Oregon State University
College of Engineering

CS Capstone Progress Report

February 17, 2017

Many Voices Platform

Prepared for

Oregon State University

Carlos Jensen

Prepared by

Group 61

Remix

Josh Matteson
Steven Powers
Evan Tschuy

Abstract

This document summaries the progress that the Remix team has made on the Many Voices Publishing Platform for the client Dr. Carlos Jensen. Additionally this document provides a week by week summary of work performed, as well as what is needed to be changed to improve effectiveness in building the MVP platform.

CONTENTS

1 Project Purpose 2

2 Weekly Updates 2

2.1 Week 3 . . . 2

2.2 Week 4 . . . 2

2.3 Week 5 . . . 2

2.4 Week 6 . . . 3

2.5 Week 7 & 8 . . . 3

2.6 Week 9 & 10 . . . 3

3 Steven Term Progress 3

4 Evan Term Progress 4

5 Josh Term Progress 5

5.1 Recapping . . . 5

5.2 Overview . . . 6

5.3 What's Left on the Frontend . . . 6

6 Fall Term Weekly Summary 8

7 Fall Term Impending Problems 8

8 Retrospective 9

9 Current Project Status 9

10 Conclusion 9

1 Project Purpose

A modern textbook is updated frequently, perhaps even yearly, and can cost in the range of hundreds of dollars. Students are often left to attempt to understand poorly worded, even incorrect information from a textbook often chosen from those sent to a professor for review by the publisher. This can lead to better works with less aggressive sales tactics not being made available, or even known. Another choice would be for a professor to write their own textbook. However, this is a process that takes months of endless research and time spent, and on top of that will require peer review and publishing before it can be released.

The Many Voices platform offers to put an end to this massive, slow, expensive cycle. Instead of a textbook being a single document written by one professor, we seek to re-imagine the textbook as instead a collection of content written by professors from around the world that are useful for a particular class. A knowledgeable professor can contribute a few chapters on their specialty, without needing to write an entire textbook around it.

Professors wishing to use this content can then modify it for their uses in the classroom. The material will be hosted in such a way as to provide the ability to f̈orkc̈ontent, or create content based off of it. The platform will provide a way to search for and find content, prioritized by relevance and credibility as determined by other users; the most popular material will be shown with the most prominence.

2 Weekly Updates

2.1 Week 3

The term started with ironing out the problem statement. At the end of the second week, we met with our client, Dr. Jensen, and briefly went over exactly what his vision was for the end result of the platform. The third week was then spent on the initial drafting of the problem statement, which was turned in at the end of the week. Unfortunately, we were unable to meet with Carlos again to go over our draft, as he was unavailable.

2.2 Week 4

We attempted to get Carlos' feedback on our problem statement document, and get him involved in the creation of the coming requirements document, but were unfortunately again unable to find a meeting time that worked well for him. Therefore, we simply pressed on and began the revision process using the feedback our TA, Jon Dodge. We spent some of the time investigating tools that would possibly be useful in the development phase of the product.

2.3 Week 5

This week, we managed to get a hold of our client and get him to sign our revised Problem Statement. We previously were having quite a bit of trouble getting a hold of him because he's been traveling. We also managed to all work together on our Requirements Document, which has been one of the few times we've all been able to find times in our schedule to do it together (even though it was over the internet). The Requirements document was pretty intimidating looking, simply by virtue of its size!

2.4 Week 6

During week six, Steven made a lot of progress revising the requirements document, and then integrated changes. Evan and Josh made to the document. He was also able to attend Dr. Winters' writing session, where we received useful and actionable feedback about documentation formatting. We also revised the Problem Statement after hearing from Dr. Winters that we may be able to re-submit revised documents for regrading. This will hopefully prevent us from receiving another 82/100. Two drafts were sent out to our client, with 48 hours notice each time, but unfortunately was only able to get a signature on the second a few hours before turn-in time. The main issue we had this week were slight differences in the requirements document formatting compared to the IEEE 830 format specification, though our TA Jon Dodge and Dr. Winters feel that the document looks great. It was also slightly concerning that we were not able to get feedback apart from the signature of our client, though this is understandable because he is traveling right now.

2.5 Week 7 & 8

The technology review document was the main point of focus during Week 7, with it being due at end-of-day Monday of Week 8. Steven also made revisions to the requirements document, including many suggested by Jon Dodge, to prepare for a re-submission for regrading. Evan was not available for a good portion of the week seven, as he was on an important trip to California, but as we split the document into its constituent sections early in the week, he was able to work on his way down. On Monday, we combined the efforts that had been written up to that point. Unfortunately, we were not satisfied with the state of the document, and so we requested an extension. We were, along with the rest of the class, given an additional 36 hours, pushing the due date back to Wednesday at noon, when we turned in a satisfactory document.

2.6 Week 9 & 10

Week 9 was mainly spent with our respective families, and as a short break from the march towards project completion. We made the strategic decision to focus on getting rested and well-fed in an attempt to mentally prepare ourselves for the last two main parts of the Fall-term requirements.

Week 10 began with work towards finishing our design document. After a few false starts and a night of less sleep than desired, the final design document was turned in on time. Unfortunately, we were unable to get our client's signature in time; we will be providing a signed copy to be graded as soon as possible. Later in Week 10, during the weekend before finals week, we wrote our progress update document and recorded our progress update video.

3 Steven Term Progress

For this week we were getting back into the groove of things after Winter break. Josh and I were able to meet with Carlos the week prior and talked about arranging meetings going forward each week.

We weren't able to get a whole lot of work done this week, but we planned for meeting each week at least a few hours a couple days of the week so we can continue making progress. We plan to meet next week and work on the framework and user stories.

This week we began our weekly meetings, though our client had to cancel meeting for the first two weeks. We also setup our meetings with Jon, which was actually pretty difficult to find a time that worked for all four of our schedules.

We plan to continue working on the User Stories and Framework so we are able to make progress towards a working prototype.

This week we were to begin our weekly meetings with our client. Our client recently transferred positions and our weekly appointment was discarded. This resulted in our weekly time slot being given away, so now we have to find a new time (planned for 9:00AM Mondays). Our client also wants to only meet every other week rather than weekly now.

We talked over the past terms documents and possible upcoming documents that we would be seeing in the class and that we should be focusing on development throughout this term.

We worked on the backend system and testing of the include and input commands with our setup (which seems to be working well!). We also looked into security practices to protect our LaTeX documents from succumbing to common exploits (escaping the document and accessing the shell).

We also worked on getting the framework up and running (TS Lint has been giving us some issues, so we might go with straight typescript without LINT and go to JavaScript with Lint.

This week we met with Dr. Jensen and discussed the back-end of the system as well as some plans for how to model the front end of the system.

Dr. Jensen suggested using low fidelity / medium fidelity to receive feedback from users instead of focusing on getting to high fidelity and having users review that as they will be less critical of the whole system and instead focus on pixel alignment.

Josh and I need to get more work done on Aurelia and get a basic user interface up and running and try working towards in page rendering of the resulting PDF from the back end system.

This week was a week we had off from meeting with Dr. Jensen, we used this time to work on developing some of the required features that we need. This included Josh and I working on the PDF in browser rendering with Aurelia. Josh finished this task up separately.

I worked on Prototype development to have Dr. Jensen review and provide feedback on during next weeks meeting. I wasn't able to get as many prototypes drawn as I would have liked, but there is still a good chunk of design that Dr. Jensen could critique.

Next week I plan to show Dr. Jensen our designs and take in any feedback he might have. I also plan to work on revising all of our documents and get them placed into our OneNote document that I have prepared for our group.

This week we met with Dr. Jensen and he had lots of feedback about our designs, mainly in ways to simplify the interface for the users while also making it easier to develop. We talked about rendering the PDF only when needed (as in active editing) instead of constantly. We also talked about the possibility of using a tabbed system to only render when the user wants to, which will reduce our server calls.

I plan to continue working on our document revisions, as well as our Progress Report materials (video, presentation materials, and report), which will mainly summarize the previous terms work and provide an overview of our progress this term.

Something that will be better next week is availability, as this week has a lot of midterms for various classes.

4 Evan Term Progress

4.1 Weekly Recapping

For the first week of the term, we were mostly catching up on what we had done over the break. Steven and Josh had managed to meet with Carlos, which was great to arrange future meetings and to get his opinion on where we were

going with the project. After a term of lower levels of contact than would have been preferable, it was good to get this initial meeting set up and done with no hassles.

Over the break, I began work on the book management backend library. This is the foundation of the entire project – the part that will do the actual work interacting between the git repositories and Javascript objects with convenient APIs.

In the second week, we got meetings set up with Jon, our TA. In the mean time I wrote a basic preliminary version of the API specification for the library. Barring any issues I ran into the plan was to implement this for the next several weeks.

The third week was to be our first meeting with Dr. Carlos Jensen. Unfortunately, due to a calendar migration relating to his change in job position, he had missed our appointment scheduling and overbooked. We were luckily able to work out a time to meet the next week with him.

Week four was the first week where we were able to meet with Dr. Jensen as a group. We go to talk about the state of the backend, including its technical document storage design, and the frontend. For the frontend, Dr. Jensen asked us to draw some rough prototypes. Steven is planning on taking the lead with that.

We were unable to meet with Dr. Jensen during week five, as with his calendar migration reset we changed our meetings to every other week. Instead, we used that week to polish features we'd been working on already. For instance, I finally got textbook rendering working. It was a pain to get, because it involves descending into chapters and scraps (all asychronous calls in Javascript), but with it working now that is a major milestone out of the way.

At our next meeting, Monday of week six, we primarily went over our frontend prototype designs with Dr. Jensen to get his feedback on user flow, interface direction, and the like. We were able to refine our vision for the interface, with his main feedback stressing making it simpler, and making it less duplicative. We now have an idea around how the user will go about editing a scrap, editing a chapter, etc., and when in the writing process to start rendering PDFs for layout preview.

This week, week six, has been all about capstone assignments – the revised documents, the video summary, and of course this progress report document.

4.2 What's Left on the Backend

The backend is split into two primary parts. The first, and most difficult part of the backend, is the interface library being used to store objects into the git repositories and to get them back out. Shown below is a code sample, which is fully working today, showing a simple script that creates new scraps, chapters, and books, and gets a valid tex document to render from them.

```
var a = new scrap.Scrap('First sentence of a chapter', 'rambourg');
await a.save('initial save');

var b = new scrap.Scrap('Second sentence of a chapter', 'rambourg');
await b.save('initial save');

var ch1 = new chapter.Chapter('First Chapter Name', 'rambourg');
ch1.addScrap(a);
```

```
ch1.addScrap(b);

await ch1.save('initial save');

var c = new scrap.Scrap('First sentence of another chapter', 'rambourg');
await c.save('initial save');
var ch2 = new chapter.Chapter('Another Chapter Title', 'rambourg');
ch2.addScrap(c);
await ch2.save('initial save');

var myBook = new Book('My Fav Book Title', 'rambourg');
myBook.addChapter(ch1);
myBook.addChapter(ch2);

var bookText = await myBook.getText();
```

We can create a new scrap with the scrap.Scrap constructor. We simply have to pass it the text to include in the scrap, and the author. This allows us to simply have some sort of API call that provides these two things and pushes them straight into a scrap. Its necessary to save an object every time. After creating the scraps we want, its then time to create a chapter. Its worth noting that normally, a user would more likely create a book first, then a chapter, then some scraps, but since scraps, chapters, and books can exist freely from each other – a scrap doesnt always need to be associated with a chapter, for example – its easiest to demonstrate here by creating them in the order we associate them in. After creating the chapter and saving it, we can another create chapter as wanted, a new scrap, et cetera. We can then just add these to a book by calling the addChapter method. When were done and want to get the text of the book in its entirety, we call the getText method. What this method does is, more or less, recursively read all chapters, and then all of their scraps, and then reconstruct the final latex file by concatenating the values of the scraps.

Lets take a closer look at the scrap object.

```
var scr = new scrap.Scrap('Brody', 'abc123-def456')

// reconstitute a chapter from author and id
var ch = chapter.reconstitute('Patrick Rambourg', '56c2c2ee')
var newCh = await ch.fork('Brody')

newCh.addScrap(scr)
await newCh.save('add new chapter')
```

We have today a working implementation to load chapters, scraps, and books from disk, modify them, and save them. As shown here, its as easy as calling reconstitute with the authors name and the objects ID number. In the future, another user will be able to fork an object, which will create a copy of the object in their space that they can modify. Theyll then be able to do things like add scraps to a chapter, chapters to a book, modify scraps, et cetera. Its worth

noting that forking is not currently implemented. However, we do not anticipate any problems with its implementation, as it integrates easily into the existing git backend.

So what is currently left on the backend? As mentioned before, we have two main parts. The library is the unique part of the project, the part that controls the actual object storage, modification, forking, and saving. Of these functionalities, the only parts left are forking, and getting previous versions. Getting a previous version is around 80from the disk and retrieve the old version. It is now only a matter of creating a new object from this old version and returning it.

The other main part of the backend is the API. This API is a simple app written in Node that wraps the backend library in web-available JSON requests. The API is going to be the easier of the two pars to implement, as I already have ample experience creating web APIs, including in NodeJS. The API will include user authentication, allowing us to control who modifies which objects, and keep track of the owner.

In addition, we will be needing some kind of search backend. We have yet to adevelop our exact strategy for search, but will most likely be using a prebuilt search backend and simply loading objects into it at save time. This will allow for easy referencing back and forth between search results, which will return the object id and its owner, and the object stored on disk, which is referred to by its id and owner.

5 Josh Term Progress

5.1 Recapping

Towards the very end of winter break, we were able to get a meeting with Carlos to clear up some possible fallout from the previous term. While we were able to get confirmation on some of the technologies we were using, we weren't able to sort out some questions on the backend because Evan is the main group member handling that side of the application. We were able to, however, figure out that we could meet with him again the following week after he moved into his new office. This meant we weren't able to meet with him for at least two weeks, however.

After our meeting, we decided to deligate some time to developing a game plan of how we could divide and conquer the majority of it.

The following week, our whole group managed to meet and accomplish setting up the basic architecture blueprints for the application. This meant that Steven and I would forward with Aurelia, and do everything we could get a working verision up and running as soon as possible.

Our client ended up needing more time to deligate to other task on hand, and this meant switching our meeting frequency to a biweekly basis. This hasn't caused for any problems, and actually allows for us to bring more deliverable content to our meetings. Two week springs tend to be more ideal in that regard, however, we'll be working a little less close with our client in the future because of this.

While the backend had been progressing with Evan, Steven and I focused our time trying for a semi working version of a local Aurelia project that would run in browser. It wasn't too difficult to follow an example online and get an express version of the application up and running. Our group was then able to meet that week to briefly discuss progress and impendiments.

During our 14th week, we finally managed to make some real progress and gain momentum, as we were able to meet with Dr. Jensen. This led to discussion about work flow designs with a desired low fidelity goal. This outlined adequate deliverables for our next meeting two weeks from then, and gave us expectations as to what our client wanted to see from us.

During the meeting, Steven and I managed to demo a fully working version of a basic Aurelia project to Dr. Jensen. This was useful to to keep him update with our current progress. After the meeting, we moved forward with the goal of having a few basic layouts prepared, as well as some further technology integrations.

Steven and I started to work on a PDF viewer that we could integrate into our application, and managed to find an online guide that would walk us through setting one up with Aurelia as our framework. While we managed to get a PDF viewer running on a separate instance, Steven and I learned quite a lot from the experience and furthered our knowledge on working with Aurelia in general. We had our meeting with Dr. Jensen later this week, and we wanted to have this accomplished going into our meeting. From this point, Steven worked on prototypes for the layout design and I branched off into finishing the pdfviewer demo.

Our next meeting with Dr. Jensen went very well, he gave us constructive feedback on our low fidelity prototype designs and we were able to demo the front of the application to him. Our group also started work towards our progress report, Which will slightly hinder the time dedicated to pushing our application forward.

5.2 Overview

The first real development our team started to work on was the user interface. We have already dedicated a fair amount of time to this section, as the user interface is one of the most integral parts of our application, and to any application for that matter. Studies have shown that the average user will stay on a new website for as little as one minute, which means that making the user interface appealing to the user as well as easy to use is crucial to the overall success.

Our goal was to start on this a couple of weeks before winter term started, that way we could get a good lead and gain momentum. However, previous impediments had led us to wait on this aspect, this way, however, we could get insight into what our client had envisioned for this part of the application. Were planning to be working on this for around 7 weeks total, which should give us plenty of time to move forward on this major part of the project. More than just these 7 weeks, well be adding continuously to the U.I. as our application continues to grow.

5.3 What's Left on the Frontend

For this next section, I'll briefly go over some of the future implementations and tweaks that I'll be taking on personally or with the help of Steven.

1) **Integration of Pdf Viewer and Application**

   We currently have a working instance of an Aurelia project with a basic front page layout, as well as a different project instance that contains the PDF viewer. While both of these seem to work well on there own, integrating them together will take some time and massaging in order to obtain the desired functionality. The pdfviewer is an essential part of the application, which means that this needs to be integrated in such a way that it won't cause difficulty when trying to work with it later on.

2) **Finalizing layout design**

   Last week, we went into our client meeting with a few layout prototypes, and with this we were able to narrow down what was expected. We have the basic layout, and our next still will be taking it from a low/mid level fidelity prototpye to a high fidelity layout.

3) **Working scrap editor**

This section will take a little bit more work, as the cominbation between backend and frontend will merge in some aspects. On the frontend, this won't be such a challenge. We need to either find an open source rich text editor/ or build one from scratch. Making one from scratch would be more time consuming, but we would have more control and knowledge as far as how it works. This will look like a word document or any other basic text editor or formatter. Seeing as this is one of the more important aspects of our application, were approximating it to take around 4 weeks. If it ends up taking more than this, well delegate more time appropriately.

4) **Book/chapter/scrap view**

This part might be more complicated. Seeing as we're a single page application, we might have to look into reformatting a good amount of the front end design. Implimenting a router would be the only way to ensure multiple page views, but shouldn't cause to much drawback.

6 Fall Term Weekly Summary

Week	Positives	Deltas	Actions
3	Got the initial draft of the problem statement done after meeting last week with our client.	Were unable to set up a meeting with our client, and thus had no way of getting feedback on the draft before submission.	We will talk to our client via email about possible meeting times, either in person or remote, that may possibly work for everyone.
4	Figured out a time for meeting with our TA.	Need to hear back from our client.	We will wait another day or two and then send a new polite email.
5	Finished revising the problem statement, got it signed. Began the requirements document.	N/A	N/A
6	Revised Requirements document via feedback from TA. Got client signature on Requirements. Attended writing workshop.	Need to be on top of things regarding contacting our client as he is difficult to contact.	We will send him another email asking for feedback on the requirements.
7	Began technology review. Revised requirements document for possible re-grading.	Need better team work schedule to get times to work on documents together rather than separately.	We will discuss possible extra meeting times in addition to our weekly meeting with our TA where we can work for several hours uninterrupted.
8	Finished technology review (after getting extension to Wednesday).	Need to be on top of documents to finish them well in advance of due dates!	We will personally push ourselves to get work done sooner rather than later.
9 & 10	Spent Thanksgiving Week getting rested. Finished design document. Finished progress update document/finished presentation.	Need to get client signature for design document!	We will be emailing Carlos. With the new term we hope to set up a weekly meeting with him.

7 Fall Term Impending Problems

For Fall term, client communication was a problem that impeded our progress at a few points. Due to busy schedules of the team and the client, communication slipped from where we expected it to be. This caused problems with project requirements and other questions the team had about moving forward. For Winter term and beyond, the team plans on having a weekly meeting with our client and additionally providing a weekly email detailing our progress of the week.

Additionally, finding time for the team to come together to work on the project proved difficult. Our schedules had many conflicting times with classes and work times that made it difficult to spend large portions of time together. This resulted in a lot of remote development of the planning and documentation, resulting in less detailed documentation and lower scores on grading. In the recent weeks, the team has spent more time working together, which has led to more cohesive development. For Winter term and beyond, the team has schedules that align more cohesively, allowing for more time to be spent discussing and developing the platform together.

8 Retrospective

Positives	Deltas	Actions
Team came together on planning and design	Client communication	We will talk to our client via email about possible meeting times, either in person or remote, that may possibly work for everyone.
Learned a lot about the software development process	Documentation / Development Confusion	If we are confused and blocked by something in the class that could be helped by asking a question of either our TA Jon Dodge or Professors D. Kevin McGrath or Dr. Kirsten M. Winters, we will.
Learned a lot about Latex and the writing of technical documents.	Team Communication	Solved: Problems with communication were solved by transition to Slack & Email communication
	Team Meeting Time	Need to compare our schedules and find a time that will work for all of us to get together.

9 Current Project Status

Thus far we have written documentation detailing the technical and design requirements of the project. Now, we are beginning to move into the technical development phase. To begin, we are finishing coalescing a unified vision of what the project is, and how we will go about architecting and building it. We are planning on beginning to build our initial prototype over winter break, based on the basic skeleton laid out in the documentation.

Moving forward, we expect to spend the majority of time doing individual development work, with weekly team development sessions to keep ourselves on the same track. In doing so we will be able to progress even when one individual team member is blocked on either something relating to the project, or on other work. To do this, we have split the project into chunks, which we will then work on either solo or in a pair.

10 Conclusion

The Many Voices Publishing Platform has been a great project to work on, bringing each team member outside their comfort zone. A lot of planning has taken place over Fall term, sometimes resulting in shifts in direction of how to manage and develop the platform. The Remix team feels more comfortable moving into Winter term, and for development to begin on the platform. Part of this comfort comes from the planning of weekly meetings with the client, and weekly emails to detail the current project status.