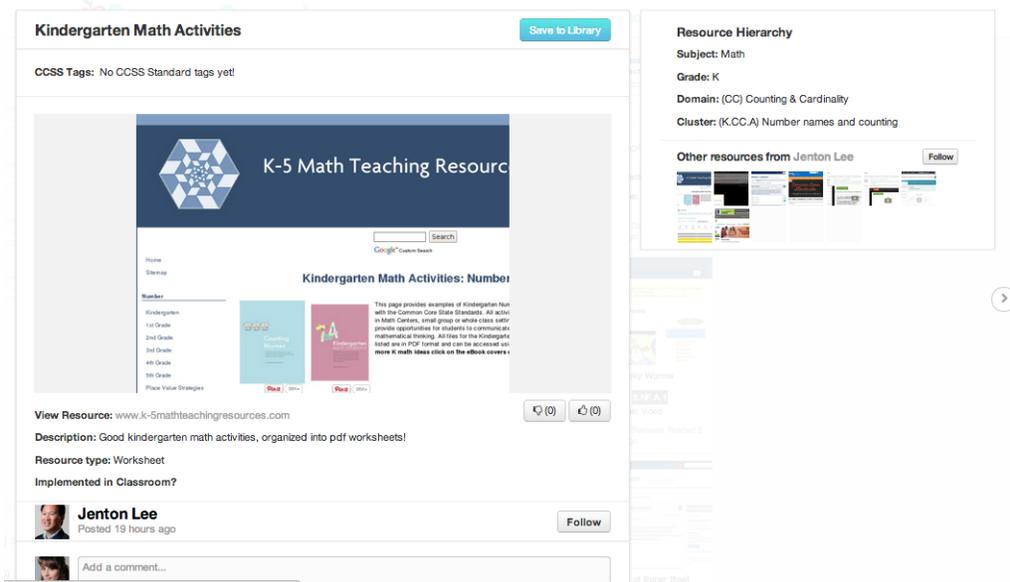


Figure 7: Common Ground Explore Page



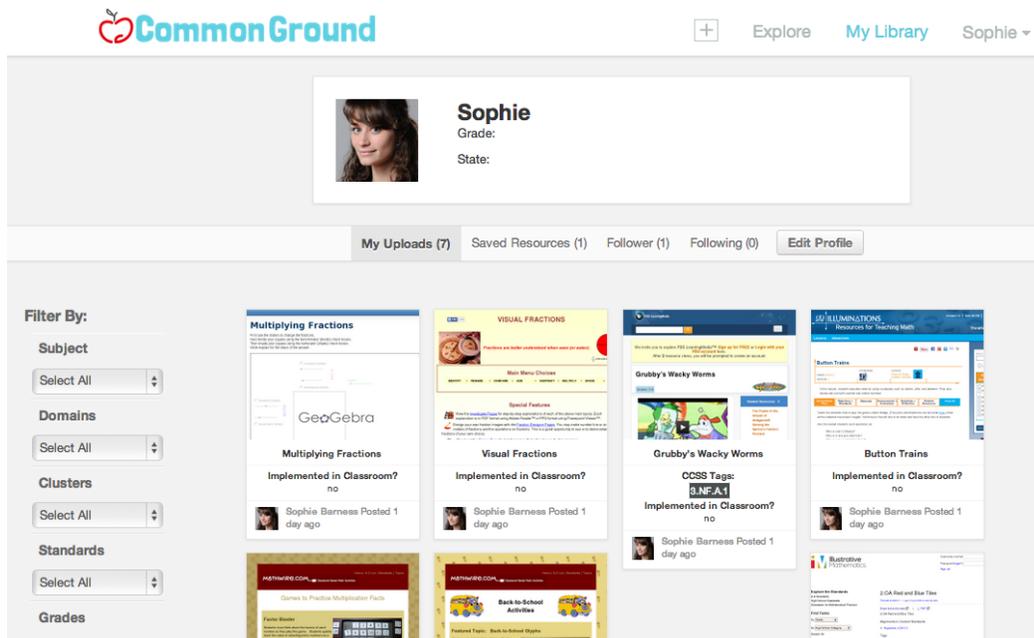
Users can explore newly aligned Common Core resources on the Explore page as shown in Figure 7. They can also use the filter to search for specific types of resources.

Figure 8: Common Ground Expanded Resource View



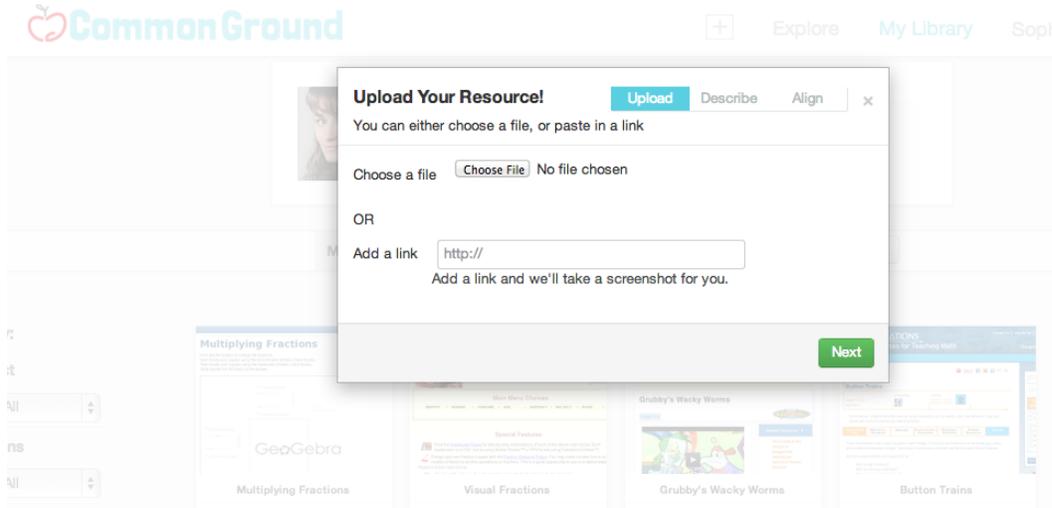
When a user clicks on a resource they will see the expanded resource card as shown in Figure 8. The card includes more information than is viewable in "Explore" view.

Figure 9: Common Ground My Library Page



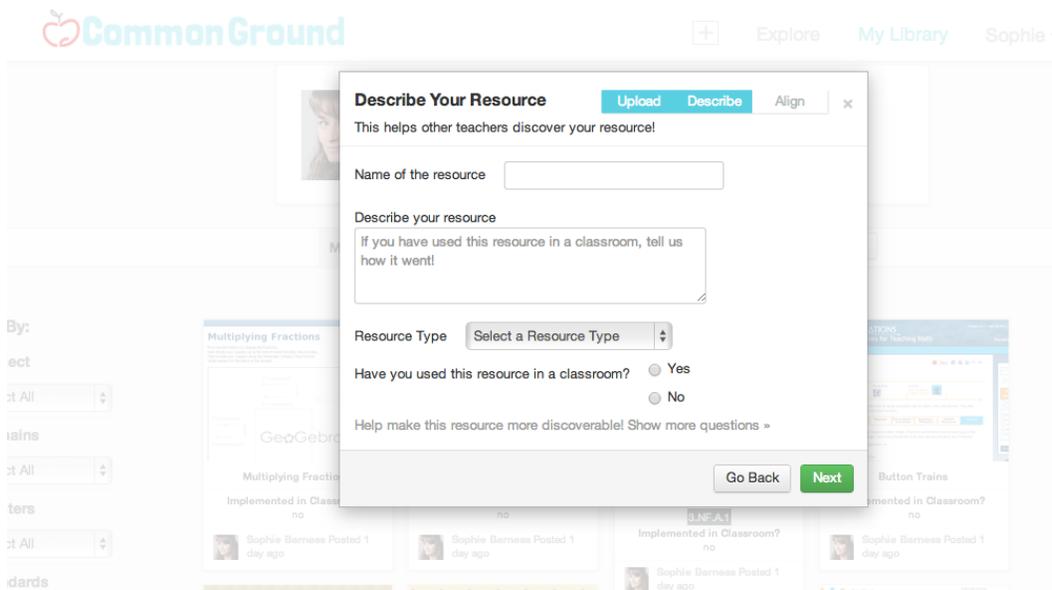
Users can go to their own library page (as shown in Figure 9) to see the resources they have uploaded and saved by clicking on "My Library". The filter here is similar to the filter feature on the "Explore" page.

Figure 10: Common Ground Upload Page



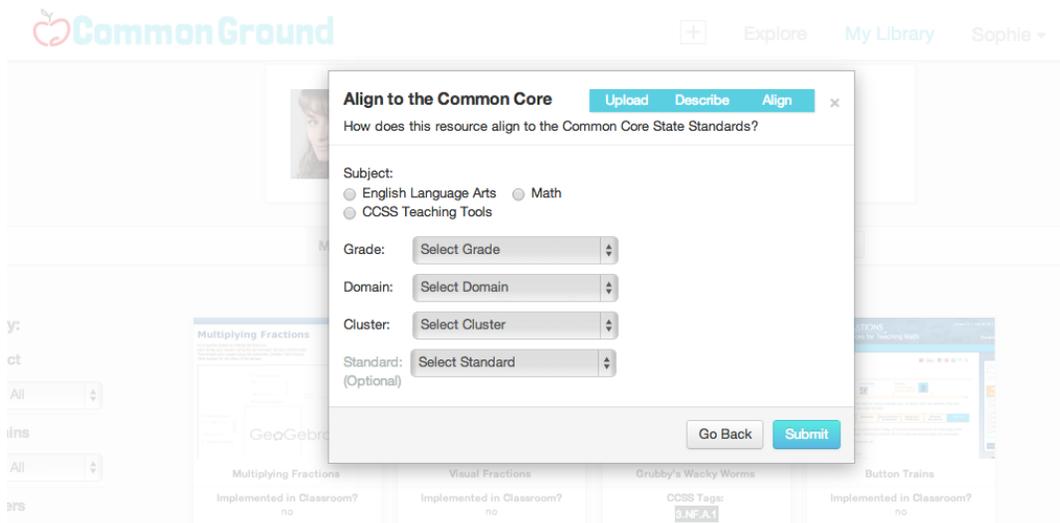
Users can upload their own resources either by adding a file from their own computer or adding a link as shown in Figure 10.

Figure 11: Common Ground Describe Page



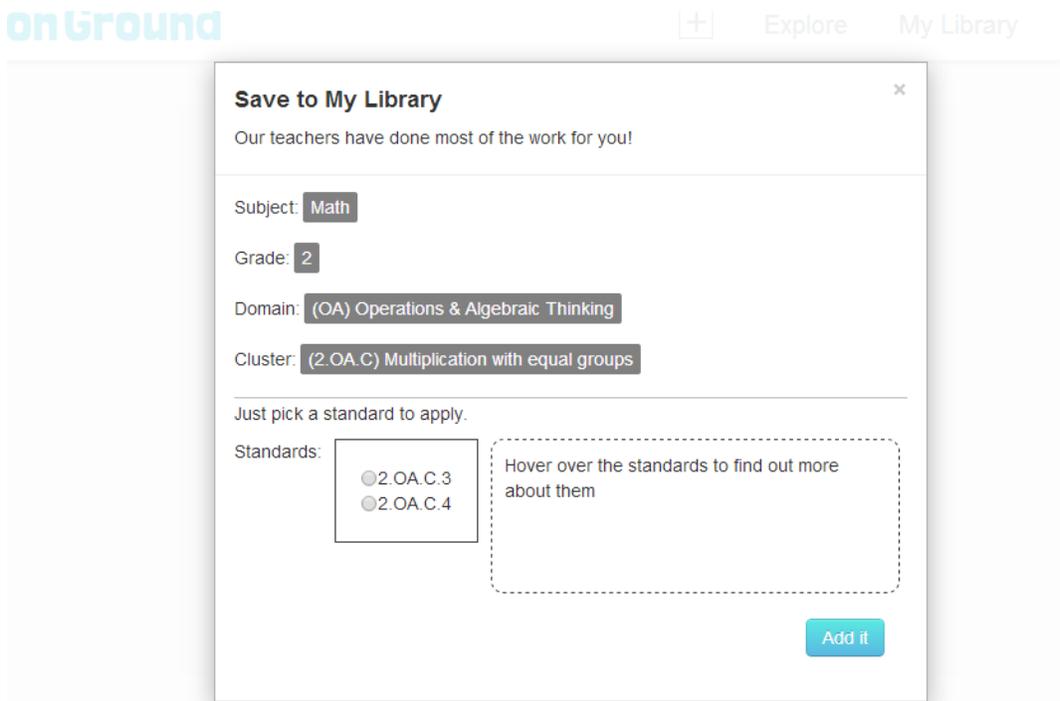
Users can add a name, description, resources type and implementation status of an uploaded resource. They also have the option to add more metadata about the resource by selecting "Show more questions".

Figure 12: Common Ground Align Page



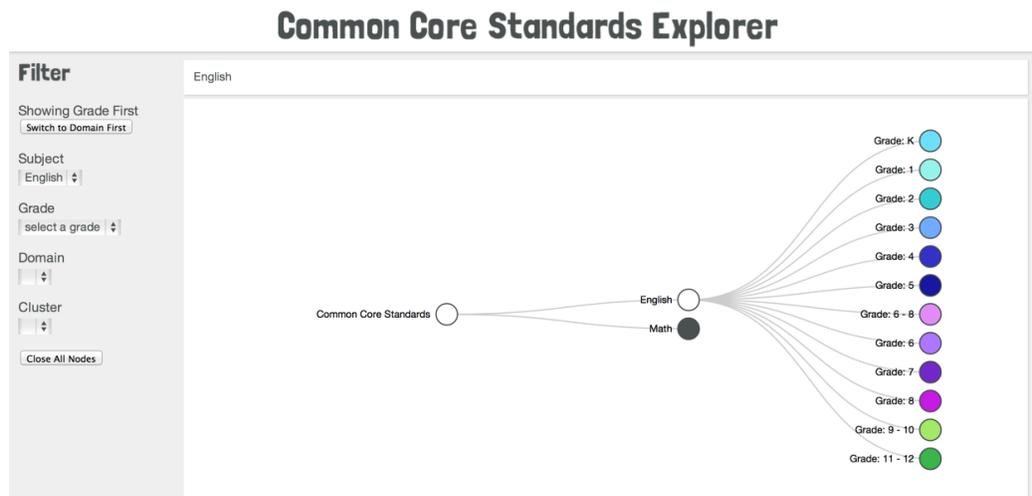
Users can select the subject, grade, domain and cluster of the resource. They also have the option to select the standard.

Figure 13: Common Ground Save to My Library Page



Users can add resources to their personal library. Users have to select the standards that apply to that resource and then it will be added to their library.

Figure 14: Common Ground's Common Core Standards Explorer



Users can use the interactive visualization shown in Figure 14 to click through the hierarchy, and explore the content of the Common Core State Standards.

7. Future Considerations

a. Design and Implementation Changes

There were a number of design changes from our usability test findings that we were unable to implement due to a time limitation. Below we have listed the changes we plan to make in the future.

- General changes
 - Add an intro modal for first time log-ins "Welcome to Common Ground! If you missed watching our intro video, you can access it here. You can also find tips on how to use our site, explore the standards with our CCSS visualization, and change your settings there."
 - Add a "reference the standards" pop-out to the right of the website.
 - Include the CCSS copyright statement and link in terms of service
 - Make our own abbreviated clusters for only the ones that are "too long"
- Changes to Explore page
 - Add question marks with hover descriptions next to "Domain," "Cluster," and "Strand" on the filter.
 - Alter filter names to reflect the differing hierarchy names for English and Math Standards; Use "Strands" and "Clusters" for English, and "Domains" and "Clusters" for Math.

- On all resource views: Add grade and city, state [to do in both masonry and expanded view]
- Expanded resource view:
 - add classroom type
 - Instead of *(number)* for number of times standard has been tagged, use words: *"x users thought:"*
- Changes in Upload flow
 - Describe modal: Allow users to choose between the screenshot, scraped images, and the resource type logo.
 - Align: Make the choice between search vs. select more visually clear; move the search bar to the bottom, add an "or" (like on the upload modal) and help text above the search bar.
 - Allow users to tag multiple domains, clusters, standards
- Changes in Save to Library flow
 - Align Modal: Remove the subject, grade, domain, and cluster information, and just prompt users to pick a standard. Under that, provide a link with text like "don't think it's any of these? click here to select from other standards." [the edit feature hasn't been implemented]
 - Add option to say "this does not align with CCSS"
- Changes on My Library page
 - Add help text to open text description box: "tell us about the demographics of your classroom"
 - Add CCSS view: [wish list]
 - create a horizontal scroll view of the resources in each cluster
 - Add # of total resources next to "grade" at the top
 - Add help text to encourage clicking
- Added Help Features
 - add "how to use our site" page:
 - linked to from the settings drop down, and on a sticky footer
 - contents:
 - the video from the landing page
 - general intro text:
 - defining the hierarchy terminology
 - link to our common core standards visualization
- Changes to Interactive Common Core State Standards visualization
 - Math standards in the domain-first view need an additional filter: K-8 domains and high school domains. The high school standards add a great number of domains that are only relevant to one grade, so even if a teacher wishes to view domain-first, they would still benefit from separating the domains relevant to elementary school and middle school from the domains relevant to high school.
 - The tooltip text that shows up when hovering over a standard could benefit from a link back to our site. Something that allows teachers to find resources

aligned with that particular standard. This would create better connections between the visualization and Common Ground.

- The teacher profiles should feed into the filter so that when a teacher opens up the visualization from our site, the default node view is relevant to him or her.

b. Legal Considerations

For any internet service provider that links to and hosts content at the direction of users, there are a number of legal disputes that might arise. Two particular considerations are that of direct copyright violation and secondary liability.

In order to prevent any claims of direct copyright violation, we must ensure that our website does not make any material contributions to the creation of content on the website. As we do host images on our server (currently screenshots of uploaded resources or linked websites, and possibly scraped images in the future) we must do so entirely at the direction of users. So, we must include, at the point of upload, statements that prompt the user to confirm that he or she has copyright over the content being uploaded. Or, if the user chooses to share a link, that we provide them with options to either use the screenshot of the website, images on the website, or a graphic that we ourselves have designed. The key consideration here is that all content will be created and hosted completely at the direction of the user. Currently we only have the option of taking a screenshot, so we have edited our help text so that a user actively makes the choice to prompt the screenshot.

Despite this, though we may avoid direct copyright infringement, there is still the possibility that we may be exposed to secondary liability if any of our users infringe upon copyright when uploading resources. So, we look to section 512 of US Code 17 (better known as the DMCA Safe Harbor Provision) to avoid secondary liability. We must:

- Register with the copyright office and designate an agent to field all claims of copyright violations (takedown notices)
- Specify in our Terms of Service a policy to terminate the accounts of repeat infringers
- Instate a policy to expeditiously remove and disable access to reported infringing material, notify the user who uploaded said infringing material of the takedown notice, and allow them an opportunity to file a counter notification. If a counter notification is filed, we must replace content within 10 days and notify the original complaining party of the counter notification.

This must all be stated in our terms of service.

In addition, we must develop a privacy policy which informs users of which information we are collecting, how we will store it, and for which purposes it will be used.

c. Future Applications

Common Ground is designed to be open to the public and a space where any teacher on the web could create an account, and begin uploading and finding aligning resources. Based on conversations that we have had with research participants and others in the education community we could

Expand site membership

The site could be modified to allow for group accounts which would be for organizations such as museums, libraries, or open education resource communities. We have learned that these organizations are also aligning content to the Common Core and Common Ground could serve as a platform to advertise and share content.

Versions of the site for a specific school district

Common Ground could also be deployed at the school district level. During our research we discovered that school districts often have curriculum developers that share content with teachers using shared drives and bookmarking sites. Common Ground could potentially replace the shared folder model and provide a way for teachers to quickly find aligned resources that have been approved within their district. The site's social features such as rating and comments could also provide feedback to the curriculum developers.

Appendix A: Collage Study Discussion Guide

Objective

Understand the classroom learning experience from the perspective of teachers, and obtain a comprehensive view of the technological resources being utilized.

Key Questions

- How do their daily activities impact which tools they use?
- How do they manage communication with the various stakeholders involved in the teaching process?
- Which resources do they use on a regular basis?
- What are the pain points in their current experience that can be mitigated with an online app?

Hypotheses

- Teachers are already using a series of apps/technical tool to manage various classroom processes (communication, classroom management, lecture preparation, etc).
- Teachers are unclear about exactly how to comply with Common Core standards.
- Teachers are unsatisfied with the tools currently available to them.

Scope of work

We will delve into three particular topics to help inform the development of our resource sharing application, which will yield mental models:

- The daily teaching experience
- Communication flows
- Existing resource toolbox

Areas of consideration

How do daily activities impact which tools they use?

- Which factors influence what tools teachers use?
- Are device affordances a consideration in the decision-making process while teachers are choosing which tools to use?
- When do teachers choose to use technology versus an existing, non-technical solution?

How do they manage communication?

- Who do teachers communicate with regularly?
- What is the purpose/content of these communications?
- Are there differences in the medium by which they communicate with these various

- people/groups/institutions?
- Which factors influence how they communicate?

Which resources do they use regularly?

- Who recommended these resources to them?
- Do/did they receive any training or support in learning these resources?
- For which purpose do they use these resources?
- What influences their decision to use an online resource vs. not?

What are the pain points in their current experience?

- Which activities are difficult to successfully complete without technology? With technology?

Script

1. Introduction

Hello, my name is _____, and with me I also have _____ and _____ who are working with me on this project. We are masters students at the UC Berkeley School of Information. As you may already know, we are doing some research to understand how teachers use tools in the classroom.

Today we are going to talk more about your daily activities in the classroom. We want to hear about how you prepare for your lessons, who you talk with, and how you manage your students. This will help us understand how the tools you use are beneficial, and where there could be improvement. We encourage you to include as much detail as you feel comfortable sharing with us.

Before we begin our conversation, I want to explain a few rules:

- We don't work for a company- we're students doing some research and hoping to create an online educational tool to help teachers access resources that meet Common Core Standards. Please feel free to express your honest opinions.
- There are no wrong answers
 - If it's ok with you, we'd like to record audio and video for research purposes only. We are part of a larger team back home that wants to hear what you have to say.
 - The video may be used as part of our final presentation at school.

Let us begin with your introduction:

Please tell me your name, how long you've been teaching, and a little about the school where you teach (name, where it is, private/public?).

- What is the demographic of your students?
- How often do you or your students use technology in the classroom?

- Tell us one thing that has changed in your curriculum since the introduction of the Common Core Standards.

2. Current Experience Collage Activity

Goal: To immerse participants in their daily teaching experience, and understand the technology and pain points associated with the range of activities.

Tools: Poster, verb stickers, picture stickers, blank stickers, colored dots, sharpies

Activity Description: Participants will lay out a typical day and a weekend day. They will indicate what they do between the time they wake up, and when they go to bed. The dots will indicate:

- Blue: moments when they use technology
- Green: moments when they collaborate with other educators
- Red: pain points

Narrative:

Now we're going to do an activity that lays out your teaching-related activities throughout a typical week day and a typical weekend day. You are going to build a collage.

[Moderator: DO NOT READ: Pass out poster boards, blue dots, word stickers, and image stickers]

The poster boards have an arrow going from left to right, which represents the start and end of your day. The area above the line represents your typical weekday and the area below your typical weekend day. I have just given you some image stickers and word stickers. The image stickers might remind you of moments in the classroom, or when you're planning your lessons. The word stickers are verbs for things you might do. I want you to combine the image stickers and the word stickers to illustrate your experiences throughout these two types of days. Feel free to use the sharpie to include anything extra—how you felt, a drawing we didn't include, an activity you want to add, whatever.

[Wait 5-10 minutes to let them draw the collage]

Now put blue stickers next to any moments when you're using technology.

[Wait 2 minutes]

Now put green stickers next to any moments when you're collaborating with other educators. (other teachers, your boss, curriculum designers, etc either online or in person)

[Wait 2 minutes]

Now put red stickers next to moments where you feel limited or want a better experience.

[Wait 2 minutes]

Ok, walk me through your typical weekday.

[Spend 10 minutes on this]

Now walk me through your typical weekend day.

[Spend 10 minutes on this]

Probes:

- Tell me about which device you used in this situation?
- Why did you choose this tool? How did you learn about it?
- How did you learn how to use the tool? Did someone train you?
- What frustrates you about this experience?
- How often do you look for new resources? How do you search?
- Do you feel like technology is something that you are open to exploring?
- In which of these moments do you talk with other teachers or parents?

3. Ideal Experience: Post-its

Goal: To co-create "ideal" solutions to participant pain points.

Tools: Collage from first activity, post-its, sharpies

Activity Description: Participants will write ideas on post-its and put them near the pain points on the collage.

Narrative:

Now I want you to look at your collage, and we want to start thinking about what type of product, feature, service, information, or any other kind of teaching resource would make your frustrating moments easier. Feel free to think way outside the box on this one—nothing is impossible. Write each idea on a separate post-it note, and stick it next to the red pain point dot it addresses. You can also think of ideas that aren't directly associated with a red dot.

[give them 5-10 minutes to do this]

Ok, tell me about the ideas you came up with.

[spend 5-10 minutes on this]

4. Communication & Common Core

Goal: To understand how they are learning about and implementing common core standards—who they talk to, how they talk to them, and which resources they use.

Narrative:

Now we're going to talk about your experience with the common core. We just have some questions to understand what you've done to understand the Common Core standards.

- Are you familiar with the common core state standards?
- How and when did you learn about the common core?
- Do you feel the new standards are different from the previous ones? If so, how/why?
- Has your school provided you with tools, training or milestones to implement the common core?
 - If yes, can you expand?
 - If no, what do you think you'll need from them to help you implement the common core?
- Based on what you know about the common core, will you have to alter your curriculum?
 - If yes, can you tell me about what you're changing?
 - If no, "oh interesting, can you tell me more about that?"
- What did you do immediately after learning about the new standards to change your curriculum?
- What do you and your colleagues do when trying to find out more information about the Common Core?
 - Probe: (try to uncover frustrations or successes in their different avenues of looking for help)
 - Probe: Do you search for information online? What sites/resources?
 - Probe: Do you talk to other educators? Who do you talk to? How? When?
- How did your school provide you with tools or milestones to implement the common core?
- Have you searched for aligned curriculum materials online?
- How have you communicated with parents or students about these standards?
- What additional resources do you think you will need to implement the common core in your classroom?

Appendix B: Administrator Interview Questions

We spoke to four administrators, two of whom are employees of the California State Department of Education, another is a technology coordinator for a school district in New Mexico, and the last is the co-director of a company that provides Common Core assessments to teachers. Each interviewee did not answer all the questions below, only the questions relevant to their roles and experiences.

Questions about the interviewee

- What is your role?
- What have you been working on in the context of alignment with the Common Core?
 - what have teachers been wanting?
 - What are teachers doing to become aligned?
- How familiar are you and/or the teachers with the standards?
- How familiar are they with the vocabulary of the common core?
- What kinds of materials would teachers need to “align”?

General Questions about the Office

- What is the primary goal of the Common Core Systems Implementation Office?
- Can you give us a high level overview of the implementation plan?
 - (Probe: How do they work with school districts?)

Common Core Questions

- What standards were in place before the common core?
- When will assessment begin in California?
- Are the California standards different than the national standards? Are common core aligned resources able to be shared State-to-State or will each state have unique needs?
- How are teachers and schools aligning themselves to the Core?
 - Acquire new aligned materials?
 - will the decision regarding which materials to acquire be made at the school district level, school level, teacher level?
- How will the standards be enforced (assessments, standardized tests)?
 - When will end of year standardized tests be aligned with Common Core?
- What feedback have you heard from teachers, school administrators, and parents regarding the Common Core?
 - How have you solicited this feedback?
- What kinds of interactions do you or your company have with teachers regarding the Common Core?
 - What sorts of difficulties have teachers reported to you, specifically in the context of the Common Core?

Questions about their website or tool

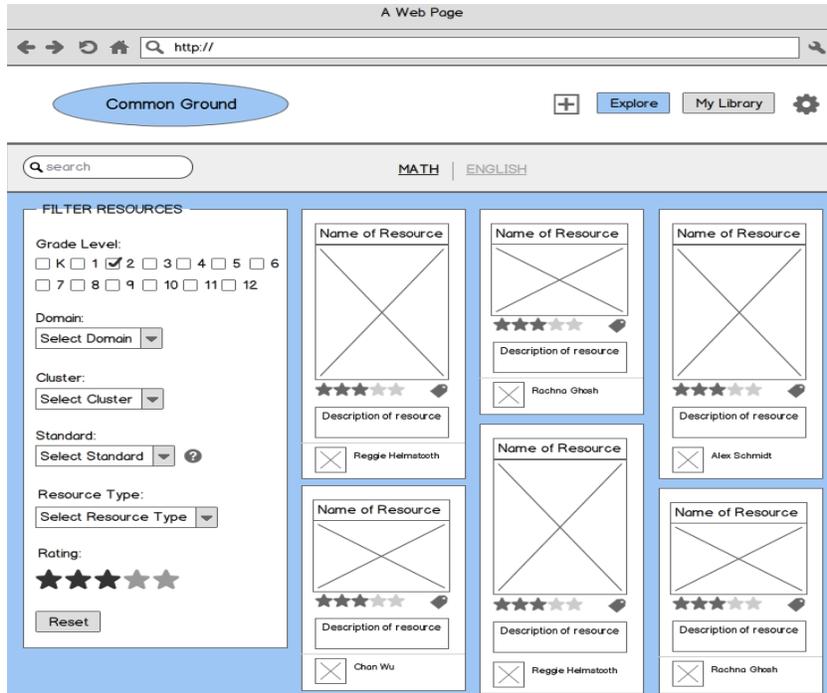
- What is the intent of the site?
 - For what purposes would teachers come to your site?
- Who decides what material constitutes as “aligned”?
 - (Governing Body? Authority?)
- We noticed that the resources on the site are aimed mainly at grades K-8. What is the plan for grades 9-12?
- Beyond the website, what kinds of outreach is being done to communicate the standards and make sure they are being understood?
- What were some obstacles you faced in getting teachers to use your tool?
- Do schools typically make the decision to implement your tool? Or is it typically individual teachers who become your customers?

Closing Questions

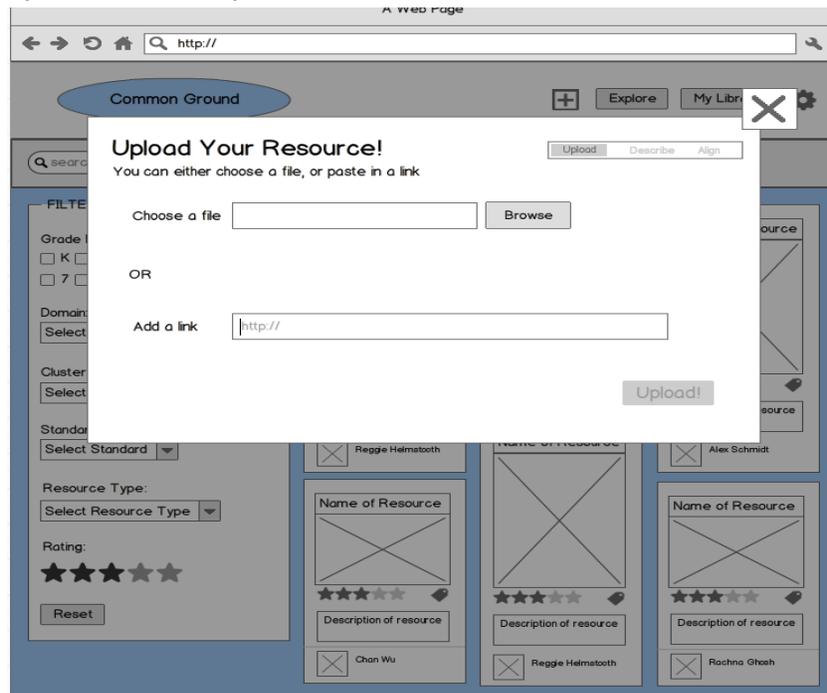
- What kinds of needs do you think are still not being met?
- Do you have any other stories about adoption and attitudes surrounding the core, that you think might be useful for us to know?
- Is this a nonprofit?

Appendix C: Wireframes

Explore View



Upload Flow: Step 1



Upload Flow: Step 2

The screenshot shows a web browser window with a search bar containing "http://". The page header includes "Common Ground", "Explore", and "My Libr". A modal dialog box titled "Describe Your Resource" is open, with the subtitle "This helps other teachers discover your resource!". The dialog has three tabs: "Upload", "Describe", and "Align". The "Describe" tab is active. It contains the following fields and options:

- A thumbnail selection area with a "Choose a thumbnail 1 of 4" label and a right arrow.
- A "Name of Resource" text input field.
- A "Describe your resource" text area with the prompt "If you have used this resource in a classroom, tell us how it went!".
- A "Resource Type" dropdown menu labeled "Select a Resource Type".
- Radio buttons for "Have you used this resource in a classroom?" with options "Yes" and "No".
- "Go Back" and "Submit" buttons.

The background shows a resource grid with columns for "Name of Resource", a star rating, and "Description of resource". Resources listed include Chan Wu, Reggie Helmstoth, Alex Schmidt, and Rachna Ghosh.

Upload Flow: Step 3

The screenshot shows the same web browser window as in Step 2. A modal dialog box titled "Align to the Common Core" is open, with the subtitle "We've already populated your grade and subject. Just select a domain and cluster!". The dialog has three tabs: "Upload", "Describe", and "Align". The "Align" tab is active. It contains the following fields and options:

- A search bar labeled "search keyword, domain, standard".
- Subject selection: Radio buttons for "English/LA" and "Math" (selected).
- Grade selection: A dropdown menu labeled "Select Grade" with "2nd grade" selected and a close button (X).
- Domain selection: A dropdown menu labeled "Select Domain".
- Cluster selection: A dropdown menu labeled "Select Cluster".
- OPTIONAL: A dropdown menu labeled "Select Standard".
- A "Help me align" link with a question mark icon.
- "Go Back" and "Submit" buttons.

The background shows the same resource grid as in Step 2.

Add to Library: Step 1

The screenshot shows the 'Common Ground' website interface. At the top, there is a search bar and navigation buttons for 'Explore' and 'My Library'. Below this, there are tabs for 'MATH' and 'ENGLISH'. The main content area is titled 'FILTER RESOURCES' and contains several filter options: Grade Level (K-12), Domain (Select Domain), Cluster (Select Cluster), Standard (Select Standard), Resource Type (Select Resource Type), and Rating (stars). A grid of resource cards is displayed below the filters. Each card has a placeholder image with a red 'X', a title 'Name of Resource', a star rating, a description, and a name. A red 'Add to Library' button is highlighted on the top-left card.

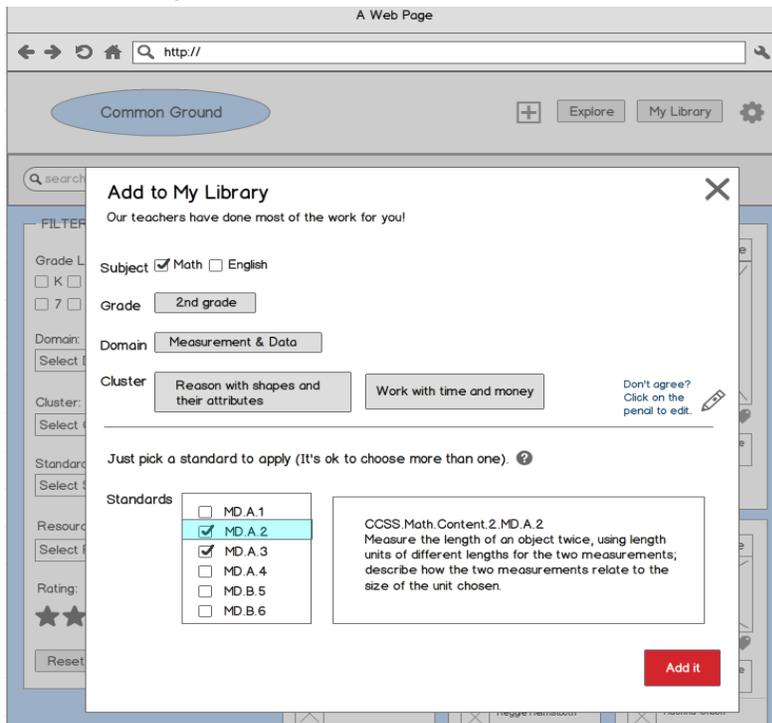
Add to Library: Step 2

The screenshot shows the 'Common Ground' website interface with a modal dialog box titled 'Add to My Library' open. The dialog box contains the following information:

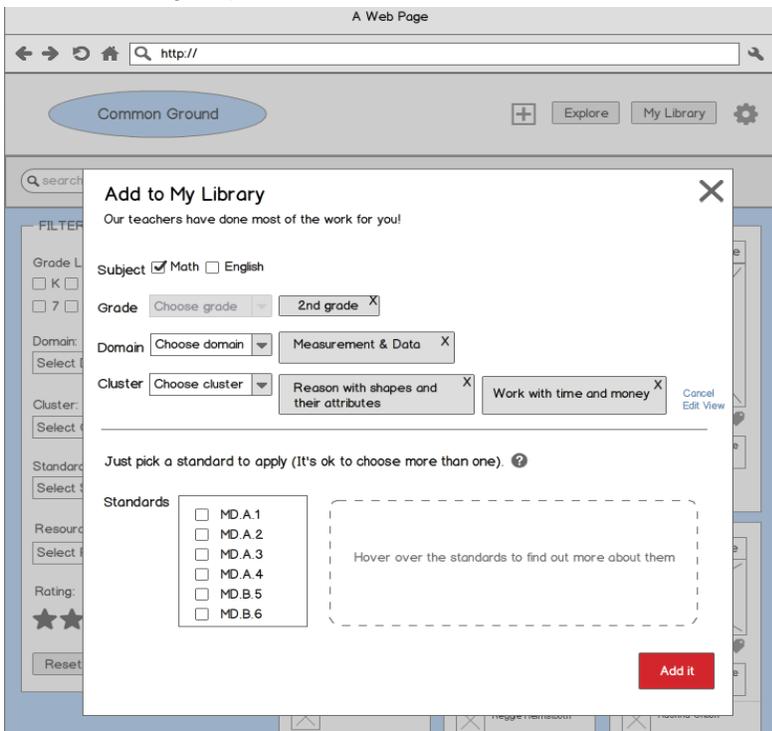
- Subject: Math English
- Grade: 2nd grade
- Domain: Measurement & Data
- Cluster: Reason with shapes and their attributes, Work with time and money
- Standards: MD.A.1, MD.A.2, MD.A.3, MD.A.4, MD.B.5, MD.B.6

 There is a red 'Add it' button at the bottom right of the dialog box. The background shows the same resource grid as in Step 1, but it is partially obscured by the dialog box.

Add to Library: Step 3



Add to Library: Optional Edit



My Library: Resource View

A Web Page

Common Ground Explore My Library

My Library CCSS View Resource View

FILTER RESOURCES

Your Grades:
 2 3

Domain:
 Select Domain

Cluster:
 Select Cluster

Standard:
 Select Standard

Resource Type:
 Select Resource Type

Rating:
 ★★★★★

Reset

Name of Resource
 Image not found
 ★★★★★
 Description of resource
 Rachna Ghosh

Name of Resource
 ★★★★★
 Description of resource
 Reggie Helmsboth

Name of Resource
 ★★★★★
 Description of resource
 Chan Wu

Name of Resource
 ★★★★★
 Description of resource
 Reggie Helmsboth

My Library: CCSS View

A Web Page

Common Ground Explore My Library

My Library CCSS View Resource View

2nd Grade

Operations & Algebraic Thinking

Represent and solve problems involving addition and subtraction.
 OA.A.1(8)

Add and subtract within 20.
 OA.B.2(5)

Work with equal groups of objects to gain foundations for multiplication.
 OA.C.3(2)
 OA.C.4(3)

Number & Operations in Base Ten

Understand place value.
 NB.1.A(2) NB.1.2(2)
 NB.1.1a(2) NB.1.3(2)
 NB.1.1b(2) NB.1.4(2)

Use place value understanding and properties of operations to add and subtract.
 NB.1.B.5(0) NB.1.B.8(0)
 NB.1.B.6(0) NB.1.B.8(0)
 NB.1.B.7(0)
 You have no resources in this cluster, check out EXPLORE

Geometry

Reason with shapes and their attributes.
 G.A.1(2)
 G.A.2(0)

Appendix D: Usability Test Questions

Common Core Intro (if necessary):

Most states have implemented what they are calling “Common Core State Standards”. Teachers are having to implement these standards by making sure their curricula meet these standards.

Here is the common core state website. Take a few minutes to explore and get familiar with the math standards. (2 minutes)

Landing Page: Tell them they are already a member and they can “login”

Task 1: Explore

- Explore page
 - What do you think you are looking at on this page? What page do you think you are on?
 - Walk me through the options in the filter and what you think they mean. If you don't know what they mean how would you find out.
 - What do you expect to see in resource type?
 - How would you find an English Language Arts (ELA) resource?
 - What kind of information would you want to know when browsing resources?]
 - Filter resources by the domain “Measurement and Data”. Is that what you expected to happen?
 - Filter resources by the cluster “Lengths and standard units”
- Resource Card
 - Pick a resource to look at. How would find out which standard this resource is aligned with?
 - Who uploaded the resource? What do you want to know about them?
 - What would you want to know about the resource to feel comfortable using it?
 - What do you expect to happen when you click on a card?
- Expanded view
 - Is this what you expected to happen?
 - Where would you look to see the standards this resource is tagged with?
 - What do you think the number in parentheses means?
 - Is there anything about this resource that isn't presented to you?
 - What would you want to see in description of resource?
 - What if you want to see other resources uploaded by this person?
 - How would you get out of this view? Where would you expect to go?

Task 2: Upload

- Modal 1: Upload
 - How would you upload a resource? (where would you click)

- What do you think you are supposed to do when you see choose a file or add a link
 - Suppose you hit upload what do you think will happen next? (*upload bar)
 - Modal 2: Describe
 - What if you didn't like the thumbnail?
 - What would you write in the describe type field?
 - Modal 3: Align
 - What do you think you are supposed to do here? How would you do it?
 - What if you don't agree with the grade?
 - What if you click submit without selecting anything, what would expect to happen?
 - What if you weren't sure which domain or cluster what would you do? What would you expect to see?
- [Click on domain]
- What if this resource is a website that talks about common core, but doesn't address particular domains or standards specifically. How would you organize it? (do you think it makes sense to have general in the domain drop down)
 - What would you expect to tag with "general"
 - Select MD, click on cluster, select "Time and Money"
 - What do you expect to happen when you hit submit?
- [Click submit]
- Is this what you expected?
- [Click X]

Task 3: Add to Library (change text "Just pick a standard to apply...")

- what do you think would happen if you hovered over a resource?
- [click on first resource]
- What do you think would happen if you click add to library?
- [click on add to library]
- On the modal, what do you think you're supposed to do?
 - What if you don't think that the resource belongs in Measurement and Data? (Operations and Algebraic Thinking instead, work with equal)
 - What if you change your mind while editing?
 - Suppose you're not familiar with the name of the standards. How would you find out more?
 - What do you expect to see if you click on the question mark?
 - What if this resource aligns with more than one standard?
- [Hover over MD.A.3]
- Is this what you expected to see?
 - Add it and click on 'see resource' after you've added it.

Task 4: Find a resource in my library

- Where do you think you are?
- What do you see on the screen?

[If they don't notice CCSS view, point it out]

- What do you think will happen if you click on that?

[click on CCSS view]

- Is this what you expected to see?
- What are you looking at?
- (if they don't say anything about the standards or buckets)... What do the white and grey boxes represent? What about the numbers inside?
- How would you use this view?

click on OA

- Was this what you expected?
- What are you looking at?
- What would you do next?
- How would you go back to the CCSS view?

Wrap-up/General

Did you notice any major usability issues?

Do you have any questions? Any suggestions?

Appendix E: Usability Test Findings

Analysis

Landing Page

no usability changes needed!

Explore

- None of the participants correctly ID'ed the page they were on (explore)
- Filter: All participants thought that domain and Cluster are unfamiliar words
- + Resource types: Manipulatives, worksheets (3), quizzes, tests, lesson plans (2), information sheets, videos, explanations, assessments
- Ratings:
 - The participants all thought the ratings needed more nuance
 - One participant wanted comments along with ratings
 - Two participants were confused by the rating filter
- Description: all participants thought the description is too open ended. info they wanted:
 - objective of a resource
 - how much time to complete/execute the resource
 - how many standards apply (is it a standard-specific resource, or does it incorporate multiple standards)
 - how was it used in the classroom
- All participants wanted more information about the teachers on the resource card
 - Geographic region (city name, urban/suburban/rural)
 - Type of classroom (private vs. public, high risk, honors students, etc)
 - Grade
 - Subject
 - Demographics of the school
- One participant wanted to know the popularity of the resource
- Expanded view:
 - two participants were confused by the "[User]'s Other Resources" box
 - none of the participants understood the (#) was the number of people who tagged the resource with a particular standard
- + All users liked the comments feature
- + All users liked "Implemented in a classroom"
- + All users/expect that the filter settings will not reset once they exit expanded resource view

Upload

- Did not see progress bar
- Did not see plus sign (Rec: use word instead)

Align: -confused by search and select
Help: Expected to see general help
General: No one likes the term or placement of General (Encourages laziness!)

Add to Library

+Hover over standards
-Placement of Edit Pencil is confusing
-Help: User doesn't trust

Find resource in My Library

- One user could not tell she was in library view
+Could tell they were looking at relevant resources
CCSS: Confused by the number next to the standards (thought it was part of the standard)
(Rec: Horizontal Scroll)
(Rec: Add total resource # after grade)
(Rec: Add help text to encourage clicking)

General Usability Recommendations

User wanted more personalized explore experience. Want to see newly added and recommended resources

Design Implications

General

- ✓ Remove subject toggle from secondary nav bar and add to filter, which will then eliminate the secondary nav bar.
- ❑ Add an intro modal for first time log-ins "Welcome to Common Ground! If you missed watching our intro video, you can access it here. You can also find tips on how to use our site, explore the standards with our CCSS visualization, and change your settings there."
- ✓ Filter: Remove General from the domains list; create a "Teaching Tools" options to the subject list.
- ❑ Add a "reference the standards" pop-out to the right of the website.
- ❑ Include the CCSS copyright statement and link in terms of service
- ❑ Make our own abbreviated clusters for only the ones that are "too long"

Explore

- ❑ Question marks with hover descriptions
- ✓ Ratings will no longer be a filter option

- ✓ Ratings should not be stars, but up/down votes
- ✓ Description: Add help text "Be as specific as possible"
- ❑ On all resource views: Add grade and city, state [to do in both masonry and expanded view]
- ❑ Expanded resource view:
 - ❑ add classroom type
 - ❑ Instead of *(number)* for number of times standard has been tagged, use words: "x users thought:"
 - ✓ Important to keep comments and "implemented in classroom"
- ✓ Important to keep filter populated when return to explore view

Upload

- ✓ Upload: next to the field where users enter URL, add text that specifies the screenshot functionality. ie. "If you enter a URL, we'll take a screenshot of the page for you"
- ❑ Describe:
 - ❑ Allow users to choose between the screenshot and the resource type logo. [wishlist?]
 - ✓ Include "time it takes"
- ❑ Align: Make the choice between search vs. select more visually clear; move the search bar to the bottom, add an "or" (like on the upload modal) and help text above the search bar. [search is currently on wish list]

Add to Library

- ✓ Change "Add to Library" to "Save to Library"
- ✓ Keep hover function over standards
- ❑ Align Modal: Remove the subject, grade, domain, and cluster information, and just prompt users to pick a standard. Under that, provide a link with text like "don't think it's any of these? click here to select from other standards." [the edit feature hasn't been implemented]
- ❑ Add option to say "this does not align with CCSS"

My Library

- ✓ Add profile box above resources in My Library
- ❑ Add help text to open text description box: "tell us about the demographics of your classroom"
- ❑ CCSS view: [wish list]
 - ❑ create a horizontal scroll view of the resources in each cluster
 - ❑ Add # of total resources next to "grade" at the top

- Add help text to encourage clicking

Help

- add "how to use our site" page;
 - linked to from the settings drop down, and on a sticky footer
 - contents:
 - the video from the landing page
 - general intro text:
 - defining the hierarchy terminology
- link to our common core standards visualization

Video

- ✓ Add overview of standard hierarchy
- ✓ Add (very quick) overview of functionality- where to click for upload, where to find my resources, etc.
- Add an explanation of the crowdsourcing technique