TEAM 4

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PRODUCT WORKBOOK

Managing Academic Degree Programs

Oct 18, 2021

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Narrative

Michael is an Academic Program Administrator at Carnegie Mellon University. His 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. He has more than a decade of experience managing academic degree programs, and is currently managing the MS ECE Program at his university. While there are several parts of his job that he enjoys, there are many other tasks in the job that he finds difficult to navigate with ease on a regular basis. Michael is looking for solutions to make his life easier, while benefiting his organization as a whole!

As an Academic Program Administrator, Michael works on a multitude of different tasks. During the season before the semester begins, he works on planning the curriculum and orientation. During the semester, his major role is to advise students on their careers, and ensure that they are on the right track to achieve their goals. Other major responsibilities include admissions, strategic planning to continuously improve the program, and organize events for students and faculty.

The most pressing problem that Michael faces in carrying out his job successfully is the time and effort it takes to plan the curriculum every semester. According to him, planning the curriculum has several facets. A major facet is scheduling courses apart from which classroom allocation and acquiring course materials for faculty are other important tasks. All these tasks involve a lot of collaboration with different stakeholders like faculty and program administrators of other departments as well. Currently, a single course can take up to about 4 weeks to be scheduled. Each program administrator can have from about 10 courses for a small department to more than 50 courses for a larger department. Another problem is that every semester, on average one of his thirty course instructors forgets what the promised course plan is and ends up withdrawing from the course schedule. You can see why Michael finds curriculum planning to be so difficult!

One major cause for this problem is that currently there exists no single tool for collaboration between Michael and the other stakeholders that he collaborates with. He sends out emails in the hope of an immediate response, but the turnaround time

for a single email can take up to 2 days! This leads to a simple process that otherwise should have taken a 10 minute conversation to drag for up to a week. Every semester requires curriculum planning, and hence this process is repeated every few months. The communication gap between faculty and the program administrator exists because there is no system that would ease their communication and would also consist of reminders and notifications for action items. As you can imagine, it can be a nightmare to communicate with the variety and number of stakeholders that Michael interacts with - students, faculty, and other program administrators as well.

Manual data entry is another major cause of concern for Michael. For instance, during the recent planning cycle his administrative assistant entered the starting time as 9 pm instead of 9 am for a course. This ended up on the final registration page, and caused so much confusion! What class begins at 9 pm in the night? Michael had to go through many hurdles just to get this one thing fixed after the error was made. These kinds of avoidable issues that can be resolved easily instead take up unnecessary bandwidth of program administrators like Michael, who could instead be working on strategic planning to make the program better during this time.

Another seed of this problem is the lack of visualization tools for the purpose of course scheduling. This process of curriculum planning requires creating visual maps and schedules to make scheduling easier for them. Generally, these schedules are created on archaic tools like Excel, and each program administrator has their own format that cannot be directly compared with program administrators of other departments. Michael asked his colleague Deborah from the EPP department for her course schedule, which had over 50 courses on an excel sheet in a calendar form. Now merging these two maps into a single one is virtually impossible in the timeframe that course scheduling happens in. Creating visual excel maps, collaborating on updating these, back and forth email communication to get information etc. are tasks which unnecessarily eat up a lot of time. The elapsed time to plan the curriculum is not of importance, rather the time spent on tasks while planning the curriculum is what counts. And this is what Michael wants to get reduced any way that he can.

A use case to consider is the situation of new and cross-listed courses. Planning the curriculum for new and cross-listed courses is even more difficult, as there is more back and forth collaboration required. Michael needs to procure schedules for other departments as well to schedule a single course of his in these cases. There exists no single centralized platform where all of the curriculum planning across departments and the university is streamlined. In general, it could take several emails (and in-person meetings too) between him, other program administrators, and the teaching faculty to come to a consensus.

Let's say we come up with an ingenious idea to mitigate this issue. How is it going to benefit Michael? The most obvious benefit with a solution is that the time spent on the tasks involved in planning the curriculum will reduce by 50%-75%, and hence will allow Michael to be involved in other important facets of his job like career advising, event planning etc. The time spent on these tasks can easily be measured. He 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. Bringing the time taken for this process down to even 2 weeks (from 4 weeks currently) would massively help free up Michael's time. This will help him spend this saved time on other productive activities like working on improving his program's diversity.

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 improve this process.

The rare occasions on which the process of scheduling a course does complete smoothly without much persistent collaboration has made Michael realize what kind of work satisfaction he can achieve with an improved process. This process can get extremely strenuous with the number of people involved, and trying to adhere to everyone's demands and constraints. Any solution to this provides a lot of long term value with respect to work satisfaction for program administrators.

The current tools used by Michael do not help collaborate with others in real-time. Michael imagined that a tool like Google Sheets could help coordinate schedules in real-time, but it does not help with data inconsistency issues and manual errors. Michael believes that system related issues like information inconsistencies on SIO and Stellic exist due to a lack of automation for repetitive tasks. Some other alternatives could be to either delegate this activity to another entity (like Tepper has done, where MSPM's Program Administrator delegated this activity to Student Services Organization) or to hire someone specifically for tasks like this one (Some Program Administrators hire 'Program Managers' that handle this and a few other activities) but this is not financially viable for all departments in general.

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 having close to 200 programs! The market can be segmented based on the role. Program administrators like Michael 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*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.

We have so far discussed everything related to the problem, the causes, and the benefits Michael will get if we solve the problem. Now let's move on to the exciting bit - how do we solve this problem?

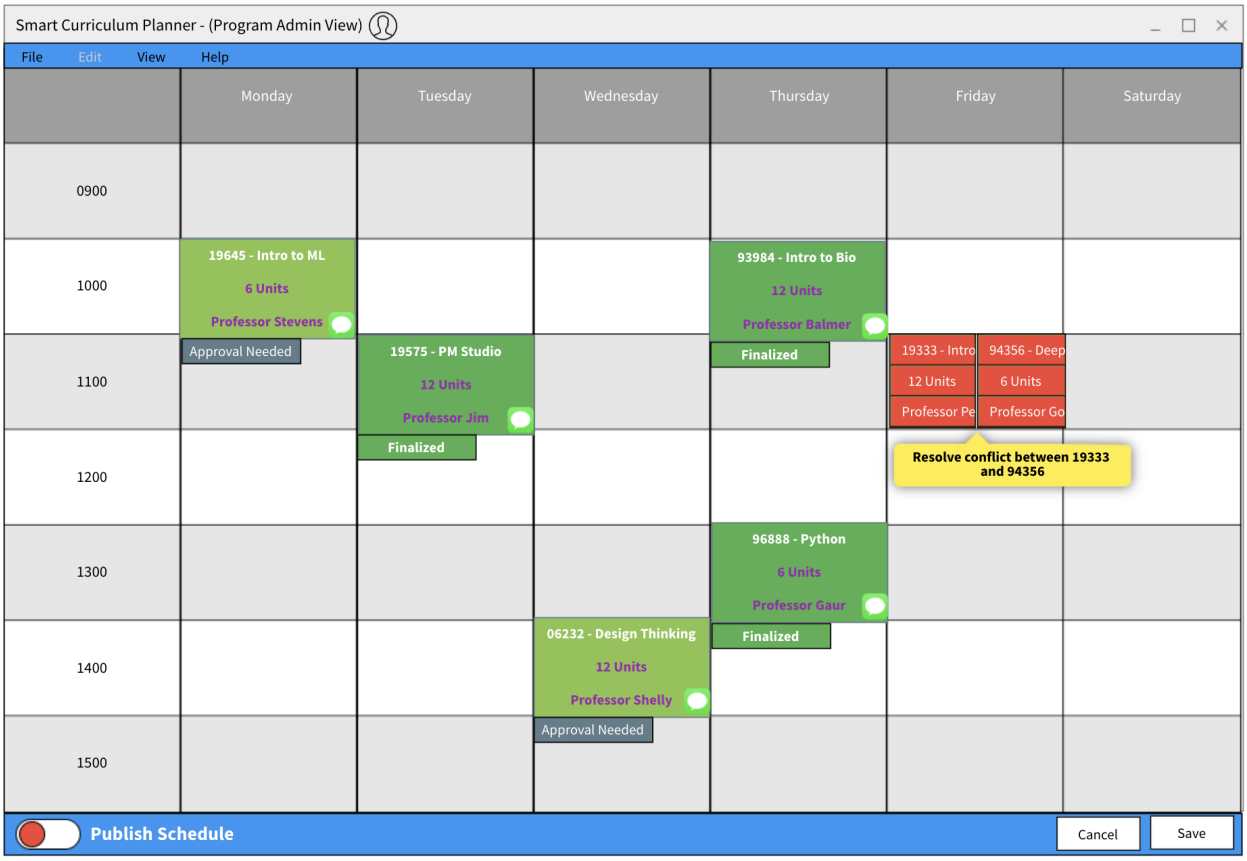
The proposed product solution has been labelled Curriculum AI. Curriculum AI is an intelligent and real-time scheduling web/mobile application specific to university curriculum planning along with in-built messaging. The primary goal of Curriculum AI is to reduce the time spent on tasks involved in curriculum planning by at least 50%. The product can be categorized as *Intelligent Curriculum Management Software*. Curriculum AI would be 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. Michael uses Microsoft Excel to form this kind of visual map. Curriculum AI 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 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. 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. (Basic visual on the next page). 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 scheduling - writing the course description, timings, materials, classrooms, conflicts, communication. Only this one application needs to be changed for all of that to reflect, and hence eliminate the need to use a different tool for each of the above mentioned tasks which is the case currently.

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.

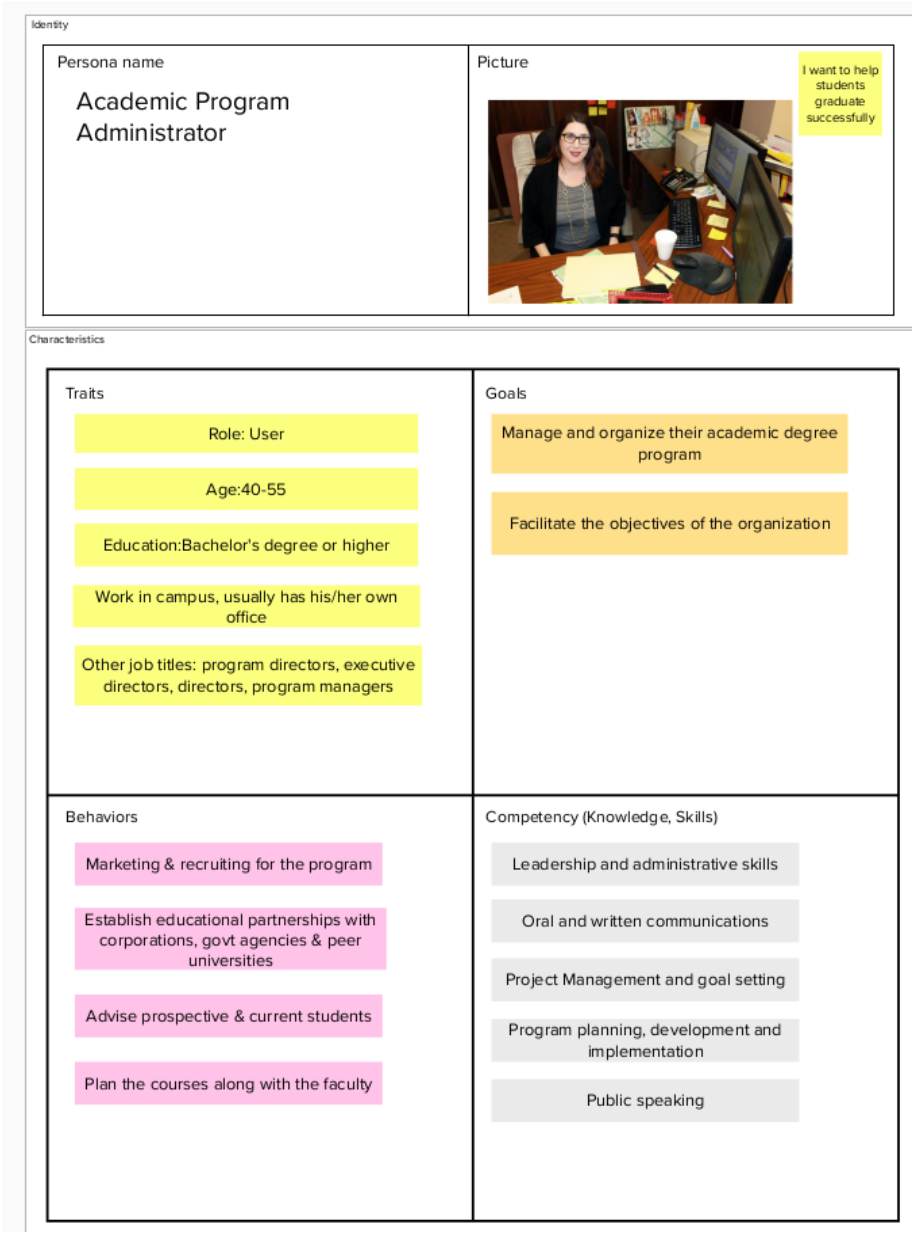
To conclude, planning the curriculum is an important responsibility of the program administrator and as Michael has mentioned, there exist significant problem and opportunity areas. Curriculum AI has been visualized as a tool to address several of the issues, and make the work life of an academic program administrator enjoyable and efficient!


Smart Curriculum Planner - (Program Admin View)
File
Edit
View
Help
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday
0900
1000
1100
1200
1300
1400
1500
19645 - Intro to ML
6 Units
Professor Stevens
Approval Needed
19575 - PM Studio
12 Units
Professor Jim
Finalized
93984 - Intro to Bio
12 Units
Professor Balmer
Finalized
19333 - Intro
12 Units
Professor Pe
94356 - Deep
6 Units
Professor Go
Resolve conflict between 19333 and 94356
96888 - Python
6 Units
Professor Gaur
Finalized
06232 - Design Thinking
12 Units
Professor Shelly
Approval Needed
Publish Schedule
Cancel
Save

Appendix

A. Customer Problem Space

1. Customer Persona Profile



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.)

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/khY7upuBmWGDOvW5JctmKlOcCm7gt2aMesMlVhALz-Pewt0KlRr4KBlmxSRgID9s.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=bWlTdlRXa1NTMXc5QzA3ZDV6Vi9xQT09
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

Project Team Team 10

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	September 16, 2021, 1:30 P.M.
Interview Location	https://cmu.zoom.us/j/98544931508?pwd=OUh2bSt3ZUhvUFlTYUoxT3RzaS84Zz09
Interview Records	--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

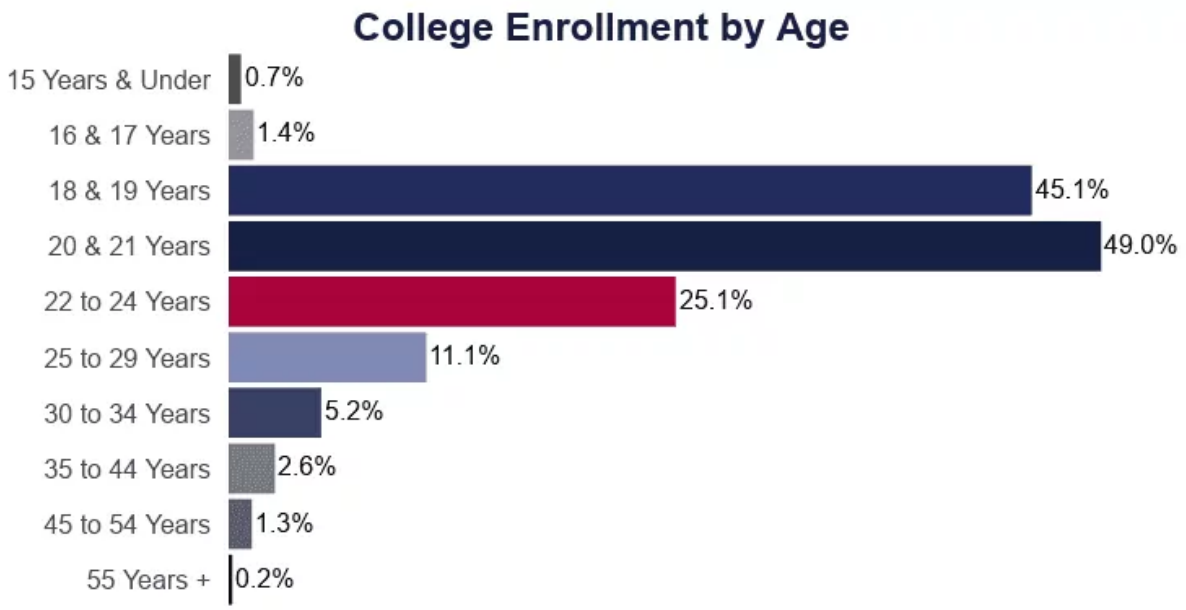
Statistics: (Source: EducationData.Org)

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.



<u>Trends:</u> (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

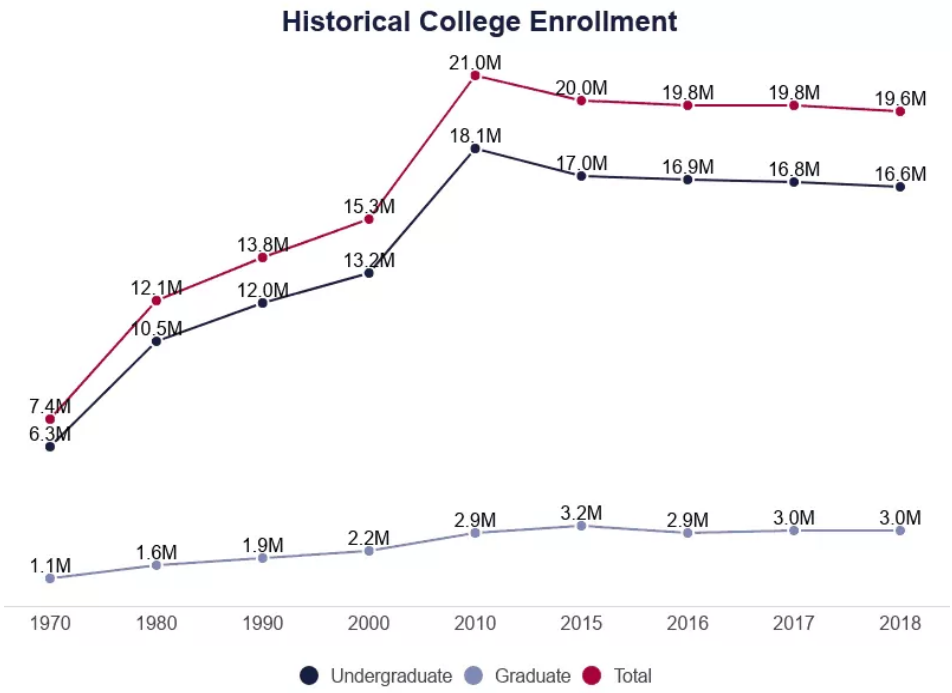
3. Competition with nanodegrees and skills training
According to a 2020 Strada Education Network survey of more than 25,000 responses, only 17 percent of adult learners believe additional education will be worth the cost, compared to 37 percent in 2019. In the same survey, just 24 percent believed additional 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.

<u>Challenges:</u>

- 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 disjoined 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) **Transparency (Quantitative):** Make it transparent and ensure everyone knows how the operation is working. This ensures that all stakeholders are up-to-date in the process of curriculum planning. Instructors can understand the differences and competing forces in scheduling.
Metric: The number of emails sent/received to schedule a course. This is a good indicator of the effort taken to communicate between stakeholders, and how the tool is being utilized.
(2) **Reduced Time Spent (Quantitative):** The amount of time spent on the tasks involved in curriculum planning will be reduced by 50%-75% using a collaboration tool. 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.
(3) **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.

(4) **Easier to fix errors (Qualitative):** It will be much easier to fix errors done by manual data entering with a visual collaboration tool for curriculum planning. This can be quantitative with more data on how much time it takes to fix such errors currently.
Metric: This can be quantitative with information about elapsed time from when an error was committed to when it was finally fixed.
(5) **Visualization (Quantitative):** Currently, the course schedules are made visually on Microsoft Excel. Each program administrator has a different document for this. Making changes to the document though can be a tedious task, where the block of time needs to be moved if there is a change in the schedule. Now, in the case where it needs to be negotiated with other departments, the visualization is even more difficult as multiple Excel files need to be merged to get the whole picture. Hence, a tool with visualization common to all departments of the university and an interactive scheduler would make collaboration simpler.
Metric: The number of useful graphs, dashboards, and maps to display information would be a metric.
(6) **(Quantitative):** More time spent with students is beneficial to the Program Administrators. This would mean they can have more career advising sessions, more events for the students, etc.
Metric: The number of sessions/events that are held by each Program Administrator.

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	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	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

	one course cases,then assume one course has one instructor. So the market size is 4000*60*60=14.4million	will assume 3 for all programs. So the market size is 4000 * 60 * 3 = 0.72million	
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	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	Assuming about two employees per university who require viewing permission, it would be about 4000*2 = 8000 professionals.

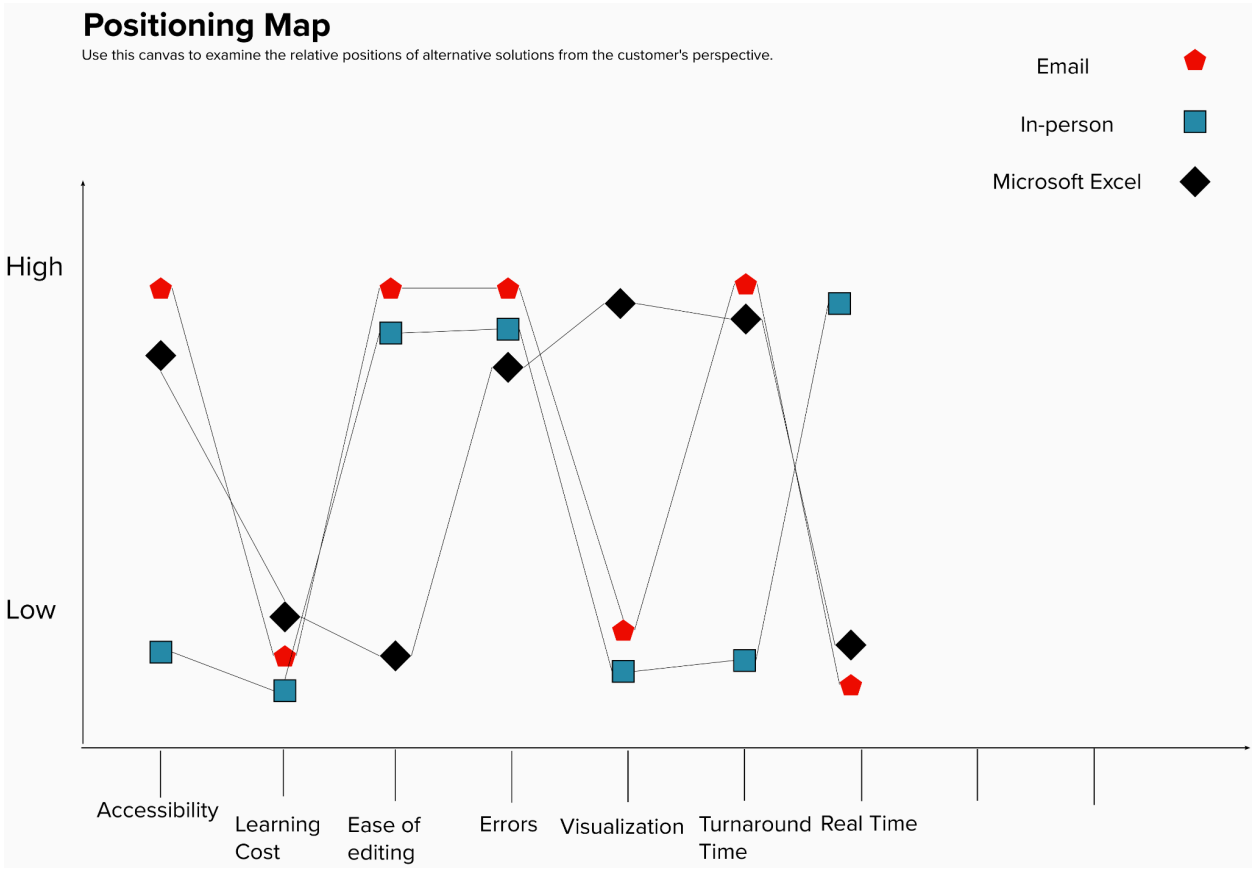
	conservatively about 60000 PAs.	universities captured.	
Segment Trends	Normal	Normal	Normal
Segment Entry Barriers	(1) Usage depends on the program administrator's responsibilities, and hence may not be attractive to every PA. (2) Price: Existing alternatives are low-priced (3) Email: Very accessible	(1) Email is most common way for faculty to communicat e (2) Learning cost: There is nearly no learning cost for existing competitor	

4. Competition Analysis

Competition Profile			
Name of the alternative	Microsoft Excel	University and Department Specific Tools (Like CAS in Tepper School of Business)	Email
Vendor (who makes it?)	Microsoft	N/A	N/A
Main reason(s) people buy it	Microsoft Excel is a very accessible and common product used to create tables and visual schedules. The main reason to buy it is that it is extremely accessible and easy to set up.	Customized tools which are university or department specific. These tools are tailored for a department, and hence are bought for the department.	Eas of access. Everyone has access to email, and hence this is always a way to schedule and plan the curriculum.
Target Market	Normal (The market is stable)	Normal	Normal

Pricing	$5-$20 per month	No data	Free

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=bWlTdlRXa1NTMXc5QzA3ZDV6Vi9xQT09

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=OUh2bSt3ZUhvUFlTYUoxT3RzaS84Zz09

Interview Records

--recording:

https://cmu.zoom.us/rec/share/MF1_gnIuvsv7_tmofx0amuY6NCd1vENmWqAe_snH8FdvLevYXDxsBnJkCbzlvk6a.SC1b-3zhxRMuZebZ

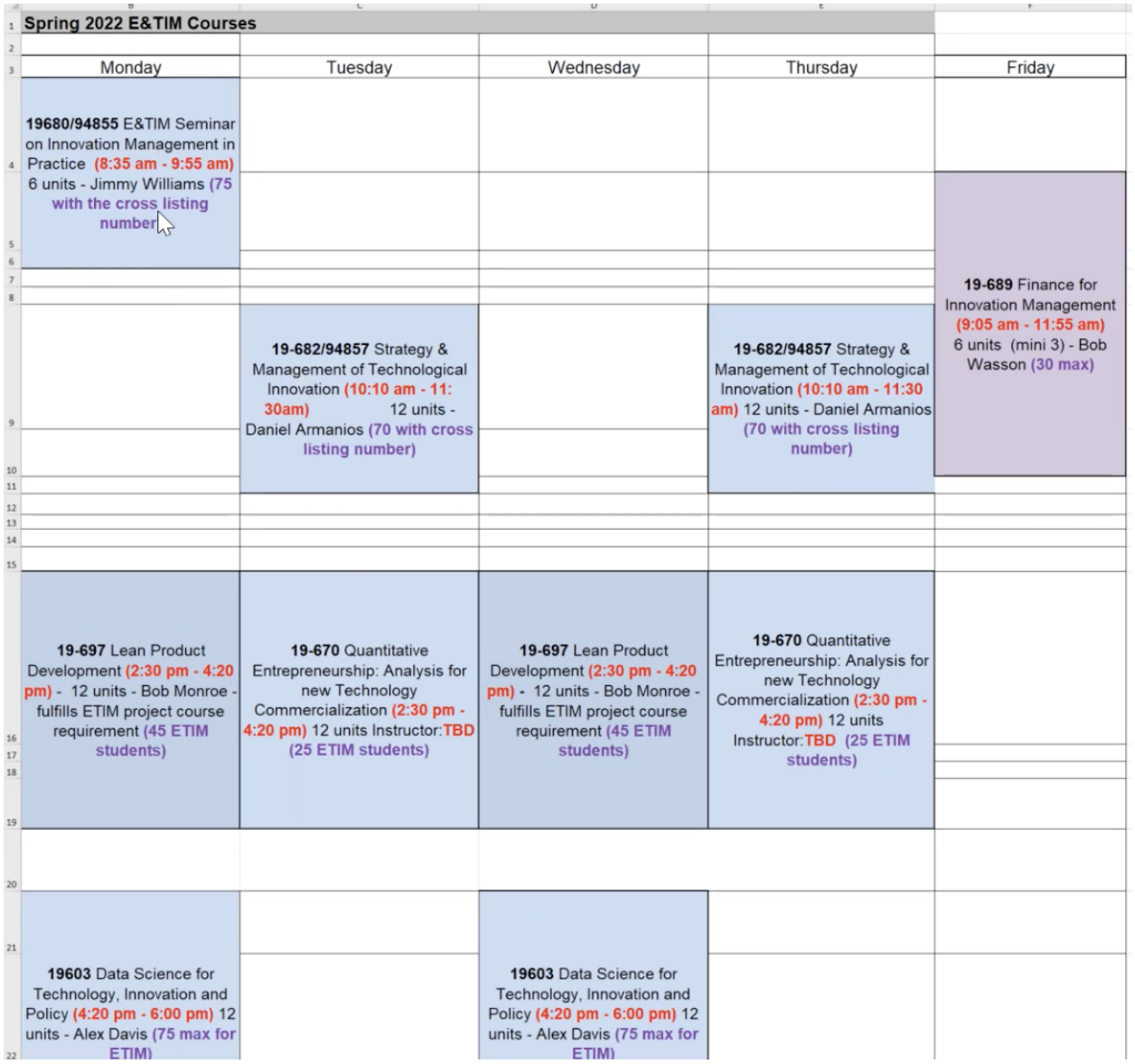
Password: rK66Yb%4

--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.



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)				
	19-682/94857 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)	**19-689** Finance for Innovation Management (9:05 am - 11:55 am) 6 units (mini 3) - Bob Wasson (30 max)
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)		

2 - Class related information entered manually are prone to error. Specific examples like the class timings and class size changes not being updated, and causing confusion for students were mentioned, that helped build our case stronger.

3 - Collaboration takes time because there are new complications every semester. Like for instance, this semester, a faculty backed out so she now has to find a new data science instructor. This could become easier to manage with a better collaboration solution.

4 - Program Administrator is a role that means different things in different departments. Program Administrators have different responsibilities at different

departments, and hence their problems have little overlap. Nesli also helped us understand this.

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 disjoined 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/1hSzIlrZ2vTnbHnBu3pnit0BE6v4y4kp-
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.

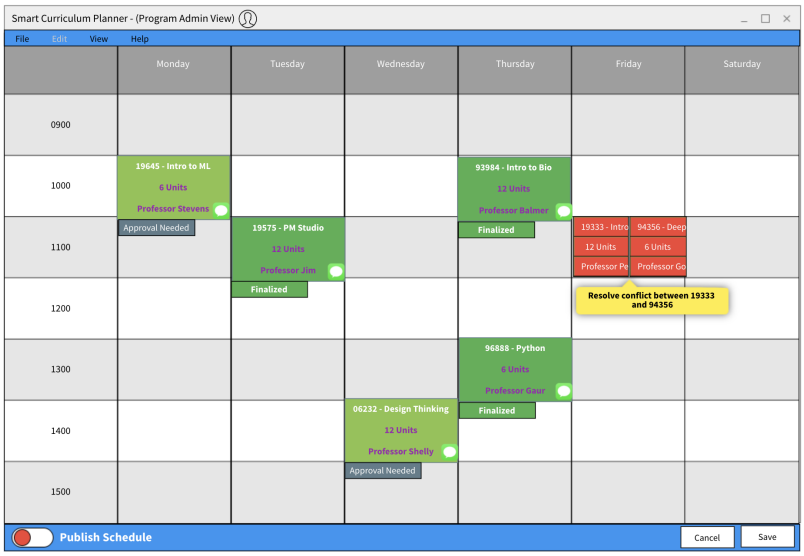
c. Product Category (type)

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

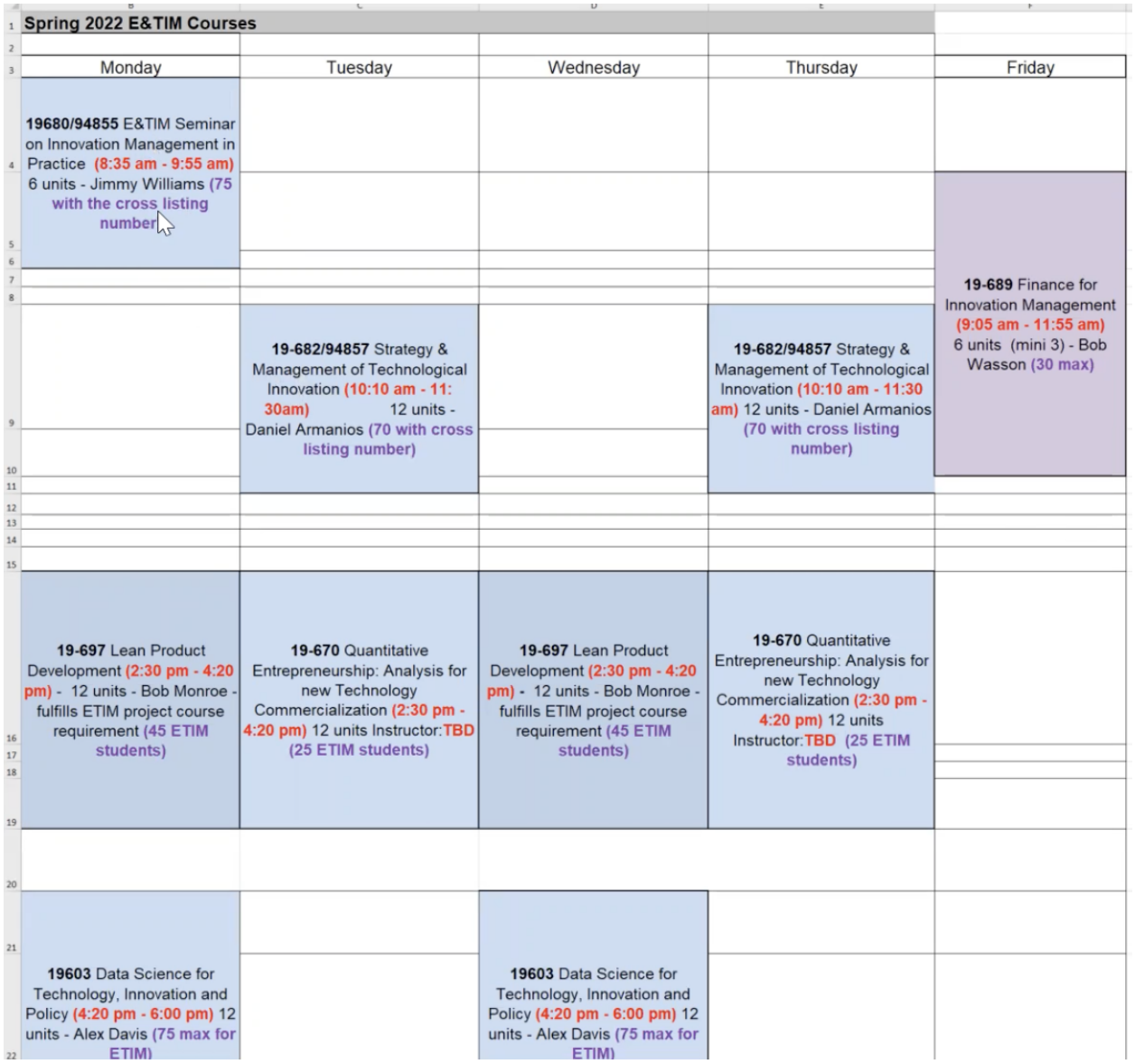
Intelligent and a real-time scheduling application specific to university curriculum planning along with in-built messaging.

g. Platform

Web Application, Android App, iOS App

h. Mental Model (if applicable)

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 scheduling - writing the course description, timings, materials, classrooms, conflicts, communication. Only this one application needs to be changed for all of that to reflect, and hence eliminate the need to use a different tool for each of the above mentioned tasks which is the case currently.



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)				
	19-682/94857 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)	**19-689** Finance for Innovation Management (9:05 am - 11:55 am) 6 units (mini 3) - Bob Wasson (30 max)
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 Login and real-time calendar scheduling complete

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: Login and Profile for each user, Calendar for all time slots possible with real-time changes visible to all users. This would be the initial release of the application.

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

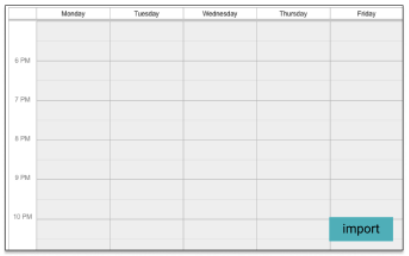
m. Technology

Full-Stack Web Development
Machine and Deep Learning
iOS/Android App Development
Distributed Systems

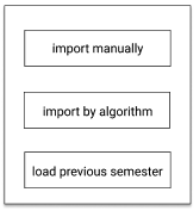
n. Data

- Course Information
- Schedule Information
- Past Course Schedule Data
- User information
- Department Information (So that the app is customizable according to the department)

o. User View

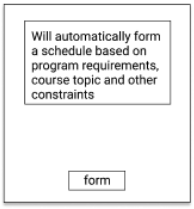


Start with a blank schedule

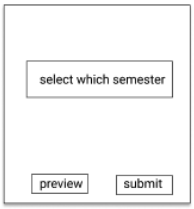


Third ways to import schedule
(By clicking import button)

manually

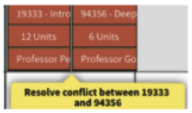


By algorithm



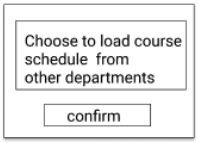
load previous semester

schedule draft(can make
changes on specific course,
drag to change the schedule)



Built-in conflict finding

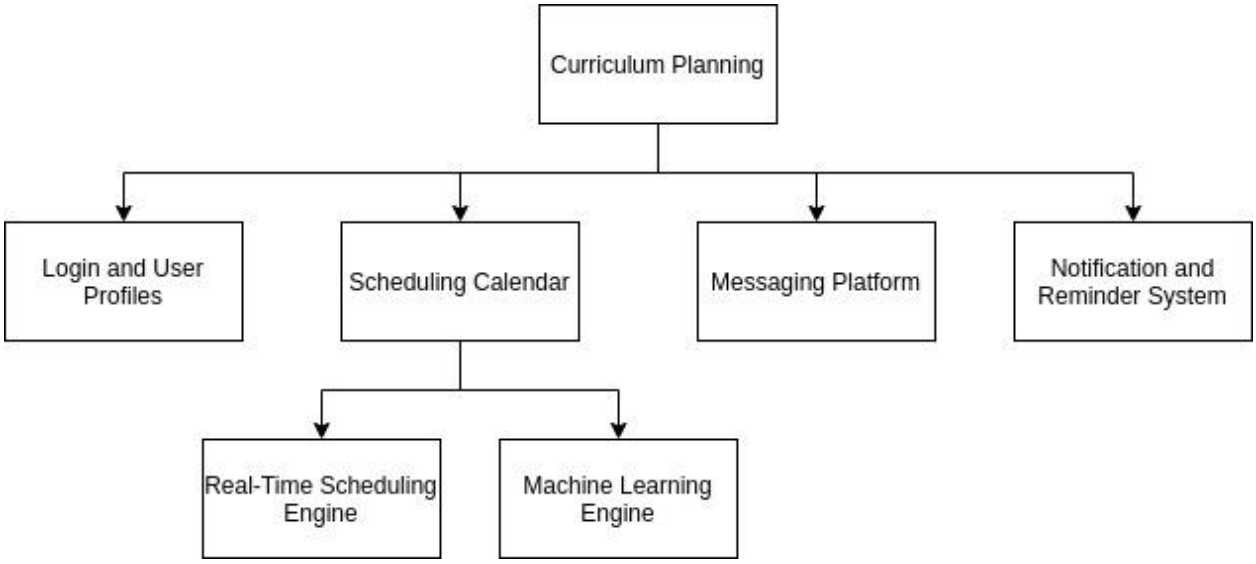
click the messge to start
conversation(also system generated
messgae to discuss the course
resources)



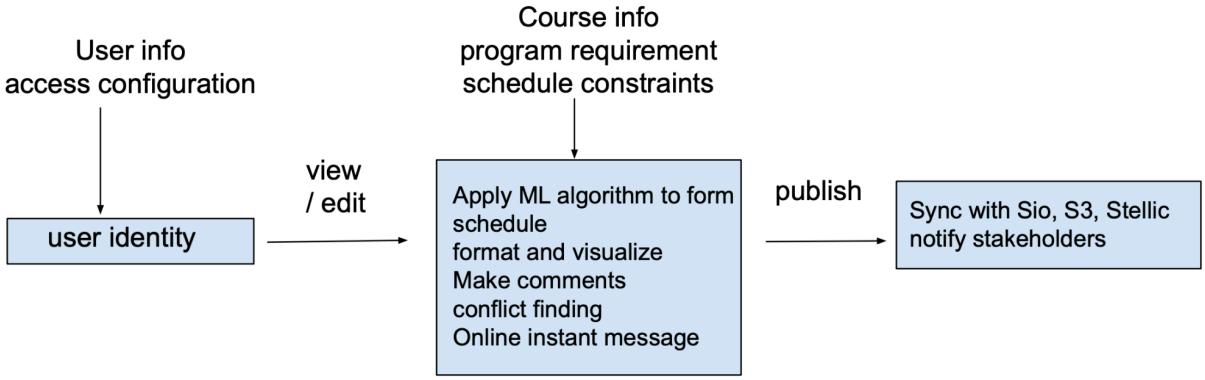
Comparations with schedules from other departments
/ load other department course schedule
(case: add a new crosslist course)

fliters on specific day(like only see Monday course)
to increase readability

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.