

WASHINGTON STATE UNIVERSITY

**Description of the SEL Slate Math Equation Editor**

Antonio Barber, Aaron Holbrook, John Archer, Kristian Suzara

Mentored by Robert “Bobby” Pepka and WSU faculty volunteer  
Dr. Gordon Taub

CPTS421 Software Design Project I

Dr. Bolong Zeng

9/24/2020

## TABLE OF CONTENTS

TABLE OF CONTENTS .....	2
LIST OF FIGURES .....	2
LIST OF TABLES .....	2
PROJECT DESCRIPTION.....	3
FEATURES .....	3
Functionality.....	3
Limitations.....	4
Current Issues.....	4
RELATED ITEMS .....	5
Public/Commercial Domain Packages.....	5
STAKEHOLDER ISSUES.....	6
Identification & Considerations .....	6
APPENDIX A. Gantt Chart.....	7
WORKS CITED .....	8

## LIST OF FIGURES

Figure 1. User Functionality	3
Figure 2. Developer Functionality	4

## LIST OF TABLES

Table 1. Compiled Issues	5
--------------------------	---

## PROJECT DESCRIPTION

The SEL Slate Math Equation Editor allows a user to generate equations like ones made in the Microsoft Word equation editor within web applications. As existing web-based equation editors lack easy to use interfaces, require memorization of syntax, and are incapable of embedding into text editing frameworks; this project aims to develop a product that solves these problems. Team Toph will be building upon the current demo developed by an earlier WSU Everett Capstone team with many planned revisions to said demo. These changes include converting the project from JavaScript to TypeScript, fixing current bugs, quality of life changes, and adding new features such as the ability to create matrices.

## FEATURES

### Functionality

The SEL Slate Math Equation Editor will allow a user to create and edit equations within web applications. As it will also be open source, it will allow developers to expand on the product and add functionality.

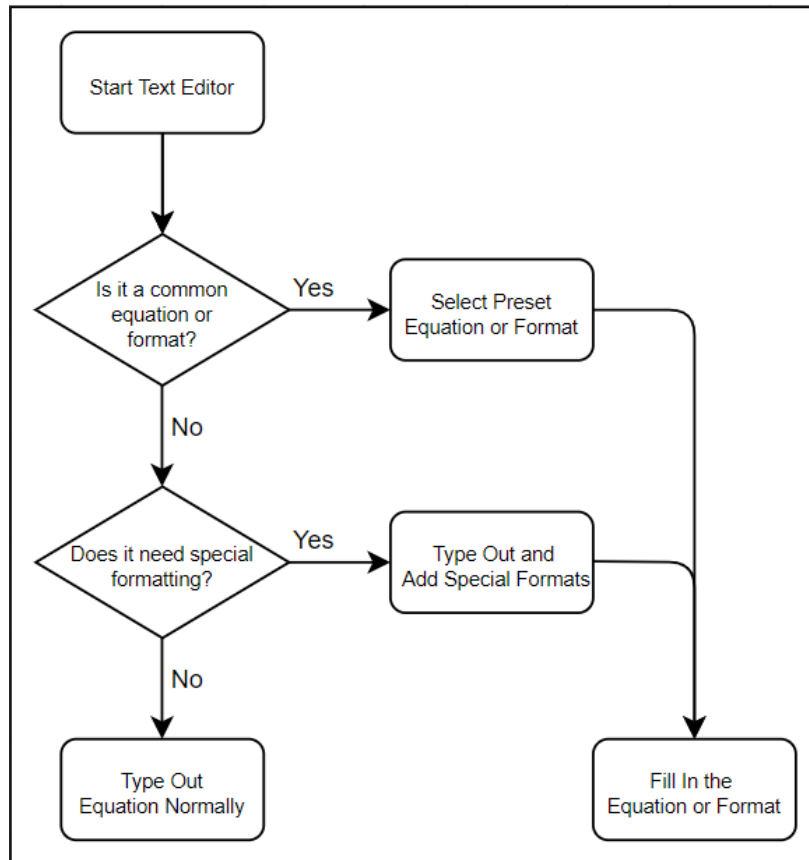


Figure 1. User Functionality

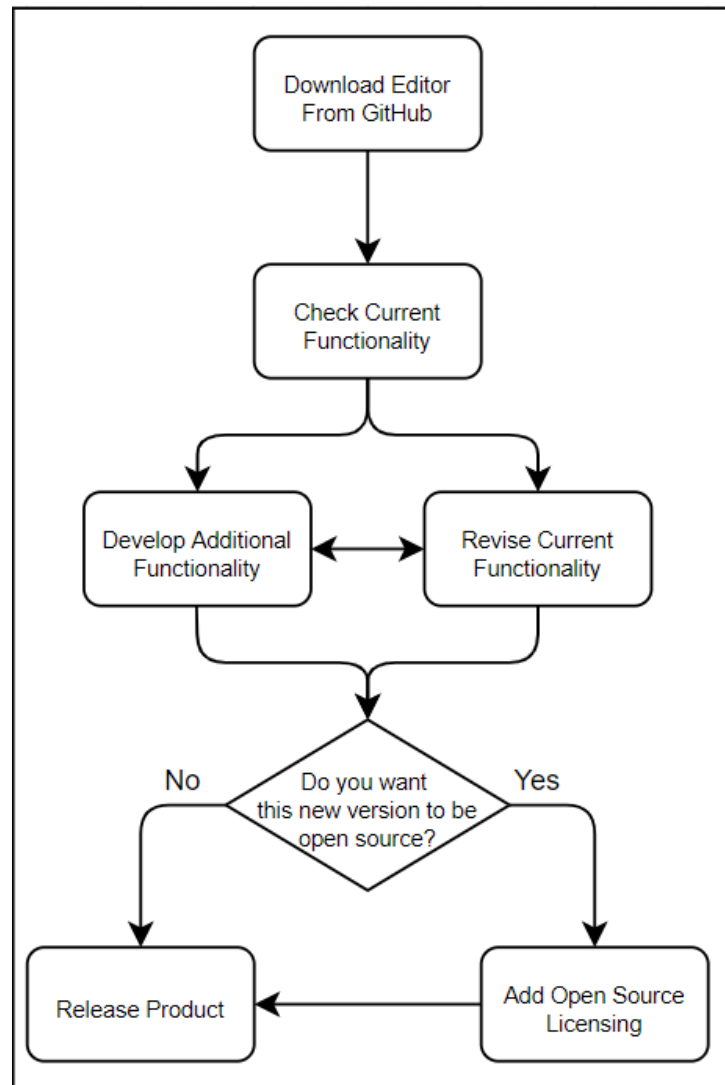


Figure 2. Developer Functionality

## Limitations

The specific limitations of the SEL Slate Math Equation Editor are of the amount preset formats and equations in its final release, this is mostly due to time constraints and potential number of presets.

## Current Issues

As this project is a continuation from last year's capstone project there are issues in the code that are currently known. Clearing up the details about these issues with last year's team lead Brandon Le and team mentor Robert Pepka allowed the compilation of them, including short descriptions and even examples:

### Table 1. Compiled Issues

We need a thin blue dashed line around empty math components	
The “\” did not bring up the entire list of available math functions	
The user can hit the enter key while inside a math equation when they should not be able to (I think we fixed this)	
When the equation bleeds into the next line, the integral symbol should follow the equation	
Cannot undo or redo(ctrl-z/ctrl-y)	
Set minimum width for when a span is empty. This affects the use navigating with the arrow keys	
Need to implement copy/paste	
Matrices and other table-like structures need implementation	
There is tight coupling between the demo and plugin code	
Code would function better if converted to Typescript	

## RELATED ITEMS

## Public/Commercial Domain Packages

A web-based equation editor requires a library that “makes it painless to create interactive UIs” (Facebook, 2020). React is a JavaScript library that allows for building user interfaces. The equation editor will use React to allow for user interaction and keep a focus on ease of use. Implementation of the React library in the equation editor is crucial for it to “efficiently update and render just the right components when data changes” (Facebook, 2020). The equation editor’s keeps a focus on readability and being user friendly with quick and efficient text and graphic updates. React’s focus on interactive UIs and efficient rendering is necessary to the editor.

The equation editor embedded in Microsoft Word runs parallel to the online equation editor. MS Word includes features that the online equation editor will mimic such as allowing for pre-built

common equations to select from a drop-down menu (Microsoft, 2020). Reviewing MS Word's equation editor and piggybacking off their flow, the equation editor's design will follow Microsoft's professional standard. Reviewing similar and competing programs ensures the online equation editor will be up to par. The online equation editor will implement features that mimic MSWord's functionality.

## **STAKEHOLDER ISSUES**

### **Identification & Considerations**

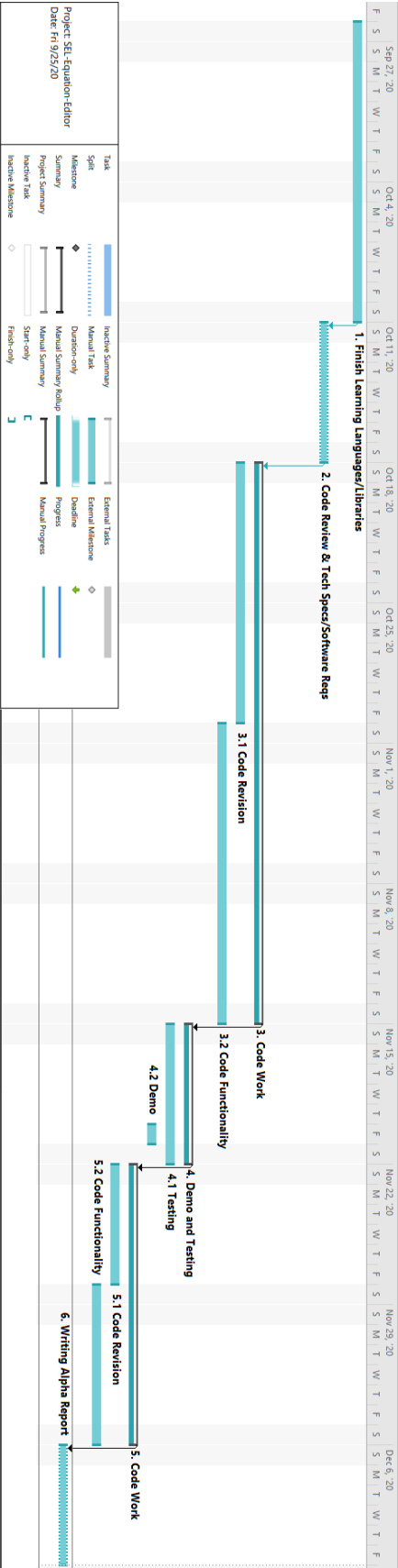
The stakeholders of the Slate Math Equation Editor, beyond the client and team members, are end-users, developers, and competitors. The end-user stakeholders are the ones that will use the equation editor. Developer stakeholders are the ones who work on the code to improve, or to implement it into other platforms. The Slate Math Equation Editor may influence competitor stakeholders.

The end-user stakeholders are the ones who will ultimately use the Slate Math Equation Editor. These end-users include, but not limited to, schools, engineers, writers, businesses, and the government. Schools use the Slate Math Equation Editor to create assignments, and worksheets. Engineers and writers use the editor for writing, textbooks, manuals, and documentation. The government uses the equation editor for legal documents. Businesses use the equation editor for accounting, marketing, and management. A user-friendly design and properly implemented equation editor can save time and help increase productivity. The inclusion of presets and templates would also increase the ease of use and productivity. A non-user friendly or improperly implemented Slate Math Equation Editor could result in inaccurate documents, textbooks, assignments, manuals, and legal papers.

The code for the Slate Math Equation Editor is open source. Thus, the developer stakeholders have the authorization to improve the code, and to implement the code into other platforms. A positive impact of an easy to read code is that the developer stakeholders have a better opportunity to understand the current code. Organized code with ample comments and documentation will positively affect the developer stakeholders. A poorly designed code without comments could hinder the developer stakeholder's ability to read and improve the code.

The Slate Math Equation Editor has the capability to, directly or indirectly, affect the performance of its competitors. A positive or negative impact for the competitors is if the Slate Math Equation Editor's design has more features and is easier to use. As a positive impact, the competitors could potentially incorporate features from the Slate Math Equation Editor into their own product. As a negative impact, the Slate Math Equation Editor has the potential to replace a competitor's product.

APPENDIX A. Gantt Chart



## WORKS CITED

Abramov, Dan. "React." *GitHub*, Facebook, 8 July 2020, 10:30 AM PDT,  
[github.com/facebook/react](https://github.com/facebook/react).

"Write an Equation or Formula." *Office Support*, Microsoft, [support.microsoft.com/en-us/office/write-an-equation-or-formula-1d01cab1-ceb1-458d-bc70-7f9737722702](https://support.microsoft.com/en-us/office/write-an-equation-or-formula-1d01cab1-ceb1-458d-bc70-7f9737722702).