

TEAM 4

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PRODUCT WORKBOOK

Managing Academic Degree Programs

Dec 10, 2021

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Jan 2022: Start Building MVP

MVP: Calendar-like canvas, real-time scheduling and version management and algorithm forming schedule

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Narrative

Curriculum Planning is a significant task of running an academic degree program, which directly impacts the reputation and popularity of a university. For instance, Carnegie Mellon University is renowned for its programs in machine learning and robotics. These programs are a result of meticulous iterations and refining of the curriculum, to make it more relevant to the current era and the job market. The people running this behind the scenes are academic program administrators. Most degree programs at each university have at least one program administrator. This amounts to a minimum of 70000 program administrators in the United States, playing an important role in planning the curriculum.

Curriculum planning includes creating a course schedule, classroom allocation, class resources allocation, and publishing the schedule to name a few. However, customer interviews have suggested that the process of curriculum planning is not a smooth ride for the program administrators. There are many areas of concern with respect to collaboration with faculty, manual effort, and work satisfaction. **We have narrowed down to two major problems faced - the time spent on tasks involved in scheduling courses takes up to 4-6 weeks which is very inefficient, and the work satisfaction during this process of curriculum planning is low.** We believe we have a solution which can reduce the time spent by 50% while boosting the work satisfaction. Before jumping into the solution, the following is a narrative from the point of view of a program administrator detailing the causes of the aforementioned problems.

“Today is August 25. The Fall colors are slowly settling in, while students are still enjoying their holidays and getting ready for the semester to begin in a week’s time. On the other hand, it is a whole other story behind the administration desk, as we are going through the busiest time of the semester.

I am an Academic Program Administrator at Carnegie Mellon University. My colleagues from other departments have different titles for a similar role - Academic Program Manager, Executive Director for an Academic Program,

Associate Dept Head of Academic Affairs and so on. I have more than a decade of experience managing academic degree programs, and I am currently managing the MS ECE Program at this university.

As an Academic Program Administrator, I work on a multitude of different tasks. During the semester, my major role is to advise students on their careers, and ensure that they are on the right track to achieve their goals. My other major responsibilities include admissions, strategic planning to continuously improve the program, and organize events for students and faculty. During the season before the semester begins like the current period, I work on planning the curriculum and orientation. And THIS is the most exhausting aspect of my job.

I am currently planning the curriculum and scheduling courses for the next semester. I came into work as usual today, and checked my email. And as expected, still no response from Prof. Smith. I have been waiting 2 days for a response just so that I know whether he is available to teach during the time slot I have provided. It should not take him more than a minute to respond, should it? But why does it always take so long to receive a response? Another day, another reminder email. I cannot understand why I spend so much time and effort on menial tasks like this when I can be brainstorming the next idea to improve the program and the curriculum. It has already been 4 weeks into this process of scheduling courses, and we are nowhere close to be done.

The ECE department that I am in charge of is massive. I have about 50 courses to schedule for the next semester, and imagine each faculty member giving me a hard time by not collaborating and responding quickly to my emails. This is what has been happening through the years, so maybe I should have known better. I have a meeting with Prof. John in the afternoon today to create a new course because Prof. Grant withdrew from the course schedule yesterday. Prof. Grant was unaware of what he had promised according to our initial discussions, and he decided to withdraw. This has happened at least once in each of the recent semesters, and this just piles onto the effort and stress of this week. When will all this be resolved?

Collaborating with faculty needs a change. I have been using emails for as long as I can remember, and the turnaround time for this on an average is up to 2 days to

receive a response. I can understand that the faculty have a large amount of emails to go through, and therefore we need a different system that will help speed up the process. It is not all that surprising that everything gets lost under an email rubble.

My colleague Denise from the School of Computer Science is meeting me in a bit to discuss some of the cross-listed courses between our departments. I need to travel to campus to have that in-person conversation with her regarding scheduling a course that is part of both our departments. Both of us create visual schedules on Microsoft Excel, which looks sort of like a calendar. Her visual map looks very different though, so I am having a difficult time making changes in her Excel schedule to accommodate my changes. We figured it would be easier just to sit together, talk, and make the changes with each other's help. But is there no other way to avoid this extra travel just to have a dialogue and make changes on our schedules?

Now that I have mentioned the Excel visual schedule, let me talk about that archaic tool - Microsoft Excel. I took 4 hours just to create that visual schedule allowing an entry for every 5-minute time slot during the day. Making changes to that is a pain as well, as it is very easy to make a tiny mistake while modifying the schedule. Last semester, my administrative assistant entered all the data from the visual schedule onto SIO when she entered 10 pm instead of 10 am and that got published! I was really confused as to how we scheduled a course for that time, and turns out it was a typing error. I caught it only because I had to double check it when it was published. Ideally I do not want to spend any of my time doing redundant work, and there definitely is a whole lot of redundancy and repetition in what my job currently entails.

I am really grateful to Prof. Hunter though, who made life very easy with quick responses over 4 days to confirm and clarify the schedule. He is probably the ONLY professor this semester to have done that. I was pinching myself as I could not believe that the process got over so quickly! I would probably look forward to planning the curriculum if that was the case with every professor. The stress is really building up over the last few weeks, and I really really need a break.”

This is a problem that affects academic program administrators all across the country, as planning the curriculum is always a part of their job. Any product that can solve this pain point would bring in a huge amount of revenue because of the massive market size. Firstly, there are about 4300 degree-granting universities in the USA. If a university has an average of 15 programs, that would be 64500 different degree programs and each one has an Academic Program Administrator. These numbers are conservative, and could be much larger in reality with universities like Carnegie Mellon University over 100 programs! The market can be segmented based on the role. Program administrators and administrative assistants would be heavy users of the solution, whereas other stakeholders like faculty would be light users of the tool. There would also be users who would just be viewers of the tool like employees of the Registrar's office. The buyer would be either the university in-charge or the head of the department. There could be different models to purchase the solution - either a licence for each individual, or the entire university buying it for a set of employees. Based on customer interviews, the purchasing criteria for a buyer is that the tool should be customizable and it should be able to keep a record of the communication.

To understand what the market size is, we need to understand who the buyer for the solution would be. The buyer of such a solution would ideally be independent departments. Hence the merits of such a solution needs to convince only each program's department head, who could then take a call of whether to purchase such a solution. Hence each department that buys the solution would buy enough individual licenses for all the program administrators, administrative assistants, faculty, and any other employees that need to have access to the software. Considering 4300 universities and at least 10 departments per university, there would be 43000 departments who can buy. Each department would buy conservatively for approx 3 program administrators, 2 administrative assistants and about 25 faculty. That would be about 30 people per department, and hence this would be a conservative total market size of $43000 \times 30 = 1.29$ million individual licenses of the software. As there is no leader in this space of curriculum management software, this is the perfect time to capture a share of this large market.

How do we solve this problem?

The proposed product solution has been labelled SemPlan. SemPlan is an intelligent and real-time scheduling web/mobile application specific to university curriculum planning along with in-built messaging. The primary goal of SemPlan is to reduce the time spent on tasks involved in curriculum planning by at least 50%. The product can be categorized as *Intelligent Curriculum Management Software*. SemPlan is created with the purpose of capturing a share of the market, eventually becoming the leading curriculum management software.

Let us understand the functionality of the proposed application. The technology stack to be used would be a neat web application user interface on the frontend, coupled with the backend running a machine learning algorithm. The tool would use a machine learning algorithm to form the first version schedule using the historical semester schedule data considering the program requirements (class size, classrooms, timings, faculty), course topic, and any additional constraints. This approach has been decided based on inputs from the customer interviews. In general, schedules are derived from past semesters and then built upon based on additional changes. Hence, the machine learning approach would automate a whole lot of manual entry, also finding a solution with the least number of schedule conflicts possible.

When PAs think of planning course schedules, they are thinking of a calendar, from Monday to Sunday. They use Microsoft Excel to form this kind of visual map. SemPlan thus has been visualized as a calendar-like application which is initially filled with a schedule generated by the machine learning algorithm. The algorithm takes the following data as inputs -schedule of previous semesters, current courses to be scheduled, classrooms allocated across departments, any extra constraints imposed by the program administrators, and faculty requests about timings. After this is generated, the program administrators and all other stakeholders will be able to see the schedule and change it on the application in real-time. What does real-time mean? It would be like Google Docs or MURAL where you can see the changes being made on the screen right away. Clicking on any slot that is reserved for a course will bring up a plethora of options like course information, faculty, course materials required, and there will exist version control for the same (like

Google Docs where you can see the revision history). We are viewing the tool as a one-stop shop for everything related to curriculum planning - writing the course description, timings, materials, classrooms, conflicts, communication.

Some of the other noteworthy features are also planned. Login and a separate profile for each user is a basic requirement. Access is allowed to all stakeholders based on their usage - high (program administrators), medium (faculty, administrative assistants), and low (other employees). An important feature is in-app messaging. This eliminates the requirement of sending emails and all communication related to curriculum planning will be recorded on the application. Another important feature is a notification and reminder system, which would allow the program administrators to avoid sending reminder emails.

The most obvious benefit with SemPlan is that the time spent on the tasks involved in planning the curriculum will reduce by 50%-75%, and hence will allow program administrators to be involved in other important facets of their job like career advising, event planning etc. The time spent on these tasks can easily be measured. One of the administrators we interviewed spent 90% of his time during course scheduling doing manual tasks, and thus any reduction with any improvement using automated methods would be a massive benefit. Reducing the time taken for this process down to even 2 weeks (from 4-6 weeks currently) would massively help free up their time, and help spend this saved time on other productive activities like working on improving the program diversity and so on. This will also make the curriculum planning process transparent across all stakeholders. Transparency means that everybody involved would be aware of the current state of planning, and the instructors would be able to understand the differences and competing forces during planning. This would enable a faster real-time response, and hence make the process more efficient. Work satisfaction can be boosted significantly as well, with the elimination of a lot of the manual tedious work involved.

Coming to the pricing of SemPlan, we have taken a leaf out of the book of other software solutions for universities like Canvas LMS. The pricing strategy is as follows:

Prices are Annual Subscription Costs

Organization Size (No. of Programs)	Price
1	\$120
10	\$1000
100	\$8500
200	\$15000
Unlimited	\$18000


This is a conservative pricing strategy, as the price has been decided only based on the number of pay hours reduced because of the reduced time. We have not accounted for a few more factors like improving the work satisfaction, automation of manual tasks, and so on. For the current strategy, let's look at an example. For example, CMU has 100 courses. They would pay \$8500 (annual) + \$3500 (one-time) = \$12000 to set up SemPlan for the university. Based on our calculations for the number of hours it saves, we estimate that it saves about \$90000 for a university the size of CMU. This would be a 7.5 : 1 benefit to cost ratio. We believe that the solution can be priced higher to account for the other benefits, and hence more research is to be done on that aspect.

To conclude, planning the curriculum is an important responsibility of the program administrator and there exist significant problem and opportunity areas. SemPlan has been visualized as a tool to address several of the aforementioned causes, and makes the work life of an academic program administrator enjoyable and efficient.

Appendix

A. Customer Problem Space

1. Customer Persona Profile

Identity	
<p>Persona name</p> <p>Academic Program Administrator</p>	<p>Picture</p>  <p>I want to help students graduate successfully</p>
Characteristics	
<p>Traits</p> <p>Role: User</p> <p>Age:40-55</p> <p>Education:Bachelor's degree or higher</p> <p>Work in campus, usually has his/her own office</p> <p>Other job titles: program directors, executive directors, directors, program managers</p>	<p>Goals</p> <p>Manage and organize their academic degree program</p> <p>Facilitate the objectives of the organization</p>
<p>Behaviors</p> <p>Marketing & recruiting for the program</p> <p>Establish educational partnerships with corporations, govt agencies & peer universities</p> <p>Advise prospective & current students</p> <p>Plan the courses along with the faculty</p>	<p>Competency (Knowledge, Skills)</p> <p>Leadership and administrative skills</p> <p>Oral and written communications</p> <p>Project Management and goal setting</p> <p>Program planning, development and implementation</p> <p>Public speaking</p>

2. Whole Problem Canvas

Alpha Team

Whole Problem Canvas

Use this template to capture the 9 elements of well-defined customer problems.

- 1 Start with the persona.** It's best to start with the persona as you want to put the focus on creating solutions that people have and want.
- 2 One canvas per persona.** In most cases, it is best to create one canvas per persona, if you want to clearly define problems that each persona faces. With two personas on a canvas, it can be difficult to know which information applies for each persona.
- 3 Conceptual Relatedness.** Make sure each of the 9 ingredients are conceptually related to each other. For example, the actual and desired outcomes should represent results for the use cases identified on this canvas.
- 4 Evidence.** Try annotating the items on the canvas for which you have evidence to support your work. You could use a check-mark to indicate that you do have evidence. Or, red-yellow-green icons to represent the quality of evidence you have. You could even try adding a statement of evidence (e.g. a quotation from a customer.)

Canvas created by Jin Berardone for his Product Management Studio course at Carnegie Mellon University.

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3. Customer Problem Analysis

Notes:

- (1) Planning the curriculum involves several tasks, from course scheduling, coordinating with faculty for their schedules, providing faculty with course resources, coordinating with other program administrators to share resources etc. Program administrators should coordinate and prepare on which course is going to be taught by which instructor on what time and what resources or link students are going to use in this course.
- (2) Instructor is not available: Case 1. Instructors may take a year off. According to the interview, sometimes instructors may take a year off from teaching or researching then do something else. 2. Instructor is retiring or something else happens that the instructor can no longer teach in this university.
- (3) Cross-listed courses taught in different time zones: for example, the same course may be taught in both Pittsburgh and Silicon Valley. This creates scheduling difficulties which involve a lot of back and forth communication.
- (4) Coordinating course resources with faculty: The course resource links posted on the course registration page or canvas are managed by the program directors, they are the people who pay for it. So, they need to communicate with the instructors to prepare before the semester begins.
- (5) Communication has been mentioned several times, and this is a pattern across interviews. Difficulties in communication with faculty was mentioned both by Ms. Nesli and Ms. Matthews, while Mr. Eiben mentioned communication between departments as an issue to be addressed.
- (6) Deanna mentioned that it takes multiple days of turnaround time to manage a clash of professor availability timings with another department. With a real time scheduler, it should take not more than an hour to resolve the issue, considering that the primary issue is the complexity in handling schedule time clashes over mail.

Evidence:

- (1) There are about **4000** universities just in the US, each having multiple departments. (<https://www.usnews.com/education/best-colleges/articles/how-many-universities-are-in-the-us-and-why-that-number-is-changing>)
- (2) An assumption has been made for the average number of degree programs in a university. Considering that big universities can have a lot more than the assumed average, the number of Program Administrators assumed is conservative.
- (3) The desired outcomes for the program administrators interviewed were different. Ms. Nesli has more academic oriented goals like ensuring good graduation rate and job placements, although she has been working on financial benefits for her program as well.

Mr. Eiben has been working on making the MS in Product Management degree program more marketable to the industry, which is a completely different goal.

- (4) For actual outcomes, Deanna Matthews mentioned the average time for her to finalize the course plan is four weeks and most of it is spent on waiting for a reply from instructors. The frequency for the case that the professor forgets what he or she has promised and wants to make a change is one of thirty courses in a semester which is nearly **3 percent**. For cross-listed courses, to avoid the conflict with the other departments' core courses, program directors need to ask for the course schedule and compare it manually. Also, they need to consider the time zone.

Why is this problem the most worthwhile?

- As we are focusing on the college context, the JTBD of planning course curriculum happens on most program directors with each of the instructors in his or her program.
- Through the customer interviews, the problem of planning the curriculum came up repeatedly. From the perspective of risk priority numbers, the detection and severity parts are high, as for occurrence, we know there will be at least two semesters in a year, so every year the program administrators have to face this problem at least twice.
- To address the confidence we have in creating a solution, we believe the product or the idea is not that difficult to realize. Hence the confidence level of solving this problem is high.
- There is a lot of scope for technology to be used to automate and make communication more efficient, and hence solving these root problems will provide time for the Program Administrators to focus on making more impactful decisions that could positively change the program's future.

4. Customer Interview Summaries

Zeyuan:

Summary of Customer Interview

Project Team *Team 4*

Part 1. Interviewing Team

Interview Facilitator *Qianxin Liu, Product Manager, TartanWorks Inc.*

Interview Recorder *Zeyuan Li, Product Manager, TartanWorks Inc.*

Part 2. Customer Interview

Customer **Sean Beggs, CMU, Heinz College, Director of
Master of Information Systems Management
program (MISM)**

Interview Date/Time *September 15, 2021, 10:30A.M.*

Interview Location *<https://cmu.zoom.us/j/9383051269>*

Interview Records

- **Recording:**

https://cmu.zoom.us/rec/share/khY7upuBmWGDOvW5JctmKIOcCm7gt2aMesMIVhALz-Pewt0KIRr4KBlmxSRgID9s.60Q6ry4xjcfWS_Nm

Passcode: +i^32B#e

- **Artifacts:** none

Key Findings

1. The goal in his work is the success of students. For students, he wants to help them succeed by registering the correct courses, finding a satisfying job, enabling them to connect with one another and enriching their own student experience. For faculty and staff, he wants to help them facilitate their process to help students succeed. He believes himself a supervisor and a team player.

2. Experience matters in this position. Sean said when he first began his career as a program director, there were redundant steps in his work, and he made some mistakes but now it's okay.

3. Main problem faced:

Sean believes the biggest problem right now is how to get students engaged comprehensively. Many students currently don't pay attention to the details of course description and prerequisite. They may also don't think of the outcome if he or she doesn't choose the right course or even fails it. Sometimes they make decisions just from talking with seniors which is not comprehensive. Sean hopes there can be an AI agent to remind or actively push his students to be right on track, keep details in their mind, know the timing and the target in a comprehensive format.

4. Perspective on information or data:

In the department of Heinz, there is a Heinz academic service center whose responsibility is to collect data. Then as the program director, he doesn't need to do this job. He also believes he has enough information and doesn't need more. He respects the boundary between students and teachers. He doesn't want to cross the line and make it creepy.

5. Respect for a student's personalized learning style: He respects that students have different agenda, different goals and different learning methods. It's hard for the current advising platform to fit all students' needs.

Some insights from the Interview with Nesli:

- A. Except for planning the course schedule, the program director may also think of how to bring new blood from the industry or other departments to teach
- B. Some program directors don't have the right to edit or change the course schedule in the student system like SIO in our case, they share the final version course plan with the head department program director like the relationship between ETIM and EPP, then they will put these courses into SIO.
- C. As they only have the view access on the SIO system, they need to make sure that everything is planned as expected. If there is anything wrong, they need to communicate with the head department to correct it.
- D. Program directors care whether his or her students are doing well not only from an academic perspective but also from personal health. When the pandemic comes and they have a chance to talk via zoom, they hope the students can turn on the camera.
- E. The program director's work may change a lot, like which software to use, how often the orientation, future admission plan.
- F. The course resource links posted on the registration page are managed by the program directors, they are the people who pay for it. So they need to communicate with the instructors on the resource plan.
- G. Sometimes the program needs to pay the instructor from another department or the industry to teach a course here.

Pranav:

Summary of Customer Interview

Project Team Team 4

Interviewing Team

Interview Facilitator **Abhinaav Singh**, Product Manager, TartanWorks Inc.

Interview Recorder **Pranav Prasad**, Product Manager, TartanWorks Inc.

Customer Interview

Customer **Brad Eiben**, Executive Director, MS in Product Management, Tepper School of Business at CMU

Interview Date/Time September 16, 2021, 1:30 P.M.

Interview Location

<https://cmu.zoom.us/j/96425743649?pwd=bWlTdIRXa1NTMXc5QzA3ZDV6Vi9xQT09>

Interview Records

-- Recording:

https://cmu.zoom.us/rec/share/eAUQdsyR4iDnLI8ndOznjAuqGtKxMSrRHlcGeiWoG33FGQXKGKxZoS878os9eAGO.GmmqO2WJ1q_Z_WOI
Access Passcode: 95??34nX

-- Artifacts: none

Key Findings

Here's what we discovered from our interview:

1 - The most important challenge that he is currently facing is to increase the awareness about the MS in Product Management program in the industry. As the program is quite new, the reputation of the program is still being built. Mr. Eiben has been working to market and increase the awareness of the program in order to gain a reputation like established programs such as the MBA program. To get the message across, he has been using strategies such as shining light on successful alumni of the program, collaborating with established programs to help each other, create relationships with the industry etc.

2 - The goal of the program is to provide all skills required to be successful in product management under a single roof. As Mr. Eiben puts it, "When someone thinks of product management, they should think of Tepper and CMU." From a financial perspective, a revenue surplus is always a desired outcome. As it is a new program, it is being treated like a startup with more emphasis on the marketing aspect than a financial gain.

3 - The least productive part of his job is the time spent in administrative work. The time spent in approving employees' hours etc. takes up a lot of time. This can be seen as an area of opportunity to make daily mundane tasks more efficient and less cumbersome. Mr. Eiben believes this is time would be better spent in strategic planning and more big picture decisions. Another point he mentioned in this area is the lack of communication between different departments, and hence the existence of an inability to share efficient processes to complete administrative work.

4 - Another major factor that the program is always trying to improve is the diversity in the program. There is not much clarity as to why students are choosing this program over others. There is a need to learn more about that aspect of the program in order to market the program correctly in different areas of the world like Europe, Africa etc. At the moment, they are able to attract a large

female population but again, more data is required to understand what is resulting in this.

Improvement Opportunities

Here's where we could improve our interviews.

1 - The response to his answers can be different and more probing, especially with respect to numbers. For the awareness issue, we could have asked more about how they are tracking how the program is improving in that aspect. We did not clarify the numbers aspect to an extent which will be very useful. Hence there probably is less clarity than we should have in that aspect.

2 - More rehearsals of the opening and the questions themselves would definitely benefit in gaining more from the interview, as it would run more smoothly.

Qianxin:

Summary of Customer Interview

Project Team Team 4

Interviewing Team

Interview Facilitator Zeyuan Li, Product Manager, TartanWorks Inc.

Interview Recorder Qianxin Liu, Product Manager, TartanWorks Inc.

Customer Interview

Customer Deanna Matthews, CMU, Associate Dept. Head
Undergraduate Affairs

Interview Date/Time Sept. 15, 2021, 12:00 A.M.

Interview Location <https://cmu.zoom.us/j/4735164855>

Interview Records

-- recording:

https://cmu.zoom.us/rec/share/HdulzqTc-4IHjYqIb5_3SPvNmGomwgQItLQ6sKUSNy1AJNUkPjewlCjE7dwXn9cn.Dtn16BJGk0YHmoFP . Access Passcode:

*pf%D1dh

-- artifacts: none

Key Findings

Here's what we discovered from our interview:

1- Her role gives her chances to administrate all undergraduate EPP programs. She explained her role and her work scope very specifically in the beginning stage of the interview. Clearly, her role give her a very deep understanding and a big picture of being a program administrator.

2- She mentioned that there are many things that are done by the program administrator behind the scenes which are not relevant to many students. Maybe some technology or products which could enable the program administrator more exposure to the students will be more welcomed by the program administrator.

3- She think there are clear metrics to value her work. The students can successfully have their jobs are one of most important metrics that she thinks she has done a good job. For the undergraduate program, she thinks the scale of the program is important. And for the graduate program, she thinks the quality of the applicants is important.

4- There are some inconvenience functions in the process of using the program administering system. She mentioned the function of this system works very well in a large program. However, there are some ‘twists and returns’ sides of the system. This is the main part we could catch to improve this system.

5- For the improvement of the system, she mentioned “visual” several times. If we could make the system more visual, that would be better.

6- She mentioned the importance of records when solving the problems of assigning courses for the teachers. She mentions the hardest task is to negotiate with the faculty. If we have a system or tool for the administrators to better record their work process or their contact with other teachers. It would be useful.

Improvement Opportunities

Here’s where we could improve our interviews.

1 - For the first item above, we didn’t inquire further about how to better improve the system, the hidden process in this system, what other parts we could visualize this system. We should try to probe this further in our other interviews, if possible.

2 - There are a few sharp transitions during the interview. Next time, we should respond more quickly based on the answers of the interviewees.

Abhinaav

Part 1. Interviewing Team

Interview Facilitator	Pranav Prasad, Product Manager, TartanWorks Inc.
Interview Recorder	Abhinaav Singh, Product Manager, TartanWorks Inc.

Part 2. Customer Interview

Customer	Nesli Ozdoganlar, Sr. Acad. Program Manager for MS E&TIM
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Interview Date/Time	September 16, 2021, 1:30 P.M.
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Interview Location	https://cmu.zoom.us/j/98544931508?pwd=OUh2bSt3ZUhvUFIYUoxT3RzaS84Zz09
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Interview Records	
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--recording:

https://drive.google.com/drive/u/1/folders/1--yqUe8wEqxJmdDSO2of_cygdr-EYm_z

--artifacts: none

Part 3. Key Findings

Here's what we discovered from our interview:

1 - She really wishes that there was just ONE system for student management.

Right from admission, to evaluations, auditing, etc. She said if the student got in with one system, which carried the student over until graduation, then that would really help her do her job. Chances of error due to manual intervention while copying student data from one system to another would get minimized. It will also be easier to track student data all in one place, without having to sign into 3 different applications. This could be an opportunity as a solution could be envisioned where data from these different platforms could be fetched and displayed on a single dashboard.

2 - Zoom calls didn't make her feel connected to the students. She spoke for quite long about how zoom calls did not make her feel connected to the students.

She could not catch the non-verbal cues and could not tell if they were stressed, in trouble or if they were taking care of themselves (based on how they were dressed and how they were generally behaving). This is another area where she thought she was not satisfied with, as part of her role as a program administrator.

3 - She sees international diversity in her program as a problem. It is a problem she feels strongly about, but hasn't completely been able to address it yet. She thinks that like with all other STEM courses, her program also has less diversity. This limits her program in some aspects and she wants improvement in this area. She herself has thought about some potential solutions, like establishing connections with other colleges and companies, hosting recruitment events and trying to get undergraduate students to enroll for the graduate program.

4 - She pointed out that communication with faculty needs improvement. She does not feel that she's able to stay in touch with faculty in a reliable and an effective way. For instance, it's her job to acquire resources like HBR articles, books, etc for the faculty that they need as part of their classes. She is unable to find out what they need and when, in real time.

Part 4. Improvement Opportunities

1 - For the second item above, we did not spend enough time to find out the root cause for her discomfort with Zoom. We should have probed a little more and dug deeper, as the reasons we have for her dissatisfaction with Zoom calls seem to be at a surface level.

2 - Our opening phase was not long enough and we dived into the questions too early. This was a lost opportunity to establish a better rapport with the interviewee.

5. Customer Interview Files

Brad Eiben:

<https://drive.google.com/drive/folders/1-0jFeleZCYP48ERJXauMD6Bv5Fro1bFQ>

Deanna Matthews:

<https://drive.google.com/drive/folders/1-2V-X62XPGJJNvdA7c4vFQ1bcCYn6wwM>

Neslihan Ozdoganlar:

https://drive.google.com/drive/folders/1--yqUe8wEqxJmdDSO2of_cygdr-EYm_z

Sean Beggs:

https://drive.google.com/drive/folders/1-2I5N2rPzgH90XEKHtg7D2Qodl4Xi_2c

Deanna Mathews

<https://drive.google.com/drive/folders/1-2V-X62XPGJJNvdA7c4vFQ1bcCYn6wwM>

6. Fertile Land Research

Zeyuan:

Responsibility for academic program administrator:

1. Recruitment, admissions, and retention of students:

- work with the Chair to set the enrollment targets. Maintains records and updates admissions and recruitment plans at the program level
- contribute to student recruitment and orientation events
- assist faculty with special or unusual student advising needs including student complaints about program advisors or courses
- review course evaluations for the specific offerings of the program for the purpose of curriculum development and maintaining quality standards
- deal with student complaints about program advisors or courses.

2. Academic program development, policies and procedures:

- assure that curriculum development and other planning for the program takes into consideration current policy and/or anticipated changes.
- develop academic policies and procedures, and monitoring compliance of these
- make recommendations about routine scheduling of courses and rooms
- responsible for official student and graduate correspondence relative to confirming program status for loans, licensure, and insurance.

3. Administration of the program:

- **make budget requests, have oversight of the program budget to ensure the financial stability of the program**
- **look for opportunities to foster professional growth and development of faculty and staff members within the program**
- **monitor and evaluate faculty and staff performance and advise the Chair in formulating recommendations for faculty and staff hiring, merit, equity, promotion, tenure, and termination.**
- **develop and maintains cooperative and collaborative relationships, activities and communication with other programs within the College**
- **keep strong relationship with Alumni**
- **provides the chair with an annual report of the core annual programmatic activities**

Goal:

The goal of an education administrator is to organize and manage their administrative department while facilitating the objectives of the institution for which they work.

TOP ISSUES FACED BY Program Administrator

- **Making decisions strategically: responsible personalities to overlook the discipline, making schedules, managing academic staff etc**
- **Recruitment of academic staff**
- **The discipline of the students**
- **Lack of attendance**
- **Staff and students retention**
- **The uncertainty of student outcome**
- **High cost in maintenance and operations**
- **Technology: not many school administrators' strong suit, a real challenge for them to identify what and when they should adopt technology to improve performance**
- **Designing the 21st-century curriculum**

Pranav:

Market: US Higher Education Market

Statistics: (Source: EducationData.Org)

Among first-time, first-year college students, 82.7% are full-time students.

2.3 million students are foreign-born.

4.43 million college students are projected to graduate in 2021.

24.6% will receive associate's degrees.

49.9% will receive bachelor's degrees.

20.8% will earn master's degrees.

4.7% will earn doctorates or professional degrees.

50.8% of all bachelor's degrees are in 5 fields.

19.1% in business

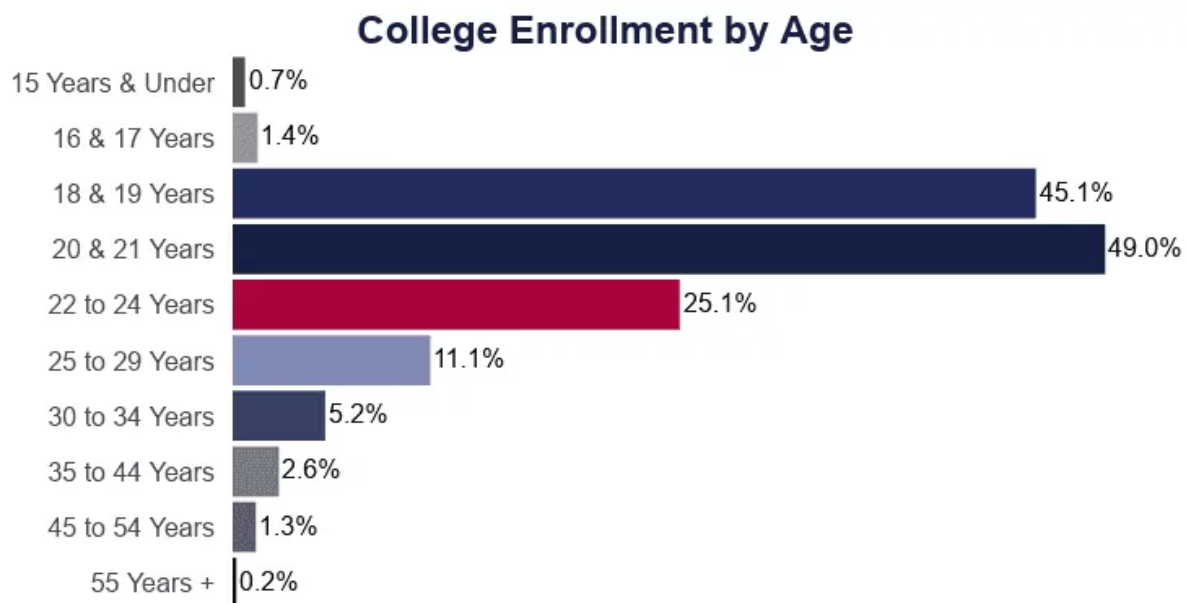
11.9% in health professions and related studies

8% in social sciences and history

5.9% in psychology

5.9% in biological and biomedical sciences

12 million or 55.2% of college students are White or Caucasian.



Trends: (Source: InsideTrack.org)

1. The need for student crisis support continues to escalate.

In a survey from the Centers for Disease Control and Prevention on mental health during the pandemic, 25.5 percent of respondents aged 18 to 24 reported that they had seriously considered suicide. Roughly one-quarter of this same group said they had increased their substance usage to cope with the pandemic.

2. Online learning experiences - Expect online learning to take a higher Ed pie, even after Covid-19

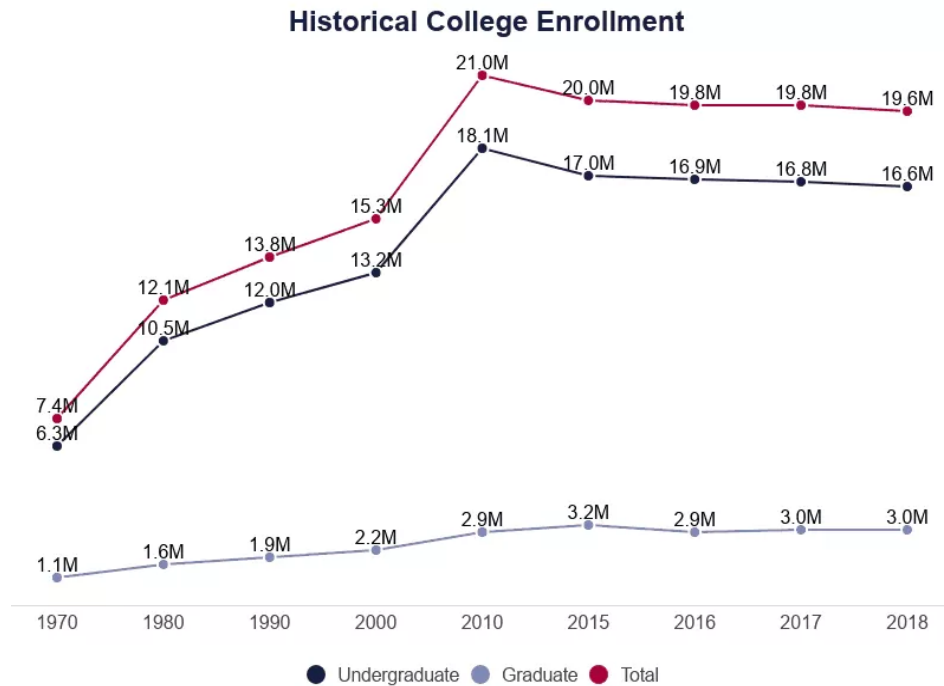
3. Competition with nanodegrees and skills training

According to a 2020 Strada Education Network survey of more than 25,000 responses, only 17 percent of adult learners believe additional education will be worth the cost, compared to 37 percent in 2019. In the same survey, just 24 percent believed additional education will make them an attractive job candidate to potential employers and help get them a good job, down from 56 percent the year before. Since the pandemic began, adult learners are opting for quicker, less expensive nondegree credentials (39 percent) and skills training (24 percent) over the traditional bachelor's degree (11 percent).

4. Adding a three-year college degree to the mix at four-year institutions.

Challenges:

- College enrollment is going down through the years (Source: EducationData.org)



- COVID-19 Impact: Not only are universities forced to transition all on-campus classes to a virtual setting, but they are also faced with concerns around enrollment, finances, and student support.

- Decreased State Funding: Multi-year decreased state funding for public institutions and community colleges has resulted in reduced critical services for students, putting significant strain on institutions.

- Tuition costs are too high for students, continuing to worsen the \$1.56 trillion student debt that plagues the US as of September 2020.

Opportunities:

- Skills Gap: 64 percent of surveyed employers said that their organization has a skills gap. This is an opportunity for universities to work with businesses to develop courses and programs that prepare workers for highly valued roles. (Source: Wiley Education)

- AI Will Personalize the Student Journey: Administrators should explore the variety of benefits AI offers and identify ways to tailor student support for every step of their journey.

- Make online education a more complete and immersive experience to reduce university costs, overheads and consequently helping reduce the student debt as well.

- Emergence of new technologies at a rapid pace allows colleges to create new degree programs targeting specific domains of technology. The emergence of machine learning degree programs in the last few years is a prime example. This can be extrapolated to computer systems, autonomous vehicles etc having their own degree programs.

Abhinaav:

Fertile Land: College Degree Program

The following information was taken from multiple secondary sources and try to give a holistic picture of the given fertile land.

Degree Programs

An academic degree is a qualification awarded to students upon successful completion of a course of study in higher education, usually at a college or university. These institutions commonly offer degrees at various levels, usually including bachelor's, master's and doctorates, often alongside other academic certificates and professional degrees. The most common undergraduate degree is the bachelor's degree, although in some countries there are lower level higher education qualifications that are also titled degrees.

Program Administrators

College administrators make recommendations about admissions; oversee the disbursement of university materials; plan curricula; oversee all budgets from payroll to maintenance of the physical plant; supervise personnel; keep track of university records (everything from student transcripts to library archives); and help students navigate the university bureaucracy for financial aid, housing, job placement, alumni development, and all the other services a college provides.

Many administrators eventually specialize in one field, such as financial aid, in which responsibilities include the preparation and maintenance of financial records and student counseling about financial aid. Specialists in information management are responsible for coordinating and producing the majority of university publications.

Administrators who specialize in student affairs (sometimes referred to as student services) deal with residence life, student activities, career services, athletic administration, service learning, health education, and counseling. Competition begins with the onset of a specialization. At upper levels, a graduate degree in education, business, student personnel administration, counseling, or information management is required. The hours increase, and administrators spend even more time away from the office at university events or other schools.

Requirements to be an academic program director

There are stringent academic requirements for positions as college administrators. While entry-level positions in financial aid offices, registrar's offices, and admissions and academic offices often require only a bachelor's degree, a PhD or an EdD is standard among those who hold influential positions in college administrations. Candidates for administrative positions should have good managerial instincts, strong interpersonal skills, and the ability to work effectively with faculty and students. People involved in the financial aspects of administration, including administering financial aid, should have significant statistics backgrounds and mathematical skills. Computer proficiency is necessary at all levels. Universities are just that:

miniature universes. Most of their administrations involve all functions of a big corporation, even a small city, within the larger community in which they are located. A person can work for the same university for 20 years and have 20 different jobs during that time!

Present and Future

In 1865, the average-sized university in the United States employed approximately four administrators for all its students.

By 1965, the average administrative staff at a United States university averaged more than 225 people. Today the number is closer to 500 employees.

The number of administrators at a university depends on funding, except for admissions offices, which exist nearly independently of funding decisions.

As state education budgets wax and wane, the number of jobs available at publicly funded schools (roughly 25 percent of all institutions of higher education in the United States) varies.

5 years out

University administrators break into two tracks at the five-year point. People who are happy with their positions frequently begin taking classes at the university that employs them. Administrators who enjoy the profession but dislike their positions aggressively pursue other university administration positions. The majority of position switching among university administrators happens in years three to seven. Geographical mobility is frequently a factor in obtaining the best opportunities.

10 years out

Ten-year veterans have supervisory authority and administrative responsibility. Many administrators have complete responsibility for the administration of substantial budgets and become more personnel managers

than student advocates, a trend that may explain the sag that occurs between years 7 and 11 in terms of satisfaction. Pay increases; the hours remain stable.

How To Become a Program Administrator

If you're interested in becoming a program administrator, one of the first things to consider is how much education you need. We've determined that 57.9% of program administrators have a bachelor's degree. In terms of higher education levels, we found that 15.8% of program administrators have master's degrees. Even though most program administrators have a college degree, it's possible to become one with only a high school degree or GED.

Choosing the right major is always an important step when researching how to become a program administrator. When we researched the most common majors for a program administrator, we found that they most commonly earn bachelor's degree degrees or master's degree degrees. Other degrees that we often see on program administrator resumes include associate degree degrees or high school diploma degrees.

You may find that experience in other jobs will help you become a program administrator. In fact, many program administrator jobs require experience in a role such as administrative assistant. Meanwhile, many program administrators also have previous career experience in roles such as internship or program coordinator.

Challenges for Program Administrators

1. Construction and Repair

Most colleges and universities are coping with increasing numbers of students, evolving programs and aging facilities. That means many schools will be constructing new buildings and sprucing up old facilities in the near future to help attract the best and brightest students.

2. Funding

To accommodate more students, as well as add the variety of programs required to meet diverse desires, colleges and universities need funding to pay for improvements.

3. Housing

Colleges and universities have to offer housing that consists of more than just a bed and a desk. Students want the comforts of home in their residence halls, and schools are building new residence halls and renovating old housing to provide more amenities.

4. Improving the Learning Environment

Students are more likely to perform well in conditions that are conducive to learning, so colleges and universities that provide these kinds of environments will be more successful in attracting students.

Links:

<https://www.princetonreview.com/careers/40/college-administrator>

https://en.wikipedia.org/wiki/Academic_degree

<https://www.zippia.com/program-administrator-jobs/>

<https://www.asumag.com/planning-design/facility-planning/article/20851194/top-ten-issues-impacting-college-administrators>

Qianxin:

What is College Degree Program

A degree program is a defined, integrated course of study leading to an academic degree. A degree program may or may not require the declaration of a specialization (i.e. major, minor, area of concentration).

There are a number of different kinds of degrees out there in the big world of academia, they can be categorized into four different units: associate, bachelor's, master's, and doctoral.

Associate Degrees come from 2-year schooling programs that prepare students either for entry-level jobs in a number of fields, or for transferring to a larger 4-year college or university.

Associate Degrees are Earned from 4-year colleges and universities, these are the culmination of undergraduate studies. They offer a more intensive and in-depth understanding of a field than an associate degree, while often also providing a well-rounded education.

Maser Degrees are for the students who specialize in a certain area of study earn graduate degrees. Graduate schools are more difficult to get into than undergraduate, and often require students to take an exam (GRE) and work on a thesis paper or capstone project during their graduate years.

Doctoral Degrees are the highest and most prestigious form of degree, doctoral degrees prepare students to be the top experts in their field and oftentimes take several years to accomplish. Students typically have to write an intensive dissertation or complete a research project.

What is the job of a Program Administrator

Academic program directors work in trade schools, colleges and universities. They oversee several aspects of education that include research and curriculum development at the post-secondary level. They usually handle the administrative, financial and curricular aspects of an academic program and create strategic plans to develop and implement new program offerings. Also, these individuals manage annual budgets, prepare proposals and launch other initiatives for program development and implementation. Academic program directors usually have many years of experience working with students, administration and staff at the collegiate level.

Program Administrator Statistics

According to the BLS, post-secondary education administrators, which include academic program directors, earned a median annual salary of \$94,340 in 2018. In academic settings, the highest salaries were paid to those in colleges and universities, followed by junior colleges and trade schools.

Program Administrator Outlook

An increase in college enrollment is expected to create 9% employment growth for post-secondary education administrators, according to the U.S. Bureau of Labor Statistics (BLS).

Program Administrator Challenges

Academic program directors are leaders with good oral and written communications and expertise in administrative tasks, program planning,

goal setting and project management, as well as knowledge of program development and implementation. Academic program directors must have at least bachelor's degrees. Most have master's degrees in fields that include education, business management, finance and public relations.

Best practices for Program Administrator

The program administration responsibilities are outlined in the management plan, which forms the spine of a disaster behavioral health response program, and should be adjusted according to the program's ongoing needs assessment. The goal of the plan is to ensure that all of the interrelated components of the disaster response plan work together and to assign accountability so that each department and staff member is clear on their roles and responsibilities.

Perspectives on Program Administrator

In the spring of 2016, IWPR undertook a major survey of program administrators to help fill this gap in the literature. The responses came from administrators at 168 job training programs across 41 states and the District of Columbia. The programs represented every region of the country and operated in urban, suburban, rural, and a mix of community types. Nearly 60 percent of the programs served mostly female trainees; roughly 40 percent trained mostly men. Programs most commonly trained participants for jobs in administrative and clerical work, health science, building and construction trades, and manufacturing.

Whatever the location, size, demographics, or other characteristics of their program, virtually every administrator agreed that supportive services were critical to job training success. Only one in five administrators, however, thought they were meeting their clients' support needs well. Administrators most commonly attributed the shortfall in services to a lack of funding. Though 99 percent of program officials wanted to provide more supportive services, only about one-third said they were likely to expand their supports in the near future.

Technology used by Program Administrator

- Proven experience as a program coordinator or similar role

- **Experience in budgeting and fundraising**
- **Familiarity with industry-related laws and regulations**
- **Knowledge of recruiting processes**
- **Tech-savvy with working knowledge of time and project management software (e.g. Confluence, Basecamp)**
- **Strong organizational and leadership skills**
- **Exceptional communication skills**
- **Analytical thinking**
- **Problem-solving aptitude**
- **BSc/BA in Business or relevant field**

B. Customer Value Space

1. Buyer and Purchasing section

The buyer: The head of the department or the head of the university. If the institution is large enough and has its disjointed type of operation, then the department head can be the buyer. But

for universities like CMU, we are using a unified system, so the buyer is the head of the university.

Purchasing Criteria:

1. **Records:** Program administrators want to keep the conversation trails with the instructors to avoid future confusion.
2. **Customization:** Different departments have different priorities regarding curriculum planning, so the solution should be customizable.
3. **Compatibility:** The new tool should be compatible with different stakeholders such as program administrators and instructors.

Budget: There is usually no specific budget.

Purchasing process:

There should be a proposal to the head of the institution, then the head may assign someone from the computer service team to check the feasibility and efficiency. Then the head will have a meeting with program administrators from different programs and other stakeholder representatives (for example instructor representative) to discuss how they think of this solution. Based on this justification, the head will then proceed with the purchase.

People involved:

Head of the institution, computer service team, program administrators, other stakeholder representatives

2. Customer Benefit Analysis:

(1) **Reduced Time Spent (Quantitative):** The amount of time spent on the tasks involved in curriculum planning will be reduced by 50% by using our product. This is not the elapsed time, rather it is just the time spent on tasks related to curriculum planning.

Metric: The amount of time spent on tasks related to curriculum planning can be measured to understand the impact.

(2) **Working Satisfaction (Qualitative):** Increase PA's working satisfaction and have more time going around other processes to make sure everything is going well.

Metric: Although this can be considered qualitative, we can use the amount of time spent on each task as a metric to measure work satisfaction. The less time spent, the better. We can also survey to first learn the current satisfaction level and then compare with the satisfaction level after using our product

3. Market Analysis

Market Segment Profile			
Segment name	Collaboration with course instructors	Collaboration with other program administrators	Collaboration with university-level Staff
Segmentation Variables and Values Variable: Use Case	Schedule the course, decide on the course description and course resources	Compare course schedules from different programs	Apply for classrooms
Segment Size	According to NCES, there are nearly 4000 degree-granting universities. Take CMU as an example, there are 60 departments and in the EPP department there are 60 courses. Here we don't consider cross-list courses and multiple instructors for one course cases, then assume one course has one instructor. So the market size is $4000 * 60 * 60 = 14.4$ million	Take EPP as an example, the programs EPP needs to collaborate on introducing new cross-listed courses or scheduling a course whose instructor teaches in both programs are MISM, MSPPM and Tepper. So I will assume 3 for all programs. So the market size is $4000 * 60 * 3 = 0.72$ million	Usually there will be one or two specific faculty who are managing the school classrooms. Here we take two, the market size is $4000 * 2 = 8000$
Segment Trends	Normal (The market is stable)	Normal	Normal
Segment Entry Barriers	(1)Price:Existing competitors are Free (2)Learning cost:There is nearly no learning cost for existing competitors (3)Records: Email is a good way to keep records	(1)Price:Existing competitors are Free (2)Learning cost:There is nearly no learning cost for existing competitors	(1)Price:Existing competitors are Free (2)Learning cost:There is nearly no learning cost for existing competitors

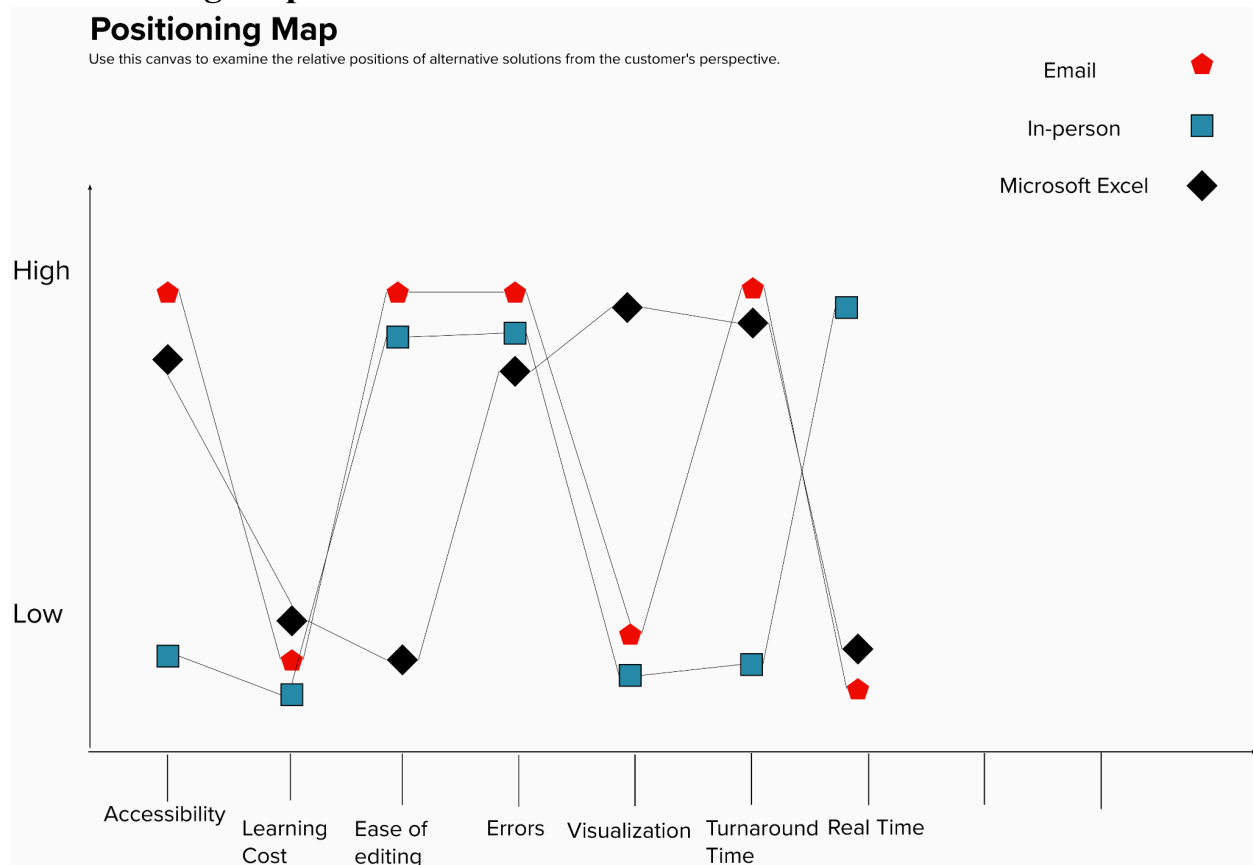
Market Segment Profile

Segment name	Supervisor	Stakeholders	Viewer
Segmentation Variables and Values Variable: Firmographic (Job Role)	Program Administrators, Administrative Assistants	Faculty, Teaching Assistants	Employees in Registrar's office
Segment Size	Assuming there are approximately 15 degree programs on average in a university with a program administrator for each program. There are about 4000 universities, hence that would be conservatively about 60000 PAs.	There are about 600,000 professors in US universities. Any purchase by a university would include all faculty and hence this market capture would be defined by the number of universities captured.	Assuming about two employees per university who require viewing permission, it would be about $4000 \times 2 = 8000$ professionals.
Segment Trends	Normal	Normal	Normal
Segment Entry Barriers	<ul style="list-style-type: none"> (1) Usage depends on the program administrator's responsibilities, and hence may not be attractive to every PA. (2) Price: Existing alternatives are low-priced (3) Email: Very accessible 	<ul style="list-style-type: none"> (1) Email is most common way for faculty to communicate (2) Learning cost: There is nearly no learning cost for existing competitor 	

4. Competition Analysis

	Course Info management	Schedule Visualization	Communicate with stakeholders	Real-time Scheduling	AI based Insights
Excel		✓			
S3	✓				
Google doc		✓		✓	
Email			✓		
Whiteboard		✓			
★ SemPlan	✓	✓	✓	✓	✓

5. Positioning Map



6. Customer Interview Summaries

Pranav:

Summary of Customer Interview

Project Team Team 4

Interviewing Team

Interview Facilitator **Abhinaav Singh**, Product Manager, TartanWorks Inc.

Interview Recorder **Pranav Prasad**, Product Manager, TartanWorks Inc.

Customer Interview

Customer **Brad Eiben**, Executive Director, MS in Product Management, Tepper School of Business at CMU

Interview Date/Time October 7, 2021, 3:00 P.M.

Interview Location

<https://cmu.zoom.us/j/96425743649?pwd=bWlTdIRXa1NTMXc5QzA3ZDV6Vi9xQT09>

Interview Records

-- Recording:

https://cmu.zoom.us/rec/share/3u6unU3xuO0D_DHLU0OrVwN-8sah8PMCgctjLO42wf3-1bxRIyGSMiE7LNdAdKgi.iPqfRrg3AGDBWz_-

Access Passcode: H6H=.ycN

-- Artifacts: none

Key Findings

Here's what we discovered from our interview:

1 - Mr. Eiben, as an Executive Director, does not handle the day-to-day of curriculum planning. This includes the tasks of course scheduling, collaborating with faculty to decide the timings and schedule, collaborating with other program directors to resolve schedule clashes etc. For the Tepper School of Business, this is handled by the Student Services Center.

2 - Kevin, the Student Services in-charge for the MSPM program joined the interview to clarify all the matters of how it is done in the Tepper School of Business. This gave us an insight as to what the product market should be for the

problem we are trying to address - Program Administrators and any academic assistants who directly deal with the problem of curriculum planning. Mr. Eiben, as an Executive Director, does not play a major role in this process, and hence would not be the ideal customer for the product. He is in charge of signing off on the final plan that the Student Services decides, and only takes part in an active discussion about course scheduling when there is a conflict to resolve.

3 - The Student Services Center in Tepper uses a service called CAS, which provides an interface to view the courses of Tepper across all Tepper programs (MBA, MSPM etc) and make changes to the schedule. This would be the direct competitor to solve the problem that we have chosen.

4 - Communication between the Student Services and faculty happens via email. There is no specific metric for the number of days that Kevin could provide for this communication. The record of all communication is still only on email, and hence information ends up in a pile of emails.

5 - There's no exact desired outcome that Brad and Kevin could define as an optimal timeline for communication. The benefits gained by solving the problem of collaboration during curriculum planning - more time to focus on other facets of curriculum planning, more employee satisfaction due to clearer communication. No specific metrics for the benefits were provided.

6 - On the CAS platform, there is no interface to communicate with faculty and other program administrators. This could be an improvement area that Kevin agreed with.

Improvement Opportunities

Here's where we could improve our interviews.

1 - More probing questions can be asked, basically the "Why?" for any information that is provided by the interviewees.

Abhinaav:

Part 1. Interviewing Team

Interview Facilitator

Pranav Prasad, Product Manager, TartanWorks Inc.

Interview Recorder

Abhinaav Singh, Product Manager, TartanWorks Inc.

Part 2. Customer Interview

Customer Nesli Ozdoganlar, Sr. Acad. Program Manager for MS E&TIM

Interview Date/Time October 7, 2021, 12:30 P.M.

Interview Location

<https://cmu.zoom.us/j/98544931508?pwd=OUh2bSt3ZUhvUFlITYUoxT3RzaS84Zz09>

Interview Records

--recording:

https://cmu.zoom.us/rec/share/MF1_gnluvs7_tmofx0amuY6NCd1vENmWqAe_snH8FdvLevYXDxsBnJkCbzlvk6a.SC1b-3zhxRMuZebZ

Password: rK66Yb%4

--artifacts: none

Part 3. Key Findings

Here's what we discovered from our interview:

1 - She currently uses an excel sheet to store the courses. Even-though she does not have a lot of courses to schedule (She has to schedule about 6-8 courses every semester. In comparison, EPP department has about 40), she uses an excel sheet to do the same. This is what we expected too, as excel sheets make it hard to collaborate with others.

Part 4. Improvement Opportunities

1 - We could have probed harder to get a better understanding of the metric for success. It was admittedly hard to gather it as she was unclear about it herself, but we could have spent more time on this.

2 - We could have spent more time on introductions. It helps to establish rapport and we spent less time on it.

Zeyuan:

Part 1. Interviewing Team

Interview Facilitator *Johnny Lau, Product Manager, TartanWorks Inc.*

Interview Recorder *Zeyuan Li, Product Manager, TartanWorks Inc.*

Part 2. Customer Interview

Customer Sean Beggs, CMU, Heinz College, Director of
Master of Information Systems Management program
(MISM)

Interview Date/Time *October 6, 2021, 10A.M.*

Interview Location *<https://cmu.zoom.us/j/9383051269>*

Interview Records

- Recording:

https://cmu.zoom.us/rec/share/2-kKqV5x3Vm64bFRyGgVd_s1sL3z8iW1AKCfciM5dV0Woy6VJUDOE39-ZDiaafZo.U77Lm-5ChCbPd7b8 Passcode: 2dy9=Wk=

- Artifacts: none

Part 3. Key Findings

Here is what we discovered from our interview:

(PA is abbreviation of program administrators)

1. New sights on customer problem

(1) When we told the interviewee our problem category is collaboration during planning the curriculum, it seems not clear. This time, Sean first thought we were dealing with planning a new curriculum or roadmap for a new program, so I think

when we introduce our problem, we can share some examples during planning the curriculum like course schedule and resources to help them understand.

(2) In CMU, each department has their own classroom. If needing extra rooms, then should apply to university to borrow some.

(3) For the course schedule, there is another problem which is some course time slots are very popular among instructors such as 10:30AM to noon. But certainly, PA can't allow all instructors teaching at the same time because of room constraint and students availability and need to do the balancing work.

(4) The job to be done for planning the course is more like a daily task. It will take 6 weeks (2 weeks planning, 2 weeks talking to instructors and 2 weeks to update) to do this job but each day won't take long.

2. Validation

When Sean understood the problem that we are trying to solve, he said there is definitely a need for that.

3. Benefits

(1) Increase community bonding. Make it transparent and ensure everyone knows how the operation is working. Instructors can understand the different things and competing forces in scheduling. It will make each one closer to the community as a body and achieve the overall goal.

(2) Centralize the moving parts. Instructors and PAs understand and see upcoming issues with the operation

(3) Avoid future problems. If instructors can share more information for example, what nontraditional time are they willing to teach, then PAs can get more insights and additional information. It will then Increase institutional knowledge. When unforeseen hardship comes, they can avoid future problems.

(4) Increase Pa's working satisfaction and have more time going around other processes to make sure everything is going well.

4. Alternative solutions

(1) Email. Currently Pas mainly use email to discuss the course schedule, course resources and classroom assignment with instructors.

(2) Excel. The temporary course schedule is stored in Excel. They also use Excel to do the visualization and avoid course conflicts.

5. Buyer, budget and buying process

Sean believes the answer to who is the buyer depends on the institution. If the institution is large enough and has its disjointed type of operation, then department level can be the buyer. But for universities like CMU, we are using a unified system, so the buyer is the administrator of the system. Sean also believes PAs can make a great influence during the buying process. The university level needs to make PAs satisfied.

Part 4. Improvement Opportunities

Here is what we could improve our interview:

- (1) When asking questions, we can give some examples to help them understand the question, or they may give us some answers which don't meet our expectations.
- (2) Know our expectations from this interview. As this is a value interview so we need to balance and allocate the time properly, for example, I will only take the first 10 mins talking about the problem and the last time to discuss the value.

7. Customer Interview Files

Deanna:

https://drive.google.com/drive/u/1/folders/1NE_fA0swYSalGdgEZLXkd-xJaX2sK6rb

Brad:

<https://drive.google.com/drive/u/1/folders/1ZQ6w4g3MH1kd73voR4nAeG-bvvawlxfN>

Sean:

<https://drive.google.com/drive/u/1/folders/1hSzIIRZ2vTnbHnBu3pnit0BE6v4y4kp->

Nesli:

<https://drive.google.com/drive/u/1/folders/1Du4TzX7WhFSxlDuEqEwubBzAg7P3--eS>

C. Solution Space

a. Goal

Reduce the total time spent on curriculum planning by at least 50%

b. Purpose

Capture a share of the market of 4300 universities, with each consisting of an average of 15 university departments to eventually become the leading curriculum management software.

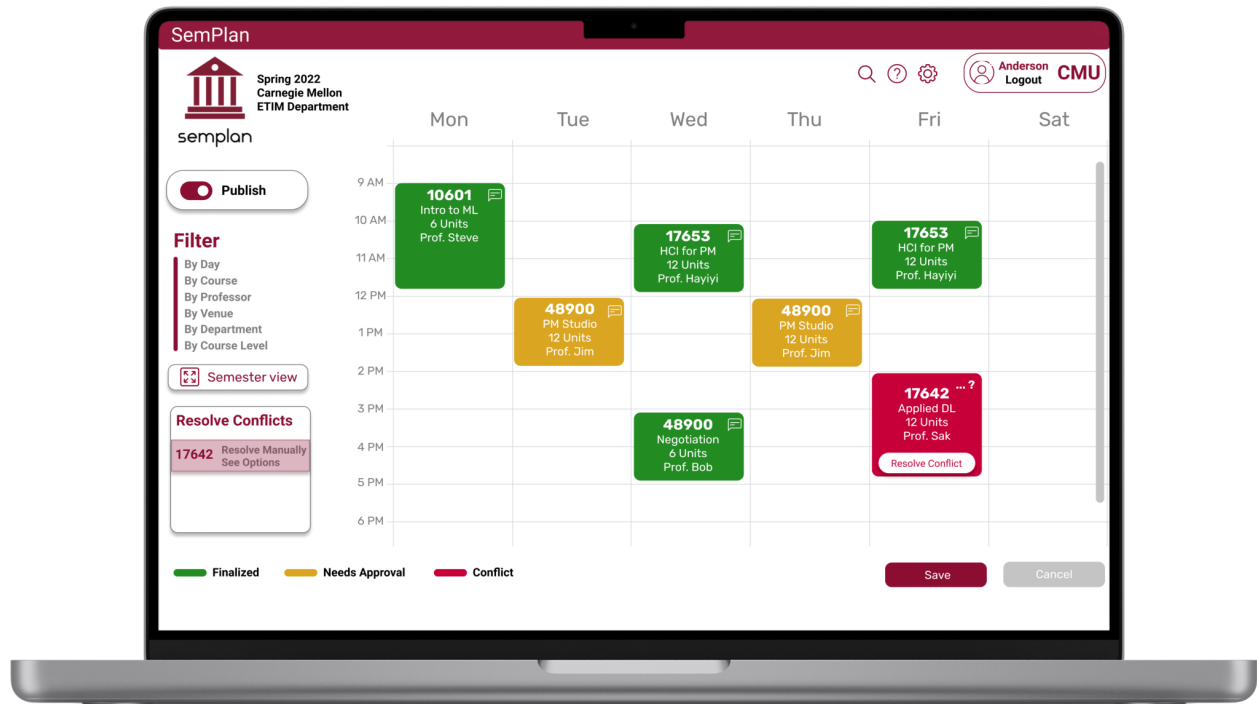
c. Product Category (type)

Intelligent Curriculum Management Software

d. Main Functionality

- (1) Use machine learning algorithms to form the first version schedule using the past semester schedule data considering the program requirements (class size, classrooms, timings, faculty), course topic, and any constraints. Additionally program administrators (PAs) can also choose to manually input the course information.
- (2) Show the schedule directly with high readability, PAs can also check schedules from other departments and can make comparisons easily.
- (3) Multiple users can make real-time changes to the schedule on the calendar which others can see right away (similar to Google Docs, MURAL etc.)
- (4) Access to program administrators as well as all other stakeholders like faculty
- (5) Built-in conflict finding function to help find the potential conflicts.
- (6) Built-in messaging to record communication and helps avoid long email chains.

e. Visual



f. Positioning

An intelligent one-stop shop for everything related to course scheduling work. One platform for all needs.

g. Platform

Web Application, Android App, iOS App

h. Mental Model

When PAs think of planning course schedules, they are thinking of a calendar, from Monday to Sunday. Currently, they use excel to form this kind of visual map (for example look at Fig 1). We shall create a calendar-like application which is initially filled with a schedule generated by a machine learning algorithm. The algorithm takes the following data as inputs - schedule of previous years, current courses to be scheduled, classrooms allocated across departments, any extra constraints imposed by the program administrators, and faculty requests about timings. After this is generated, the program administrators and all other stakeholders will be able to see the schedule and change it on the application in real-time. Clicking on any slot that is reserved for a course will bring up a plethora of options like course information, faculty, course materials required, and there will exist version control for the same (like Google Docs where you can see the revision history). We are viewing the tool as a one-stop shop for everything related to course

Spring 2022 E&TIM Courses					
	Monday	Tuesday	Wednesday	Thursday	Friday
19680/94855 E&TIM Seminar on Innovation Management in Practice (8:35 am - 9:55 am) 6 units - Jimmy Williams (75 with the cross listing number)					19-689 Finance for Innovation Management (9:05 am - 11:55 am) 6 units (mini 3) - Bob Wasson (30 max)
		19-682/94857 Strategy & Management of Technological Innovation (10:10 am - 11:30am) 12 units - Daniel Armanios (70 with cross listing number)		19-682/94857 Strategy & Management of Technological Innovation (10:10 am - 11:30 am) 12 units - Daniel Armanios (70 with cross listing number)	
19-697 Lean Product Development (2:30 pm - 4:20 pm) - 12 units - Bob Monroe - fulfills ETIM project course requirement (45 ETIM students)	19-670 Quantitative Entrepreneurship: Analysis for new Technology Commercialization (2:30 pm - 4:20 pm) 12 units Instructor:TBD (25 ETIM students)	19-697 Lean Product Development (2:30 pm - 4:20 pm) - 12 units - Bob Monroe - fulfills ETIM project course requirement (45 ETIM students)	19-670 Quantitative Entrepreneurship: Analysis for new Technology Commercialization (2:30 pm - 4:20 pm) 12 units Instructor:TBD (25 ETIM students)		
19603 Data Science for Technology, Innovation and Policy (4:20 pm - 6:00 pm) 12 units - Alex Davis (75 max for ETIM)		19603 Data Science for Technology, Innovation and Policy (4:20 pm - 6:00 pm) 12 units - Alex Davis (75 max for ETIM)			

Snapshot of the current schedule being used on Excel

j. Total solution (complements)

Contact with instructors, program requirements, program vision, school rules

k. Product Vision, Product Roadmap, MVP

Product vision: One-stop shop for every task involved in curriculum planning for an academic program administrator.

Roadmap:

Jan 2022: Start Building MVP

May 2022: Basic MVP with Calendar-like canvas, real-time scheduling and version management and algorithm forming schedule

June 2022: Release 1.0 after testing

August 2022: In-App Messaging and Notification system complete

September 2022: Release 2.0 after testing

October 2022: Explore extra features like automatic messages and emails using machine learning, and any other machine learning opportunities in the application long with UI improvements.

MVP: Calendar-like canvas, real-time scheduling and version management and algorithm forming schedule

l. Features and benefits

- Automated pre-fill of courses using machine learning on historical schedule data
- Real-time scheduling (like Google Docs and MURAL)
- In-app messaging
- Login and Profile
- Notification and Reminder System

- Automated Emails

Benefits:

- Eliminates most of the manual entry into the application
- Less miscommunication due to real-time visibility
- Email communication eliminated with in-app messaging and the notification system
- Transparency among all stakeholders with a centralized platform

m. Technology

Full-Stack Web Development

Machine and Deep Learning

iOS/Android App Development

Distributed Systems

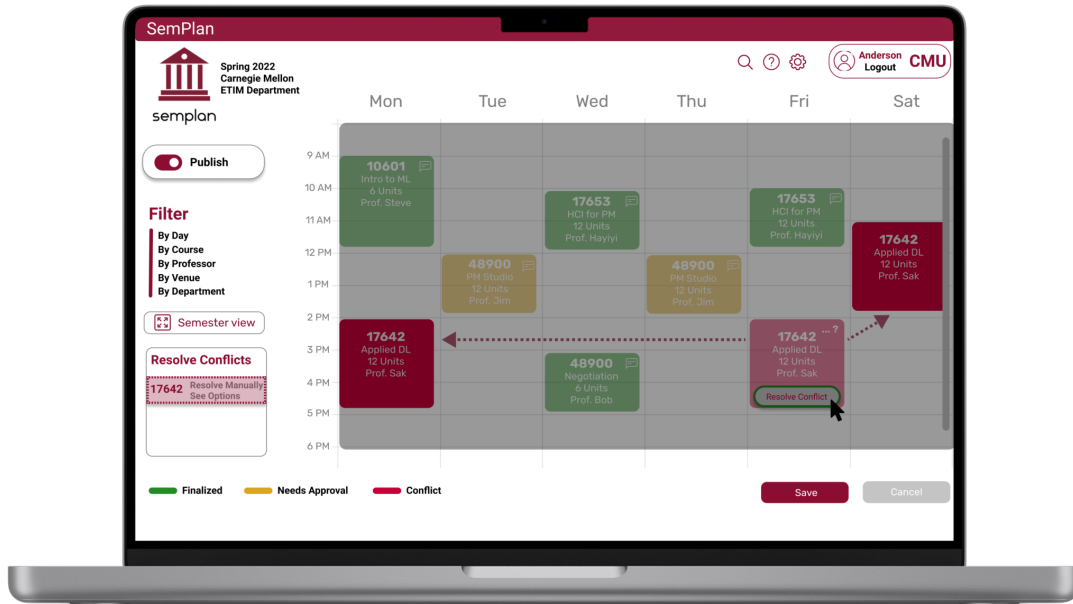
n. Data

- Historical data
- Department data
- Faculty/ course list
- Classroom data
- Class size
- Office Hours timings
- Additional constraints

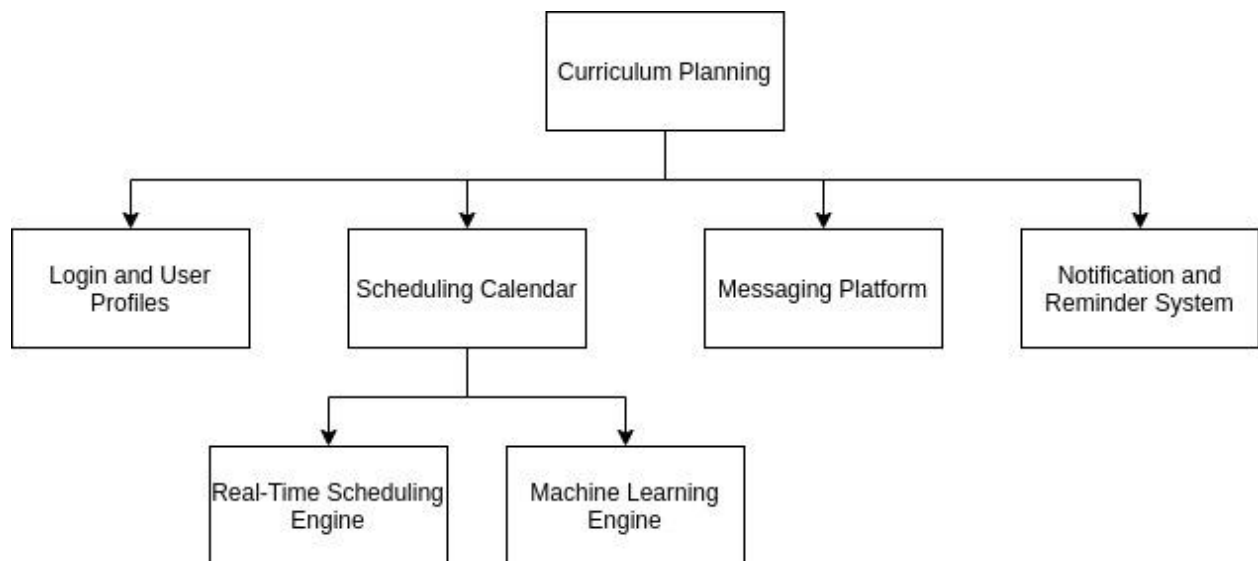
o. User View

The top screenshot shows the 'NEW SEMESTER PLANNING' interface. It includes a header with the SemPlan logo, Carnegie Mellon ETIM Department, and a user profile for Anderson CMU. The main content area has two sections: 'Generate Using Algorithm' and 'Generate From History'. The 'Generate Using Algorithm' section has a checked checkbox and contains two sub-sections. The first sub-section has an 'Add Constraint' button and a dropdown menu with 'Time Constraint', 'Instructor Constraint', and 'Venue Constraint'. The second sub-section has an 'Add Course Manually' button and input fields for 'Enter Course Name', 'Enter Course Number', 'Enter Instructor Name', and 'Add Other Details'. The 'Generate From History' section has an unchecked checkbox and a 'Load From Previous Semester' button with a 'Select Semester' dropdown. At the bottom right are 'Generate Semester Plan' and 'Cancel' buttons.

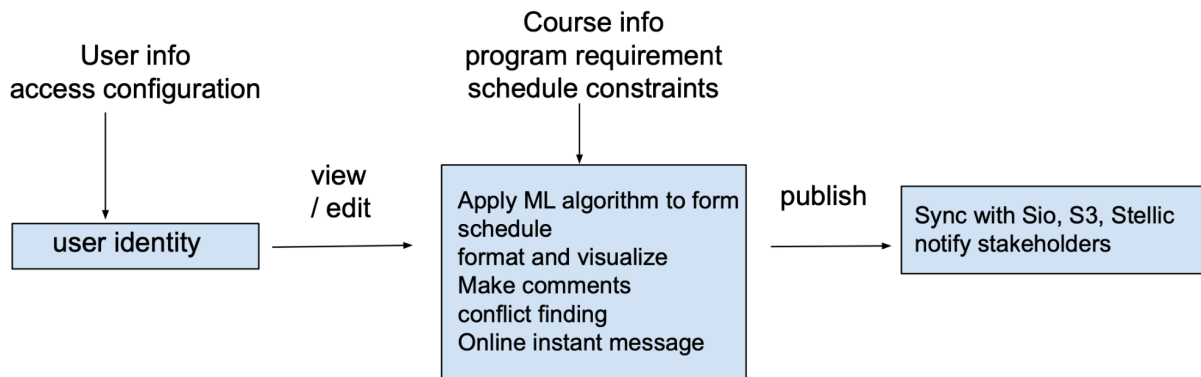
The bottom screenshot shows the resulting semester plan. It includes a header with the SemPlan logo, Spring 2022 Carnegie Mellon ETIM Department, and a user profile for Anderson CMU. The main content area has a 'Publish' button and a 'Filter' section with options: 'By Day', 'By Course', 'By Professor', 'By Venue', 'By Department', and 'By Course Level'. There is also a 'Semester view' button and a 'Resolve Conflicts' section with a '17642 Resolve Manually See Options' button. The plan is displayed as a grid with days of the week (Mon, Tue, Wed, Thu, Fri, Sat) and times (9 AM to 6 PM). Courses are represented by colored blocks: green for 'Finalized', yellow for 'Needs Approval', and red for 'Conflict'. The courses shown are: 10601 Intro to ML & Units Prof. Steve (Mon 9 AM-10 AM), 17653 HCI for PM 12 Units Prof. Hayiyi (Wed 11 AM-12 PM, Fri 11 AM-12 PM), 48900 PM Studio 12 Units Prof. Jim (Tue 12 PM-1 PM, Thu 12 PM-1 PM), 17642 Applied DL 12 Units Prof. Sak (Fri 2 PM-3 PM), and 48900 Negotiation & Units Prof. Bob (Wed 4 PM-5 PM). A legend at the bottom indicates the color coding: green for Finalized, yellow for Needs Approval, and red for Conflict. At the bottom right are 'Save' and 'Cancel' buttons.



p. System View



q. Information View (if applicable)



r. Deployment View

Mail server, configuration data storage, user access management, data exchange with S3, SIO and Stellic webpage, mobile access, Desktop/laptop computer access

s. Fulfillment View.

Our solution is a configured-To-Order (CTO) option. As program administrators in different colleges or departments have different workflows for course scheduling, our product will adapt to specific requirements from them.

t. Critical requirements.

Functional:

- (1) As a Program Administrator/instructor, I want a system that can form a reliable course schedule automatically, so that it can make my work easier.
- (2) As a Program Administrator/instructor, I want a system that can make comparisons with schedules from other departments and apply filters, so that it can improve the schedule readability.
- (3) As a Program Administrator/instructor, I want a visual representation of course scheduling data so that I can quickly mentally process the course scheduling information.
- (4) As a Program Administrator, I want a semester curriculum planner that can help me plan my semester in real time with all other stakeholders like other Program Administrators and instructors so that the courses can get planned quickly.
- (5) As a Program Administrator, I want a curriculum planner that can find potential conflicts by itself, so that the course plan is more accuracy
- (6) As a Program Administrator, I want to be notified whenever an instructor needs a resource from me in real time, so that the course can go on unhindered.

- (7) As an instructor, I want a system that helps me request my Program Administrator for specific course related resources (like HBR articles) at any time during the semester so that I can teach effectively.
- (8) As an instructor, I want a schedule that is already prepared for me unless there is a change in timings/ details from previous semesters so that I can use that saved time for other productive activities.
- (9) As an instructor, I want more transparency about which time slots are being allotted to which instructors/ courses so that I feel more connected to the university and how it works.
- (10) As a Program Administrator, I want a system that helps me convey messages to the instructors in my department during the semester so that I can notify them of important announcements/ requests in real time.

Unfunctional:

- (1) The user interface should be concise, so that program administrators can easily find desired information
- (2) Each course should have a unique course number, so that program administrators can differentiate each course.
- (3) The system should be scalable so that as the university becomes bigger/ other departments get added, the system can handle the added user load.
- (4) The system should be customizable so that different departments with different needs can use it to plan their semester course curriculum.
- (5) The system should be hosted on the web, so that it can be accessible from anywhere.

u. Experiment cards.

(Testing part)

Assumption:

When we are trying to set the MVP and roadmap, we do not have evidence for which feature from our solutions matters most to our customers

Hypothesis:

We believe that the top three important features for our customers are calendar-like schedule visual, real-time scheduling and algorithm forming schedule.

Test Method:

To verify that, we will refer to the feature sorting cards method during the further interview with our customers. The cards are Calendar-like canvas, Sync with s3, Real-time scheduling and version management, Algorithm forming schedule, Comparison, Search / Filter, instant messaging system, Conflict finding.

Test Metric:

Measure what are the top three features recognized by our interviewees.

Test Criteria:

We are right if the top 3 features are calendar-like schedule visual, real-time scheduling and algorithm forming schedule.

(Learning part)

Observation:

We will first number the eight features:

Calendar-like canvas(1), Sync with s3(2), Real-time scheduling and version management(3), Algorithm forming schedule(4), Comparison(5), Search / Filter(6), instant messaging system(7), Conflict finding(8)

The answer from four interviewees are:

1-8-3-4-5-6-7-2

1-3-4-2-8-5&6&7

1-8-3-7-4-6-5-2

4-1-3-2&7&4&6&5

Learning:

Combining the answer from our interviewees, we learned that Calendar-like canvas(1), Real-time scheduling and version management(3), Algorithm forming schedule(4) are the top three features which match our expectation.

Decisions and Actions:

Therefore, for MVP we will focus on these three features.

v. Summary of Customer interview

Interview with Sean:

Summary of Customer Interview

Project Team *Team 4*

Part 1. Interviewing Team

Interview Facilitator *Johnny Lau, Product Manager, TartanWorks Inc.*

Interview Recorder *Zeyuan Li, Product Manager, TartanWorks Inc.*

Part 2. Customer Interview

Customer Sean Beggs, CMU, Heinz College, Director of Master of Information Systems Management program (MISM)

Interview Date/Time *November 23, 2021, 10:30A.M.*

Interview Location *<https://cmu.zoom.us/j/9383051269>*

Interview Records

- Recording:

<https://cmu.zoom.us/rec/share/NqCQ2S5xS3bnGOueyO3285tE39BM4CZbRsibDMBGVJRMb4d4pSbMkuvNQDFhpW26.uqbDLJbJK4pAXLvz>

Passcode: zn6Q?+rm

Artifacts: none

Part 3. Key Findings

1. Which parts were validated:
 - (1) Sean said the idea of the sync logic with S3 was very good.
 - (2) Sean said as long as program administrators can see the conflicts, it will help save a lot of time.
 - (3) Sean said the real-time modification can help instructor know the competing strength so it's a good idea.
 - (4) Sean likes the instant messaging function very much, he said it's perfect.
2. Which parts were invalidated:
 - (1) Put a limit on how many schedules to compare, or it will be messy to see all the information. Sean shares an example, if we compare the schedule from three different departments, it will be so much info and the readability is low.
 - (2) When there are still conflicts in the schedule, the publish button should be greyed.
3. New idea on the solution
 - (1) Match the courses in different status with different colors
 - (2) Add draft function for schedule (save current progress).
 - (3) Consider the courses with a long waitlist for the past semesters in the algorithm. Should be a notification there just like a conflict.

Part 4. Improvement Opportunities

Here is what we could improve our interview:

1. During the interview, I think my teammate should not only focus on sharing what's our solution and what we are going to do next. We need to stop after each function and ask questions like how do you think of this feature, does it meet your expectation, or do you think it will solve the problem? Because the interviewee may want to make some comments, but if we keep talking and don't give him the chance to talk, he may forget later, and we will lose an important insight.
2. I believe each of the interviewee should be fully prepared for the interview. For this meeting, my teammate is not very clear on some features like how the sync works. I am eager to help out but it may make our interviewee feel we are not serious or professional.

Interview with Nesli:

Interview with Brad:

Summary of Customer Interview

Project Team Team 4

Interviewing Team

Interview Facilitator **Abhinaav Singh**, Product Manager, TartanWorks Inc.

Interview Recorder **Pranav Prasad**, Product Manager, TartanWorks Inc.

Customer Interview

Customer **Brad Eiben**, Executive Director, MS in Product Management, Tepper School of Business at CMU

Interview Date/Time Nov 23, 2021, 1:00 P.M.

Interview Location

<https://cmu.zoom.us/j/96425743649?pwd=bWITdlRXa1NTMXc5QzA3ZDV6Vi9xQT09>

Interview Records

-- Recording:

https://cmu.zoom.us/rec/share/B9_O1HKP1TSZ7H4ueV3HGA6LQmHBhP1qbRxdyVzWNYqgFtL6LI5Q5i-VEftRqqfz.zu2J-hRieJy0q2Pb?startTime=1637690528000

Access Passcode: H6H=.ycN

-- Artifacts: none

Key Findings

Here's what we discovered from our interview:

- 1 - Mr. Eiben recognizes the fact that he is not going to be the primary user for the product as the Student Services Organization handles this in the Tepper School of Business. He gave his opinions on the basis of how he would be using it.
- 2 - One major use case he said that needs to be addressed is that there should be no requirement for emails to be sent to the faculty at all. Ideally the faculty needs to be able to input their availability and the need for the administrator to reach out to the faculty should be eliminated. This will avoid a lot of the manual work to reach out and wait for a response.
- 3 - He mentioned that the tool can be expanded to include more features. He mentioned that it can be the main interface for program administrators and faculty to decide the course strategy for the course. Features like TA recruiting, office hours, campus events, course evaluations of previous years and such will help improve having all the data readily available on the same application. The tool is a collaborative workspace with a visual work template which has everything related to curriculum planning tied into a single application.
- 4 - A slack type chat for all stakeholders involved in the course can be added. This would make it a real-time workspace.
- 5 - Making the algorithm more advanced. The example he provided is that his students have classes in Tepper and SCS and hence the distance should be accounted for while making a schedule. This is data that can be learnt on the fly by the ML algorithm.
- 6 - Idea for the UI: Include university holidays and break days in the calendar as professors generally seem to plan without accounting for these days. Make it look a little like the UI or

include it as an add-on for Outlook. He acknowledged that maybe it is not the best idea as all features will not be able to be made available on that interface.

Improvement Opportunities

Here's where we could improve our interviews.

1 - The first 15 mins went in explaining the solution without much opportunity for Mr. Eiben to ask questions. Hence the explanation could have been shorter, or prompt the interviewee to ask questions or ensure that he has understood.

w. Interview Links

Brad:

https://drive.google.com/drive/u/1/folders/1-h6R8SvTrBiiUavkv_akk2Oc6puAo1aM

Deanna:

https://drive.google.com/drive/u/1/folders/1OC15e6kIwQ0FFNzcSj_zWSdA28FE1R9b

Nesli:

<https://drive.google.com/drive/u/1/folders/1G-Y-AAmqfxOul88aJT5tL2jdPrPEWHGg>

Sean:

https://drive.google.com/drive/u/1/folders/1MvcBl7E9sLVxI_y96MgpHmWS4VyxQm2o

D. Customer Value proposition

a. Pricing decisions

Pricing setting strategy:

We first compare the prices from our competitors. The one time fee for excel is \$140. The annual subscription fee for the Google doc business version is \$70.

Then we apply the “A similar product but for a different problem or market” method. By referring to Canvas LMS, we find the the price distribution for Canvas is below:

Starter: \$120 per year for 50 users and 250 MB of storage. Mini: \$220 per year for 100 users and 500 MB of storage. Small: \$390 per year for 200 users and 1 GB of storage. Medium: \$870 per year for 500 users and 2.5 GB of storage.

After taking into the consideration of both competitor price and Canvas reference, we decided to apply an annual subscription charging method. The price starts from \$120 dollars and the price will change depending on how many programs are in the organization.

Pricing metric:

Organization size(How many programs are in this organization)

We believe this metric is easy for both customers and us (as designers) to measure. It also matches the expectation of the customers, as the more time they are using and the more programs they have, the more benefits they can get from our solution and the more money they need to pay.

Payment structure:

Items to be priced: Our online course scheduling collaboration software access

How often the price be charged: Per year (Reason: As some universities apply a quarter system, some apply a semester system, in order to be consistent, choose one year)

When will payment be required: Paid annually

Who will pay for the product – the organization (University computer service team)

Price:

Organization Size	Price
1	\$120
10	\$1000
100	\$8500
200	\$15000
Unlimited	\$18000

b. Customer purchasing justification

Semplan Cost Benefit Analysis(Take CMU as an example with 100 programs)		
Costs		
Category	Item	Price
From the perspective of the organization	Software access	8500
	Time desired to make the decision	500
	Cost of integrating the tool into the academic system	1200
	Maintenance of application	800
From the perspective of the user	Time committed to learn how to use this solution	1000
Total costs		12000
Benefits		
save over 50% time of course scheduling task(about 30 hours per year)		90000
Boost working satisfaction		/
Total Benefits		90000
Benefit Cost Ratio		7.5 : 1

Explanation:

Software access: annual subscription fee based on the organization size. As the organization has 100 programs, it's \$8500.

Time desired to make the decision: from our interview, during the buying process, the university may invite PA and instructor representatives to discuss the

feasibility of the new product, here is mainly the time cost. The hourly salary for PA is \$30, then make the estimation of \$500 for all participants.

Cost of integrating the tool into the academic system: as our solution needs to sync with S3, Sio and stellic, We suppose it needs the computer service team(10 people) work 3 hours, the hourly wage is \$40, so then the cost is \$1200

Maintenance of application: The organization computer service team may need to help PA solve some problems during their usage or fix some bugs. It may cost 20 hours of work per year. As the hour wage is \$40, so \$800

Time committed to learn how to use this solution: Suppose each program has one PA, as we have 100 programs now, so we have 100 PAs. We believe it will only cost 20 mins to learn how to use our product. Suppose the hourly salary for PA is \$30 so the cost is \$1000.

Save over 50% time of course scheduling task(about 30 hours per year):

Time span for course scheduling work per year	Total time spent on daily course scheduling work	Time saved by our solution	Hourly pay of Career Advisors	Total money saved for one PA per year	Total money saved an organization with 100 programs
8 weeks	1.5 hrs per day	30 hours	\$30	\$900	\$90000

Through our third round interview, our interviewees are supportive to our 50% reduction assumption, so we will apply this value here.

Boost working satisfaction: The time saved is the largest and most straightforward benefit for our solution, so here we don't calculate the benefit of improved working satisfaction.

Reason for a compelling offer:

From the benefit-cost analysis, we can see if CMU(with 100 programs) decides to buy our product, then the \$12k cost will bring \$90k benefits. The benefit-cost ratio is 7.5 : 1. Also, it's a conservative estimation as we didn't take into consideration the improved working satisfaction and the learning cost and decision cost for following years won't exist. Even though we believe the benefit-cost ratio of 7.5 is a clear sign that our product is compelling.