Final Deliverable

StudySync Web Extension

Sunidhi Abhange

Gage Fleming

Hashem Ramadan

Mason Waldapfel

University of London

CM2020: Agile Software Projects

Team 68 (Tutor Group 6)

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# 1 Background

## 1.1 Introduction

Two months ago, our group proposed a project, StudySync, that would meet the vision statement below. The proposal laid out a quality plan to ensure our team could bring this vision to life. Our team has worked diligently during the past months to bring this project to life through iterative development and a user-centred design philosophy.

“For computer science students enrolled in the program offered via Coursera and the University of London who need help to limit distractions to their studies, StudySync is a web extension that will provide a single point of access to study productivity tools. The web extension will use a whitelist to block all web traffic except for the URLs specified. The system will combine this with time-tracking analytics to provide actionable feedback on the quality of the user’s study sessions. The time tracker will track students' time spent studying

during semesters in each class and each specific task within classes. This extension will increase students’

productivity and provide actionable statistics to help guide their study sessions. This enables students to

create better study habits and become better students. Unlike the current productivity web extensions on the

market, our product will integrate directly with the Coursera website, contain no paywall, and come with out-

of-the-box functionality to combine into a low barrier to entry Coursera productivity extension.”

This final report details the successful implementation of the project and highlights the intricacies our team navigated in completing the project. The reader will understand why our group made certain decisions and how the implementation came to be. Finally, the report will reflect on the overall process from a group and individual perspective. Developing new skills and overcoming setbacks has been challenging and rewarding. Our team is proud of what we built and looks forward to navigating more complex projects throughout the rest of our degree.

Throughout his report, we will heavily refer to the work presented in our project proposal and have thus classified it as a dependency. Therefore, it has been included in the dependencies section of this report and specified references would be made by referring to the section title only instead of repeating ourselves.

## 1.3 Literature

Our project proposal went through an in-depth analysis of the current products on the market that could solve our project's problems and objectives described in the above vision statement. The market analysis found that none of the current products could match the needs of our target demographic and what they wanted from a tool of this nature. This validated StudySync had a place within the market. We recommend reviewing section 2.1.2 of our project proposal for brevity to better understand the market picture before StudySync’s development.

This market analysis significantly aided in developing the functionality and design of StudySync. The minimalist nature of these web extensions and the simplistic functionality were critical design heuristics our team saw as valuable within this market. The images below show how this market analysis influenced the overall outcome of StudySync. The simple colour scheme, the visual distinction of call to actions, and the input/output forms were some of the many items influenced by our research.

// TODO IMAGES

Reviewing this section of our project proposal proved to be critical for the development of StudySync. The market analysis was completed effectively, which helped guide us to follow designs that our users widely accepted throughout the development process. Please refer to the section

TODO APPENDIX LABEL FOR USER TESTING

for references on how users responded to the designs put forward by the group and how they largely met their expectations. This was a direct consequence of the market analysis.

Further literature review involved direct research regarding specific design patterns or functionality. This is better reserved for the planning and research section of the report, where sources and their influence will be discussed within their domain to show their effect on StudySync better.

## 1.4 Scope

Section 2.2 of the project proposal defined the project's scope. We defined significant features and limitations, scoped the development process via a Gantt chart, and explicitly defined the context in which the project was being built.

Throughout the latter half of this class, this section was heavily referenced to ensure our team stayed within the scope and ultimately ensured the MVP met our stakeholder's expectations. It was a critical section that kept our group focused and aligned in producing our MVP.

Within section 2.2.1 of the project proposal, we defined the significant features of our initial release. Through a robust testing system, we confirmed that the MVP produced by our team met the major features defined for release. The testing also demonstrated that the final MVP met our defined scope requirements.

## 1.5 Group Work

We split the working tasks for the latter half of the course. While there was much overlap within the project, we did assign major roles to individuals that served as a guideline. Still, all four of us were crucial to implementing the MVP and the deliverable.

* Technical
  + Hashem was the technical lead. He oversaw the implementation of the web extension. He completed this role with his strong technical background and efficiently divided up roles related to the process. He was pivotal to the success of the project.
* Testing
  + Sunidhi and Mason were the lead quality assurance and user liaisons. They ensured the project stayed within scope and completed much of the research and user testing required to guide and validate it. They kept the stakeholders within the loop and efficiently guided the project toward a sound completion.
* Report
  + Gage served as the report lead and managed the implementation of the report. He effectively divided roles and managed the report process throughout the latter half of the course.

# 2 Planning and Research

## 2.1 Literature

Throughout the development process, many resources were used. Ranging from Google extension documentation to other BSc courses to discussion prompts. A high-level overview of these three resources follows.

### 2.1.1 Google Extension Documentation

Our project proposal identified Google Chrome as the sole supported web browser for StudySync in section 4.2.2. This was done in response to a survey which indicated around 70% of our target demographic use Google Chrome as their web browser. To ensure StudySync met the standards set by Google, we heavily referred to the Chrome extension developer documentation: <https://developer.chrome.com/docs/extensions/develop>. No one in the group has built a web extension before, and this resource proved invaluable to guide our project implementation.

To highlight this, one can see how the whitelist storage was implemented. We knew storage would need to be used when researching the project, and Hashem found the Google Chrome Storage API referenced in section 4.6.2 in the project proposal. However, we did not anticipate it being difficult to get the API to store the extension's data effectively and consistently. These web docs enabled us to navigate this trouble with efficiency.

A screenshot of a computer program

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Figure 1: The documentation used to help guide storage implementation.

### 2.1.2 Software Design and Development

The software design and development course offered by the University of London was another great resource which helped the testing team navigate that process. The testing Excel sheet provided in week 14 of that course served as the basis for our complex testing set. It also directed us to the SUS testing procedure to speed up and efficiently test the usability metrics of the extension. A detailed breakdown of SUS and how it affected the design can be found in the design portion of this report.

A screenshot of a computer

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Figure 2: test procedure provided in CM2010.

### 2.1.3 Discussion Prompts

Lastly, our group completed the discussion prompts throughout the course during our weekly meetings. These discussion prompts were primarily discussed ad hoc at the start of our meetings to help get us into a proper mindset for that week’s work. For example, the discussion prompt 7.202, the importance of integration testing, was discussed before we decided on a manner for testing StudySync. It helped guide us to relevant industry practices. It ultimately led us to choose the testing method provided in CM2010, focusing on ensuring the program met our functional requirements and verifying the validity of the MVP.

// TODo INSERT PHOTO OF CONVERSATION ABOUT 7.202 Importance of integration testing

## 2.2 Planning and Iteration

In section 2.2.2 of the project proposal, we created a Gantt chart to guide us through the completion of this assignment. This Gantt chart was followed exceptionally well by the team throughout the course. Hashem, the technical team lead, guided the team through the sprints related to the user stories defined in section 3 of the project proposal. To get an accurate picture of the development process, it is best to look at it weekly. Our team relied heavily on a quick, agile methodology in which our sprints were weekly based. This was because the user stories we wanted to target were broken down into easily digestible chunks that did not require our technical team to overextend themselves to complete. They could also be quickly tested and validated by our testing team.

Every week, a new sprint was initiated based on a user story. These user stories encapsulated the system's functional requirements from the user’s perspective. With the valuable insight provided by the project report, the technical side of the team could get started on each sprint at the start of the week. Each user story would be roughly completed by Thursday-Friday of that same week. Our Testing team could then create an equivalent test set and validate that the newly added functionality matched the expectations in the project proposal. They did this in tandem with usability testing based on an SUS questionnaire to see how the newly added functionality affected the overall usability rating of the system. If we saw that the ratings went down, we knew that usability improvements would be made. The testing team then decided if more user feedback was necessary. A quick survey or a user interview gathered this.

During our Saturday meetings, we reviewed the materials and discussed how successful that sprint was, whether there were changes we all agreed needed to be made, or whether we were happy with the work produced that week.

# 3 Prototyping and Iteration

## 3.1 Prototyping

Prototyping and evaluating user feedback was a critical aspect of our development process. Section 5 of our project proposal shows the prototype and user feedback loop followed to produce the design and user interface. In brief, the team used market analysis to create low-fidelity prototypes that met our project objectives. The prototypes were then tested against direct user feedback to see the direction the users wanted us to follow.

During the iterative development cycle, we used SUS surveys to test our usability choices every other week. The SUS survey allowed us to test our design choices held up when functionality was implemented. We found that the users responded positively to the product as functionality was implemented. Therefore, little was needed on our end to change the product's design as our development process proceeded. The market analysis and initial user involvement paid dividends as the project progressed. This allowed our technical team to focus on implementing our project solutions rather than adjust the design on the fly.

## 3.2 Iteration

Most of this half of the semester was spent in iterative development cycles loosely related to an agile development process. Our technical team was given a user story to implement at the start of every week. These user stories are directly correlated with a set of functional requirements. For reference, the user stories and functional requirements are in sections 3 and 4.3 of the project proposal.

The technical team was then given 3-5 days to implement this functionality in our codebase. Hashem was the technical team lead, effectively divvied up roles, and managed the GIT repository in which the code base was stored. After the technical team implemented the functionality of the user stories, the testing team wrote a testing suite which directly mapped to the functional requirements covered by that particular user story. The testing suite was then run to confirm all functionality was successfully implemented. The group then met every Saturday to discuss the past week and the overall success or failure of the sprint. The testing team created a SUS survey every other week to validate that the design and functionality were still receiving positive user feedback. Which, as mentioned above, it was.

While this iterative process was ongoing, the report team was documenting all processes as methods used by the team into a coherent final report which touched on the successes of the individual weeks and the project as a whole. For a picture of our work, our GIT logs and code base can be found in response 2 of this submission.

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Figure 3: Defining roles after project proposal submission.

# 4 Design

# 5 System Development

# 6 Analysis

# 7 Evaluation

# 8 Conclusion

# 9 Individual Reflection (Name)

# 10 Appendix

# 11 References