Optimize your schedule, Enroll with confidence.

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CSE 190: Successful Entrepreneurship in Microsystems

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Executive Summary

Objectives and Mission

TrytonsPlan offers schedule generation and optimization software with auto-enrollment to eliminate student stress from the course registration process. Our goal is to become the main course enrollment tool used by colleges in the US so that American students can plan out their courses with confidence and focus on their university career.

Keys To Success

1. Student-Obsessed Business Model

   The existence of our company is dedicated to giving the students what they want and reducing their stress in college. Every aspect of our business is customer-oriented, from our sales plan to our product delivery timeline. We plan to utilize our most important asset - students - in helping us achieve the goal of delivering the tools available in our course enrollment and scheduling software.

2. Right Market, Right Timing

   As an on-campus UCSD startup, we are in our element. There is tremendous market potential for our product both on campus and in other colleges. Every quarter/semester there are students who struggle meeting their enrollment appointment time and those who desperately want the scheduling process to be easier and quicker. As long as there are dissatisfied students, we have customers.

3. Cheap Software and Popular Features

Behind the scenes, our scheduling and auto-enrollment software is top-of-the-line, developed by Computer Science Undergraduates. We use modern sorting and web scraping solutions for our backend and industry-leading front end frameworks like React. With our abundance of expertise we are able to provide high-demand sorting preferences including: sort by GPA, Professor Rating, Study Hours, and Time Efficiency between classes. To top it all off, our product is being offered for a cheap yearly or quarterly subscription of $25 per year or $10 per quarter. This price is exponentially lower than the cost of having to attend an additional school semester if students miss their enrollment time.

Company Summary

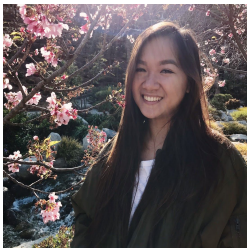
The Team

Peter Pi

Peter is the CEO. He is a graduating 4th year CSE major with a passion for leadership, project management and team-building.

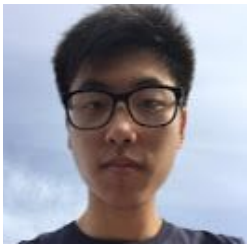
Luhao Wang

Luhao is the CTO. He is a Junior CSE major with expertise in web and mobile front end, embedded systems, and game development.



Yumi Minami

Yumi is the Customer Representative. She is a graduating CSE major with high level experience in product design, team management, and customer relations.



Jialiang Ji

Jialiang is the CFO. He is a graduating CSE student at UCSD who possesses high-demand skills in statistical analysis, and developing successful financial plans for major businesses.

Zixiao Fan

Zixiao is the CMO. He is a CSE major at UCSD who is aspiring to become a major marketing expert in the startup industry with skills in sales, product branding, and market research.

Customer Problem

Class registration is PAINFUL. First of all, students **don't have enough information** when making scheduling decisions because they don't have access to the right resources. Even the ones who know about these resources have to spend **tremendous amounts of time and effort** to search for course reviews, student discussions, and professor ratings. On the scheduling side of things, students have a **hard time deciding what courses** to take because of tight appointment times, inflexible course times, and extracurricular commitments. It is really difficult to consider all the possible scheduling arrangements in a short amount of time, and if you take too long, the course might become full or you might **miss your enrollment appointment**. If a student misses their enrollment time, then they have to stay another semester to take the required courses for their degree. They will have to **pay an extra $4000 - $10,000** depending on their state residency status.

Entrepreneurial Idea

TrytonsPlan offers a two-pronged solution to this problem that ensures students will have a stress-free enrollment experience. Firstly, we make the course registration process quicker, easier, and more informative. This is achieved via a web application and easy-to-navigate user interface that allows the student to **select the courses** they want for the quarter to fulfil their unit requirements, **generate all possible schedule** arrangements for those courses, and finally optimize these arrangements by **sorting them based on GPA, Professor Rating, Study Hours Needed, and Time Efficiency** (minimal gap hours between classes). Lastly, we eliminate the risk of missing appointment times by having our web application **monitor your appointment times** and **enroll in the desired courses quickly**. View the *Product Summary* section for more details and mock-up.

Potential Customers

Within UCSD alone, there are thousands of students who rely on the school's current outdated registration system and seek a replacement or enhancement. There are ten times more students in all the UCs combined than UCSD, and an even larger multiple in all of US. Any of these students can be our potential customers. However, we are currently targeting UCSD undergraduate and graduate STEM majors who have especially busy lives and often need help with their class schedules. Once we capture this beachhead market, we will be in a better position to scale up the business. More of this in *Market Research and Analysis* Section

Product Summary

Product Description

TrytonsPlan is a web application that is built on Javascript web frameworks such as React, Node, and Webpack. Hosted on Heroku open source software with Firebase as a backend, it is a multi-purpose scheduling app that lists school courses, generates schedule permutations, and displays this as a highly modern UI calendar with in-demand sorting features. The app also includes the function of auto-enrollment, which simulates a user visiting the school's course registration website and clicking "enroll". Overall, TrytonsPlan receives its data from generic web scraping algorithms that populate lists of offered classes, times, professors, and average GPAs derived from data sources such as *UCSD Course Catalog*, *WebReg, CAPES,* and *RateMyProfessor*.

Unique Features

The diagrams below illustrate a step-by-step rundown of how our prototype functions with the specific features it provides. Refer to **Figure 1** and **Figure 2**.

1. Select your courses (Left)
2. Generate schedules (Middle + Right)
3. Sort by preference (Top)
4. Monitor and enroll (*)

**Note: Auto-Enrollment is scheduled to be developed by 2021*

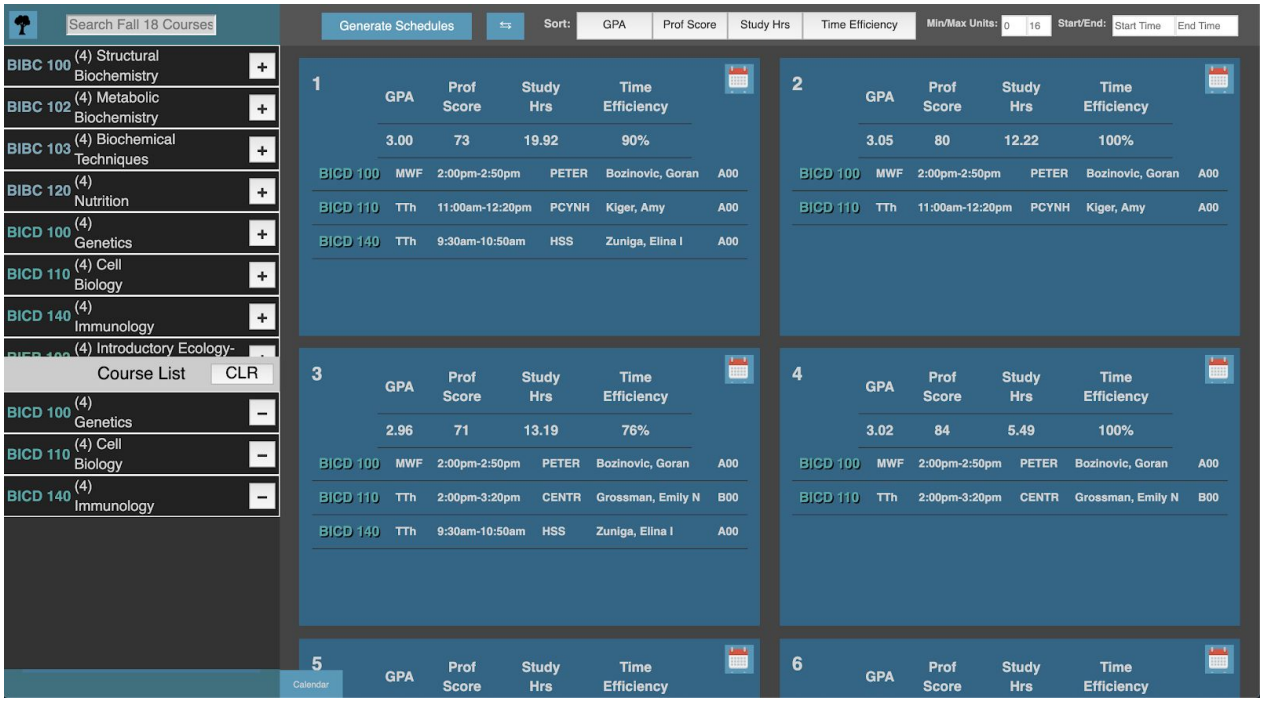


Figure 1. trytonsplan.herokuapp.com schedule generation and optimization

Based on student input, we decided to incorporate the specific features of sorting by GPA, Professor Rating, Study Hours, and Time Efficiency. Most students we questioned rated these as their top considerations when enrolling in courses at UCSD. With data from more colleges, our product can be adapted to fit the enrollment processes of specific schools, and incorporate more functionality.

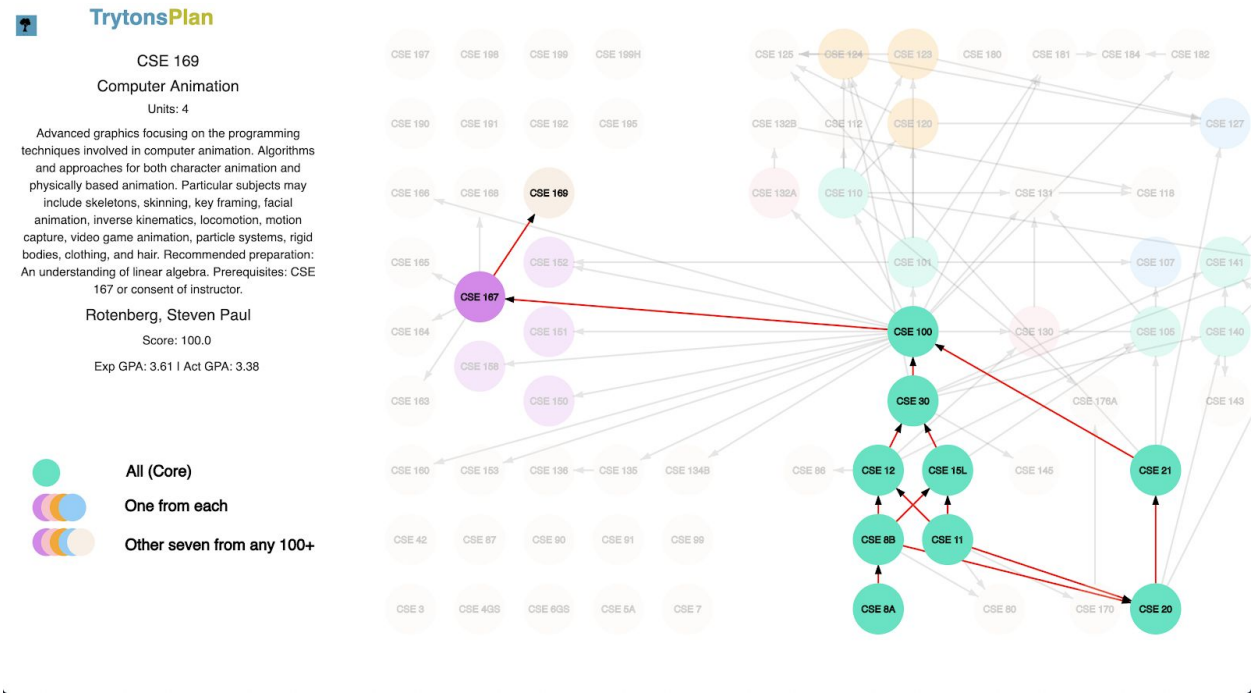


Figure 2. course dependencies, description, professor ratings, gpa

A secondary feature, apart from the main scheduling and enrollment functions, is our web-scraped database of all course prerequisites, descriptions, professor ratings, and average GPA of the class taken by students in the past. This is a handy and informative tool for students that provides more detailed information on the aforementioned sorting parameters.

Development Timeline

We have a three-year development timeline that involves conducting market research, prototyping with extensive student feedback, developing our software, improving on our current UI design, and finally, releasing the product and making iterative improvements and updates. Refer to **Figure 3** below.

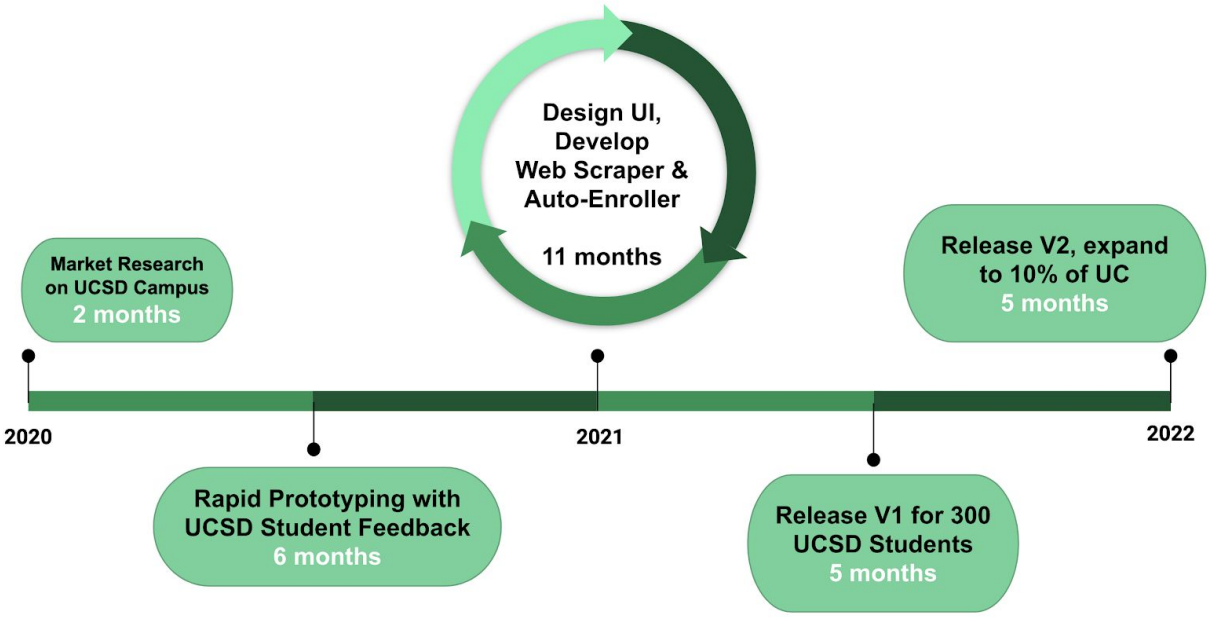


Figure 3. Product development timeline 2020 - 2022

We will begin the initial stages of market research in 2020 by conducting on-campus interviews, creating online surveys, social media posts, and making in-class presentations promoting our company. Once we have enough valuable statistics on demographic of potential users, market demand for our product, and pricing preferences, we will begin developing the prototype of our web app. For the next 6 months, we will proceed with agile development, basing our rapid prototyping off of consistent student test and feedback results. By adopting this human-centered design process, we can quickly come up with a final prototype that users will love, want, and need. We will then dedicate a whole 11 months to developing our original web scraping and auto-enrollment algorithms, siphoning expertise from the software industry and using them to the best of our ability. We don't expect to have any customers at this point. However, once we have completed V1 of TrytonsPlan, we will release it to a targeted beachhead market of 300 UCSD undergraduate STEM majors. During this time, our focus will be on retention of users and managing our servers in case of crashes. The goal after 5 months of release will be to expand our services and capture 10% of the market in

the UC college system. Then, once we have a stable cash flow, we will hire more software engineers and designers to maintain, update, and iterate on our software versions.

Market Research & Analysis

Market Overview

According to the National Center for Educational Statistics backed by the U.S Department of Education, there were 16M+ college students enrolled in the United States in 2018, and more than 5000 existing colleges in the U.S alone. Within the University of California, there are a total of 251,700 students [1].

Based on this information, we selected our target market to be “all college students currently studying in the U.S”, and our beachhead market as a small population of “UCSD undergraduate and graduate STEM majors” (1% of them to be exact). If we take into consideration the minimum tuition cost to attend a UC school, then our total available market value in the UC system is expected to be $1.004B. Just UCSD offers a potential market of $120M.

Market	Customer
Total Available Market (TAM)	All students enrolled in US colleges
Serviced Available Market (SAM)	All students enrolled in UCSD
Beachhead Market	UCSD undergrad/grad STEM majors

Figure 4. Summary of TAM, SAM, and Beachhead markets [2]

Market Opportunity

Course registration is a necessary service for every college student that will still be in high demand decades into the future. There is an annual demand for this service since students need to choose their courses every quarter or semester, so our revenue stream will be frequent and predictable. In general, there will always be the need to optimize schedules and enroll in college courses because students are motivated to plan out their future careers and want to graduate believing that they gained something out of their time in college. Furthermore, there are an abundance of students who miss their enrollment times and have to pay extra tuition to stay another semester. These are the students that will try to find a cheap solution to their problems thereby discovering our product.

Competitor Analysis

Our main competitors include course registration companies, and student info-bases such as *WebReg, CAPES, RateMyProfessor* and so on. These systems focus on the different types of registration such as activity registration, event registration and class registration. They also individually provide courses statistics such as professor ratings, average student GPA received, time commitment required, and general student feedback. However, these services are not centralized and often provide an incomplete solution to the problem by only solving one aspect of it. TrytonsPlan offers a complete solution by centralizing the features provided by each of these companies, and improving these features even further. Furthermore, there is one thing that none of these companies provide, and that is automatic enrollment. Refer to **Figure 5** below.

Service\Company	TrytonsPlan	WebReg	CAPES	RateMyProfessor
Professor Rating				
Regular Enrollment				
GPA statistics				
Schedule Generation				
Automatic Enrollment				
Sorting Parameters				

Figure 5. TrytonsPlan and competitors compared by services offered

Marketing & Sales Strategy

Customer Discovery

Based on our market research and analysis, summarized in **Figure 4**, we have conducted on-campus customer research with a sample size of more than 30 UCSD students. **Out of the sample size we interviewed, 80% criticized the course enrollment process as "time-wasting, frustrating, and uninformative".** Overall**, 70% were willing to pay for our product.**

Selling Tactics

Since we are mostly dealing with college students as our customers, our main selling tactics will include: on-campus advertisements and posters, email list ads, social media posts, in-class surveys and presentations, student referrals, and promotions for students who try our product (Amazon Gift Cards, etc). We expect to spend most of our initial months conducting on-campus interviews and gathering a large enough user base that will use, refer, and promote our product.

Business Model Canvas

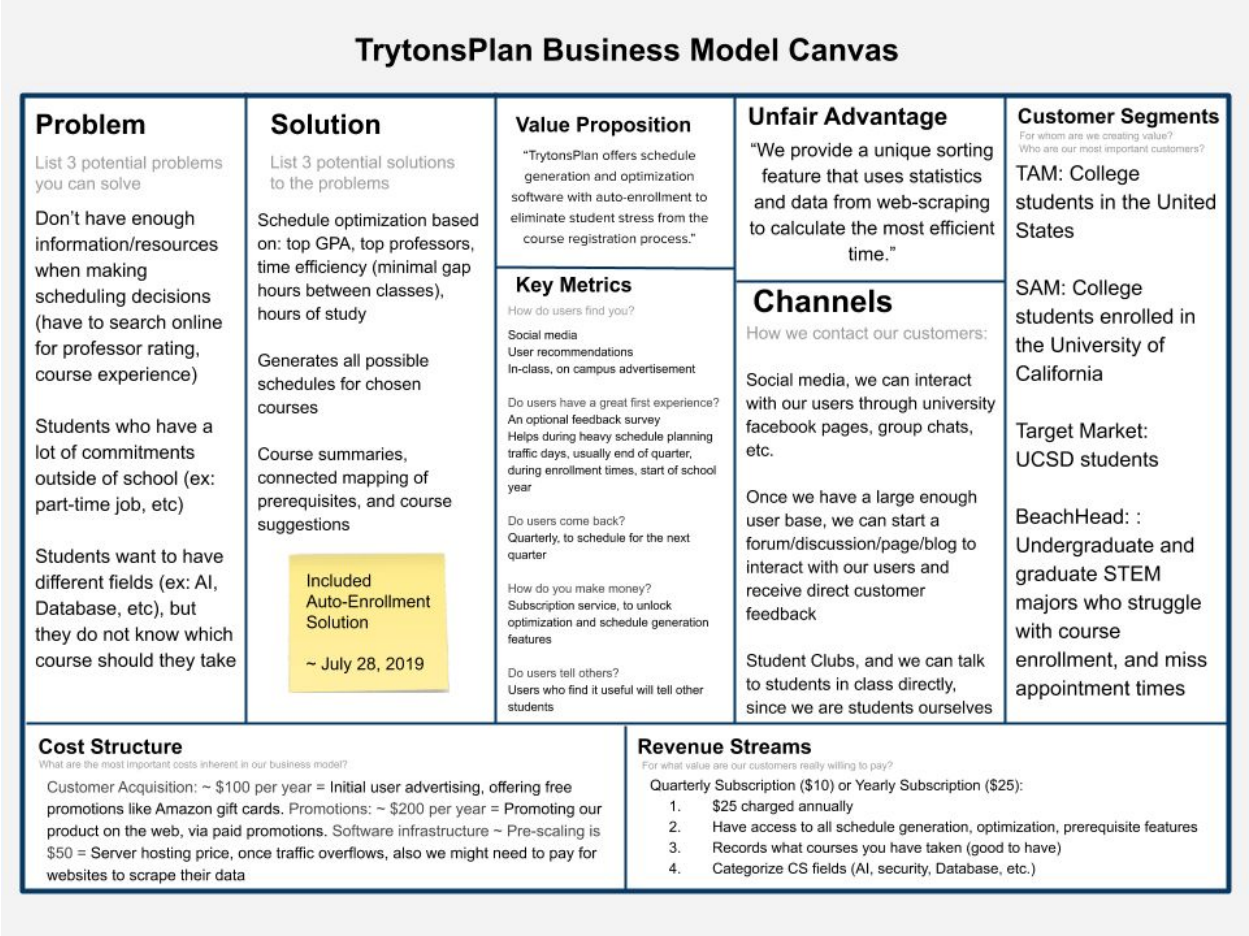


Figure 6. TrytonsPlan Business Model Canvas

Financial Plan

Revenue Model

Our main source of revenue will be the subscriptions users have to pay to use our product. We offer tiered subscription that range from free trials to yearly paid. Refer to **Figure 7** below.

Subscription Tier	Cost/Duration	Benefits
Free Trial	Free/1 Week	Access to some schedule generation, optimization, prerequisite, auto-enroll functionalities. Potential permanent grade/GPA booster. Can get insight on course experience, professor ratings and value
Limited Time	$3.99/Per Usage	Access to all functionalities except auto-enrollment.
Quarterly	$9.99/Per Quarter	Access to all functionalities. Records which courses you take to set default scheduling parameters for next use.
Yearly	$24.99/Per Year	Access to all functionalities.

Figure 7. Tiered subscription service model

Income Statement & Projections

INCOME STATEMENT			
	Year 1	Year 2	Year 3
REVENUE			
Product Revenue, $	$7,500	$80,000	$600,000
TOTAL REVENUE, $	$7,500	$80,000	$600,000
EXPENSES			
Product Cost			
Web API Cost	$25	$250	$25,000
Labor Cost	$0	$5,000	$10,000
Other Cost	$500	$500	$500
TOTAL COGS, $	$525	$5,750	$35,500
GROSS PROFIT, $	$6,975	$74,250	$564,500
Operating Expenses			
Design, Development & Testing	$1,000	$500	$500
Server Infrastructure	$150	$1,500	$3,000
Sales & Market Research	$500	$500	$1,000
OPERATING INCOME, $	$5,325	$71,750	$560,000
Earnings Before Interest And Taxes (EBIT)	$5,325	$71,750	$560,000
***Tax (8.84%)**	$471	$6,343	$49,504
NET INCOME, $	$4,854.30	$65,407.30	$510,496
	*On average, business income tax rate is 8.84% in California		

Figure 8. Income Statement with financial projections

Explanation

As **Figure 8** details, we expect our immediate revenues after releasing V1 of our product to be roughly $7,500, assuming that we obtain all 300 students in our Beachhead market. The cost of producing the web application will be dependent on the Web API costs we accrue, labor cost of each engineer, and other maintenance costs. Operating expenses will likely include that of the design, develop and test process where we will conduct research to improve our software functionality and debug errors. Further expenses can be attributed additional software infrastructure costs such as server usage (AWS), and any additional market research conducted during the development phase. With that, our total

operating income for year 1 will be around $5,000 with a net income of $4,800 after California business income tax is applied. The statement also shows our financial projections for year 2 and year 3, where we expect to expand our services to most of UCSD, and then to 10% of students in the UC system. Specifically, in year 2 we will focus on inviting more UCSD students to use our product until we achieve a projected goal of 3,000 students, generating roughly $80,000 a year. Then, our major milestone will be to invite most UC schools to use our product. With 10% of UC captured, we will more than 25,000 users, generating a total revenue of $600,000 and net income of $510,496.

Operations Plan

Sourcing

The secret sauce behind our company business model is our ability to communicate effectively and personably to students on a personal level, and develop original software right from our college dorms. That being said, most of the designing, developing, and testing will be done on UCSD campus, spearheaded by our design specialist Yumi Minami, as well as our CTO Luhao Wang. In phase 3 of our development plan, we will hire more UCSD students to help work on the software and design aspects. This is because UCSD students also understand each other's struggle when it comes to course enrollment, and will be a natural resource to gain insightful knowledge on which features to include in our software. Once we have developed a minimum viable product that can service over 300 customers, the next phases of expansion will require us to outsource our database management, testing, and designing to software engineers in other UC colleges, since they understand their own campus environments. These students will also be able to redesign iterations of our MVP that conform to their own design standards and attract diverse customers.

Organization & Personnel Plan

Legal & Administrative Summary

Our company will start off as an LLC, because as a startup we want financial and legal assurance and safety. This means we do not want to be personally liable for debt, or legal issues and we don't want taxes to take away a huge chunk of our already minimal revenue. On the other hand, we also want the freedom to gain more revenue than our percentage shares of the company, and we want to keep the financial side of things simple (income statements, paperwork, taxes). This can be considered "playing it safe" but ultimately we want our company to succeed with as little issues, delays, or barriers as possible. Once we progress from a Startup to a fully established company, we will consider incorporating as a C Corp, or S Corp.

Patents & Trademarks

The specialty of our product lies in its web scraping algorithms, insider knowledge of how the college enrollment system works, and also our automatic enrollment software which is specific to the school's online registration system. We would file a patent for the algorithms that can scrape the web, and also the adaptable automatic enrollment software. If that takes too long, we can also use provisional patents or trade secrets to protect our IP and products before we officially in-corporate. The main reason our software needs to be patented is because it is highly specific software tailored towards scraping course enrollment related websites, and automatically enrolling in courses on school websites. Although this will require using existing software frameworks developed by other Companies, the algorithms and specific features/services of our web app would be developed by us.

Bibliography

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