DreamSIS

INFO 380

GROUP AD7

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Client Site Identification

Description of the organization

The organization we chose to collaborate with was Dream Project, a student run program at the University of Washington. Dream Project's goal is to help first-generation, low-income students in the state of Washington apply for colleges, financial aids and scholarships.

Student Technical Director

Mitchell Harper is the Student Technical Director. His main responsibilities are organizing events, maintaining instances of DreamSIS and managing the contents of the Dream Project system. He is responsible for the DreamSIS service and ensures everything is working successfully.

Connection to organization

Our Project Manager, Thomas was a Mentee in the program in his junior and senior year of high school. He decided become a Mentee after enrolling in UW. After a year and a half of Mentoring, he got involved in event planning, and eventually became a high school lead. As a high school lead, he serves as leader for his specific high school visits: He teaches Mentors on how to be good Mentors, plans visits, leads quiz sections, and has worked extensively with Mentee data.

DreamSIS Description

We will be analyzing the primary information management system used by Dream Project: DreamSIS. It is a system that allows Mentors to submit data about their Mentees, such as the colleges and scholarships they've applied for, attendance, and notes about visits. Mentors also sign up and RSVP for Dream Project related events on DreamSIS. One main complaint Mentors have about DreamSIS is that it is confusing to use the system as there are many different types of functions for Mentors to manipulate.

System Context Description

Dream Project has a main mission, and five core values. Its mission is to "assist low-income and first-generation high school students in attaining higher education and to raise awareness among university students about the issues of educational opportunity and social mobility."

Dream Project's core values are:

1. Every student has the right to higher education.
2. The power of education to inspire empathy.
3. Providing vehicles for student leadership and engagement.
4. Dream Project is one part of a larger effort and collaboration is critical to their success.
5. The impact of meaningful student-to-student relationships.

From Dream Project's mission statement and five core values, we discerned the organization's two main target groups. Dream Project is actively helping high school students who are from low-income families and are first-generation students in order to obtain higher education. Another target group in their mission statement is university students, in which the organization hopes to spread awareness to university students about issues of educational opportunity.

The core purpose of the DreamSIS system is to collect data from Dream Project Mentors about their Mentees. The Mentors in Dream Project are undergraduate students that attend the University of Washington. The Mentees are high school juniors and seniors. The data that is collected within DreamSIS includes the colleges and scholarships Mentees have applied for, their attendance during visits, notes about their high school visits, and whether or not students they have filled out their FAFSA. In terms of the FAFSA data that is collected, DreamSIS does not store sensitive data such as Social Security numbers, it only stores whether or not a student has submitted a FAFSA, and the date that they submitted. Dream Project is a non-profit organization and most of its money is spent on buying food for visits, providing workbooks for Mentees and Mentors, and hosting quarterly events for Mentees. Mentors also sign up for Dream Project related events on DreamSIS. Through the information stored in DreamSIS, Dream Project is able to help funders understand what data the organization are keeping track of and if the program is living up to its mission.

DreamSIS is custom built web application that was written by former iSchool student, Matt Harris. Matt originally built the site to track Mentors and their involvement with the Dream Project, including upcoming Dream Projects events. The site has grown since then and now tracks data about Mentees and including that information in the system. The site uses the Ruby on Rails framework.

Currently, the site's maintenance is a collaboration between Matt and Mitchell Harper for the past six months. While they both work on maintenance, Mitchell Harper maintains the database.

DreamSIS is currently a mostly computerized system that manages Mentor and Mentee profiles who participate in the UW Dream Project. Information is put into the system from various sources through both automated and manual processes. Mentees themselves do not input their own data. Datasets from schools that are participants of Dream Project are obtained and inputted by running custom scripts. However, due to the variety of schools, this process can include manual steps such as converting CSV files or extracting data from PDFs. There is currently no standardized way of asking for data from participating schools. The National Student Clearinghouse is also a significant provider of data to DreamSIS, which goes through the US Department of Education. Information such as student enrollment data and college degree data are updated automatically by the National Student Clearinghouse so DreamSIS is able to pull the most updated information. Washington College Bound program is another provider of data about students who have College Bound scholarships, and its data is updated in the same manner as the National Student Clearinghouse. By aggregating data from various sources, DreamSIS acts as a reference for participants in the UW Dream Projects, such as checking who has filled out FAFSA.

DreamSIS interacts with technological systems from the UW Student Web Services, the Department of Education, and the National Student Clearinghouse in order to pull various types of data about Mentors and Mentees. DreamSIS leverages the UW Groups and directory information to gather contact information and enrollment data for Mentors. For instance, DreamSIS pulls information from UW Groups to ensure Mentors are enrolled in Dream Project courses. Additionally, DreamSIS interacts with databases from the Department of Education to gather monthly information on colleges and with the National Student Clearinghouse to gather student enrollment information. DreamSIS is also capable of leveraging CollegeMapper's API to allow Mentees to keep track and synchronize their academic information with DreamSIS but this feature has been disabled. As DreamSIS is hosted on campus, it relies on web servers provided by the Undergraduate Academic Affairs department. As a whole, DreamSIS performs mainly information retrieval (manual data-pulling via scripts) while interacting with external technological systems.

In the future Dream Project would like to incorporate the Road Map region into their system. The Road Map region is a collection of five school districts in King County. They would also like to be able to gather data from school districts in a more unified fashion which currently isn't comprehensive. The current data-pulling-process involves reaching out to get data and bringing in data in different types of formats such as PDF and CSV. They aspire to be able to use a more standardized process of collecting data across multiple systems. This way they can be more efficient and hopefully be more effective than their current data-pulling-process.

Problem Statement

Benefits

Tangible	Intangible
Gather data from DreamSIS to generate presentable reports	Improve public image of DreamSIS, and Dream Project as a whole
Receive funding from donors	Ability to recruit new High School Leads and Mentors
Information is more timely and accurate, therefore being more valuable	More organization and maintenance of DreamSIS
	Gain reputation by showing that Dream Project is effective, charitable, and philanthropic
	Ability to supply data and results of missions and goals

Costs

Tangible	Intangible
Lack of IT human resource to maintain DreamSIS	Inability to fulfill organization's mission
Lack of standardization due to mix of manual and automated processes, leading to inefficient use of resources	Image and perception of DreamSIS (and consequently Dream Project) will degrade
Inaccurate information can lead to devaluation of data	Lack of flexibility and adaptability due to high schools using different systems and varying student population size
Lack of standardization may result in malfunctioning code and misconfiguration, making the system vulnerable to hacking and malware	Flow of DreamSIS will be hampered and would slow down Mentors from helping Mentees
No documentation to facilitate formal training	Unreliability of DreamSIS will deter students from becoming involved in Dream Project
	Lack of standardization in data gathering from various sources affects the integrity and consistency of data

The tangible costs and threats involved in DreamSIS are primarily focused on its human resources. DreamSIS is a system maintained by both manual and automated processes. Mitchell, the Student Technical Director for Dream Project who manages the code of DreamSIS, is actively looking for IT people to help out since he feels he is short on people. Due to the nature of DreamSIS and maintenance being a manual and automated process, there lacks standardization in several aspects. One of which is how data about Mentees and Mentors are gathered from various sources. The gathering process sometimes involves automated scripts, but much of the data collection process involves the high school leads typing in information. These inconsistencies are putting the integrity and consistency of the data within DreamSIS at stake. The tangible costs of such inconsistencies would be the resources used to run the current system such as computing and paper materials that could be reduced by having a more streamlined process. Furthermore, if the actual data is not valuable, Dream Project will have difficulty getting funding and the operations of the organization itself would be at stake. Since DreamSIS is a digital information system, it is prone to threats such as corruption from dysfunctional code or misconfiguration, as well as hacking and malware. Also, documentation is not readily available and DreamSIS lacks formal training.

A tangible benefit of gathering and organizing data is that we can make information, from graphs of student involvement to real student stories that shows Dream Project's success. Therefore, the goals of The Dream Project will be shown as realistic and an organization that deserves funding and grants. The Dream Project gained $100,000 from the Bill and Melinda Gates Foundation a few years ago and the Dream Project is re-applying this year. It is important to show the success and this can only be done using a system which is capable of providing this information easily. Funding is highly favorable to The Dream Project as they provide money to a small number of students from a high school if they decided to attend University of Washington through The Dream Projects' scholarship scheme. Information that is both accurate and timely is the only kind that is valuable and it is therefore necessary to have a system that intakes new data and can organize older, less relevant data to show the priority difference. All of the benefits of having an effective system lead to a more effective organization so that high school retention rates can be increased when prospering students believe they can go further in education.

There are several intangible threats and costs of DreamSIS. First of all, there is a possibility that the DreamSIS system cannot fulfill their organizational mission if there were consistent problems with the system. If certain functionality or features of DreamSIS prevents Mentors from helping Mentees, then The Dream Project cannot fulfill its mission or goals. Secondly, another intangible threat focuses on the perception of The Dream Project. To continue a growing relationship between local high schools and the Dream Project, then DreamSIS needs to be reliable in managing its data to become more effective and efficient. Also, the perception of The Dream Project encourages more college students to become Mentors or high school students to join as Mentees. Thirdly, the system needs more flexibility and adaptability. The Dream Project currently has 17 high schools involved in the dream project but each school has different scales of students, for example, some high school will have entire senior class. There will be a problem if the system isn't customized to fit the conditions of different high schools.

There are intangible benefits that can be gained by focusing on DreamSIS that pertain to the overall image of Dream Project. DreamSIS is the central hub for storing all information pertaining Mentors and Mentees, the core of Dream Project and their endeavors. Should DreamSIS be further developed, Dream Project will have a greater ability to recruit Mentors and more high schools as a result of a more robust and structured system. The reputation of Dream Project of being active and dedicated to their missions and objectives is supported by relevant data and results: DreamSIS, being the backbone of Dream Project is capable of improving their public image and reputation, garnering more support from benefactors and donors.

Problem Scope

- We will analyze how data is collected and stored from various sources:
  - High School administration
  - Government organizations
  - High School Leads
  - Mentors
  - Mentees
- We will emphasize the importance of features on the website that we believe is essential to the collection of data
  - We believe that the “Notes” section of the Mentee page of DreamSIS should be a focus on the Mentee page
  - We believe that the “Parent/Guardians & Contacts”, and “College Degrees” should less of a focus on the Mentee page
- We will identify trouble points during the process of acquiring data and information
- We will be suggesting features to add to DreamSIS that would sustain the collection of data
- We will give recommendations about how to keep Mentors actively entering in data about their Mentees
  - We believe that a constant reminder to Mentors would be a benefit to the system because it will allow for a regular and standard usage of DreamSIS
  - We believe that Mentors should be accountable for sustaining the collection of data from Mentees
- We believe that implementing a feature that would constantly remind Mentors about entering Mentees’ data after every visit is of high importance
- We will **not** be providing analysis of the underlying code of the DreamSIS system.
- We will **not** be implementing any of our recommendations in terms of software code or addition of new hardware. This may include increase in performance or optimization.
- We will **not** be analyzing or accessing student information due to FERPA.

Work Plan

Task	Responsible	Week										
		1	2	3	4	5	6	7	8	9	10	11
Stakeholder Analysis and Requirements List	Group											
Prepare Interview Questions	Group											
Interview Mentee	Thomas											
Interview Mitchell (System Developer)	Midori											
Interview Jenee Myers (Stakeholder)	Lily											
Interview Jason Bartlett (Stakeholder)	Thomas											
Interview Mentors	Charlotte, Nancy											
Behavioral Analysis and Design	Group											
Interview Mitchell (System Developer)	Group											
Creating Diagrams	Group											
Structural Analysis and Design	Group											
Entity Relationship Diagram	Group											
Completing write-up	Group											
Final Proposal	Group											
Edit and revise assignments	Group											
Create Recommendations Page	Group											

Stakeholder Analysis

Keep Satisfied

Mitchell Harper (Student Technical Director)
Thomas Phan (High School Lead)

Primary Values, Motivations, and Concerns

Mitchell Harper is the direct stakeholder of DreamSIS system. As a developer, he primarily values providing the most accurate data for DreamSIS as possible. He is concerned about demonstrating to benefactors, donors and the participating High Schools that the Dream Project is efficiently helping a portion of high school students to attend colleges by recording the events, data of Mentors and Mentees through DreamSIS system. His motivations include showing data to benefactors/donors, create publications about data that is sent to the benefactors as well as working with outside consulting groups and individual counselors. The most valuable aspects of DreamSIS, according to Mitchell, include documenting the work of Mentors/Mentees by checking how effectively they are helping and communicating with students in the program and keeping track of the percent of students who are attending college. Another key component of DreamSIS includes the integrity of data and the well-developed basic functions. Mitchell also has some worries about the current system. Although the data in the system is accurate, the amount of data is low because Mentees don't always respond to notifications from Mentors. Another problem is that Mentees don't have the access to the DreamSIS but we may work with our future partnership to allow Mentees to communicate with DreamSIS directly.

As a high school lead, Thomas Phan's primary value is to know that his Mentors are aware of their responsibilities. It is up to the High School Lead to make sure that their Mentors are actively submitting Mentee information. Currently, Mentors are motivated by Jason and the staff of Dream Project to enter or update data. Thomas Phan is always concerned that his Mentors are not actively entering data and must constantly remind them.

Needs and Wants Analysis

Mitchell Harper wants more interaction with the Mentors and is interested in finding ways to remind Mentors to update the data on their Mentees. Currently, High School Leads are in charge of reminding Mentors to input their data about their Mentees. Given that there are around 400-500 Mentors every quarter, rather than having high school leads remind Mentors, instead, DreamSIS could potentially send notifications to Mentors reminding them to update their data. Additionally, Mitchell also discussed creating more documentation about the general functionality of DreamSIS and specific features. This documentation could also help with the

training of Mentors surrounding DreamSIS. Currently, high school leads are showing the Mentors the dashboard, how to interact with participant view and how to add colleges. Also, once a quarter, they Mentors take out their laptops and enter information about their Mentees. With more documentation and reminders to Mentors, inputting data into the system about the colleges the Mentees are applying to or if they filled out their FAFSA would be much easier.

Thomas Phan wants DreamSIS to be easier for Mentors and high school leads like himself to submit data. The system is falling short because navigating through the system can be daunting and tedious. There needs to be a more organized way of submitting Mentee data.

Expected System Changes

There are many changes that Mitchell Harper would like to see in current DreamSIS system. One of the first concerns he mentions is the general layout and presentation of DreamSIS's online interface. The dashboard, and Mentee profiles are currently big, long lists of information. He believes that the layout could be "more thoughtful about how we're displaying information". Theme development is underway, but it is an improvement he would like to see. Thomas Phan also wants the DreamSIS system to be more user friendly. He believes that its current layout is detracting Mentors and high school leads from submitting data.

Another aspect that needs urgent changes is the way data is entered into DreamSIS. 90% of the data that is in DreamSIS comes from a physical paper survey from that is required to be filled out by Mentees before they work with Dream Project. This information is then inputted manually by high school leads and Mentors. However, when entering data into DreamSIS, the data sometimes does not match what is written on the survey because the handwritten information is not legible, and other human errors. There needs to be a better way of entering data accurately into DreamSIS to avoid such anomalies. Despite the data entry process being a heavily manual task, Mitchell says that the data that is currently in the system is accurate; he is more concerned about the lack of data. His goal is to make a more efficient, automated data entry process that is not vulnerable to human errors and does not rely on interaction with Mentors, Mentees, and schools. He hopes that doing so will encourage Mentee data to be entered more frequently to make a more complete database.

Manage Closely

Jenee Myers Twitchell

(Director of UW Dream Project; not interviewed directly, but has worked with Thomas Phan)

Primary Values, Motivations, and Concerns

Jenee is motivated by receiving money through donations and grants from donors. Because Dream Project is a non-profit organization, it can only run from getting money from donors. It is important that Dream Project can demonstrate that it is fulfilling its mission and goals, so that donors can see that they are doing what they promised.

Needs and Wants Analysis

She wants the data in DreamSIS to be as complete and accurate as possible. She needs the system to be able to accurately capture all of the information. The inaccuracy and lack of data is a concern, because it makes Dream Project questionable as an organization.

Expected System Changes

She needs the system to be easier for Mentors and high school leads to input data. All the data is gathered from the high school leads, so her main focus on the system is to make sure it can fulfill the needs of the Mentors and high school leads.

Monitor

Anonymous Mentees

Primary Values, Motivations, and Concerns

Mentees value their future pathways in their education and value input from their Mentors. As such, they are motivated by the advice and guidance received from the Mentors. While they do not exactly know the exact workings of DreamSIS and how their data is handled, they are concerned about how their data can help them make an educated decision about their academic pathway.

Needs and Wants Analysis

Mentees require a close connection with their Mentors and hence would benefit greatly from more informed and prepared Mentors to guide them. Currently, Mentors are not fully proficient in using DreamSIS and may not be able to provide Mentees with all their needs.

Expected System Changes

Mentees would benefit from Mentors that are more informed and are able to provide them (Mentees) with relevant information about their academic advancements.

Keep Informed

Courtney S *(Former Class Lead)*
Anonymous Dream Project Mentors

Primary Values, Motivations, and Concerns

Student Mentors stated that they valued that they any information about Mentees, for example, it is good to be able to see if they have done the FAFSA. They also valued using a 'record-keeping system' and it is good to be able to store any new information they get about their students, such as test scores, and be able to access it wherever and whenever they wish with an internet connection.

They are only motivated to use the system as it is part of their curriculum and they do believe it is a good idea to have the information online for future Mentors to see and for the sake of the dream project being able to analyze it.

Needs and Wants Analysis

From the system they want to gain easier access to events as there isn't a direct link when you log into the system. They said they only access the events via email as it is much easier and takes less time. A feature that is lacking in DreamSIS is a walkthrough feature, showcasing all the tools available to Mentors and high school leads as most of them are not proficient with the capabilities of DreamSIS.

Expected System Changes

Changes that they wish to see in the system include changes to the college information that students have on their profiles - such as a check box for 'college bound' students and a list of colleges they applied to and maybe an attachment to the essay they wrote for that college so they can refer to it in the future. A formal introduction for Mentors about DreamSIS would be a welcomed feature.

Requirements List

Keep Informed

Requirement	Description	Priority (1 - 3)	Required By
Make a walkthrough of DreamSIS to let high school leads learn more.	High school leads will be provided with a detailed documentation of DreamSIS. They will also be provided with frequent refreshers on their responsibilites and tasks.	1	Former Class Lead (Courtney S.)
Create formal introduction/ workshop focused on DreamSIS	Lectures tend to talk about DreamSIS during lectures, but is never a focus.	1	Former Class Lead (Courtney S.)
Provide easier access to events on DreamSIS	The current system doesn't allow for easy access to events - most Mentors go through their email	2	Anonymous Mentors
Show a list of colleges that the Mentee has applied to on the Mentees profile	A list of colleges applied to should be added to the Mentee profile as this allows an easier view of the Mentee information.	2	Anonymous Mentors
Encourage Mentors to attend Dream Project lectures	Lecture material provides Mentors with effective training materials for carrying out their roles and tasks.	2	Anonymous Former Class Lead
Introduce a 'college bound' checkbox for students' profiles	Additional information about students is helpful to future Mentors and also to add to DreamSIS data	3	Anonymous Mentors
Provide a link to the college essay that the Mentee has written	On the Mentees profile there should be a link allowing the Mentor to see the previous essays written by that student as a reference for the future.	3	Anonymous Mentors

Manage Closely

Requirement	Description	Priority (1 - 3)	Required By
Needs to make sure that the data inputted into DreamSIS is accurate	As the Director of the program, it is important to maintain integrity and accuracy of the data collected.	1	Jenee Myers Twitchell
Needs to make sure the data is up to date	She is responsible for writing proposals for benefactors and donors of the Dream Project	2	Jenee Myers Twitchell

Monitor

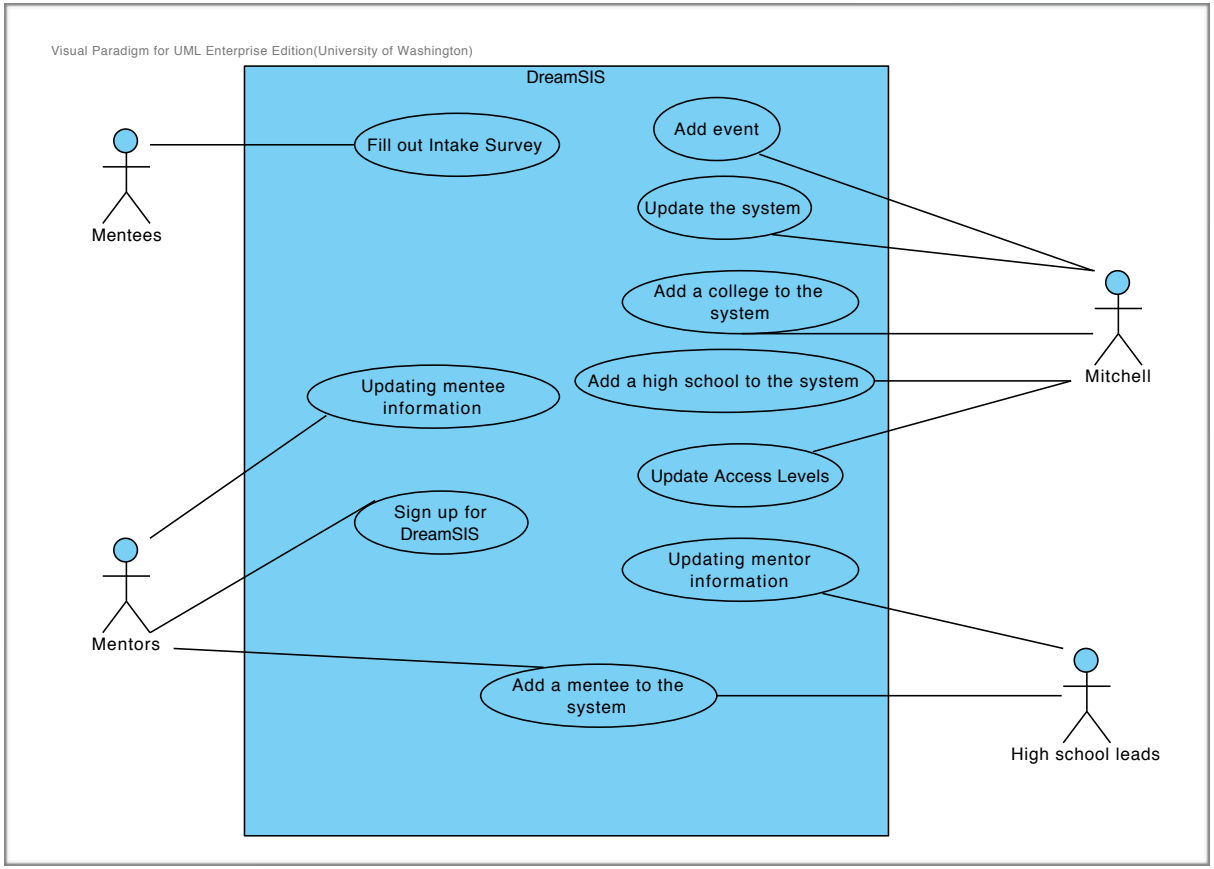
Requirement	Description	Priority (1 - 3)	Required By
Need Mentors to understand what's in the system	The effectiveness of the Mentors work with the Mentees depend on how well the Mentors know and understand their Mentees' information	3	Anonymous Mentees

Keep Satisfied

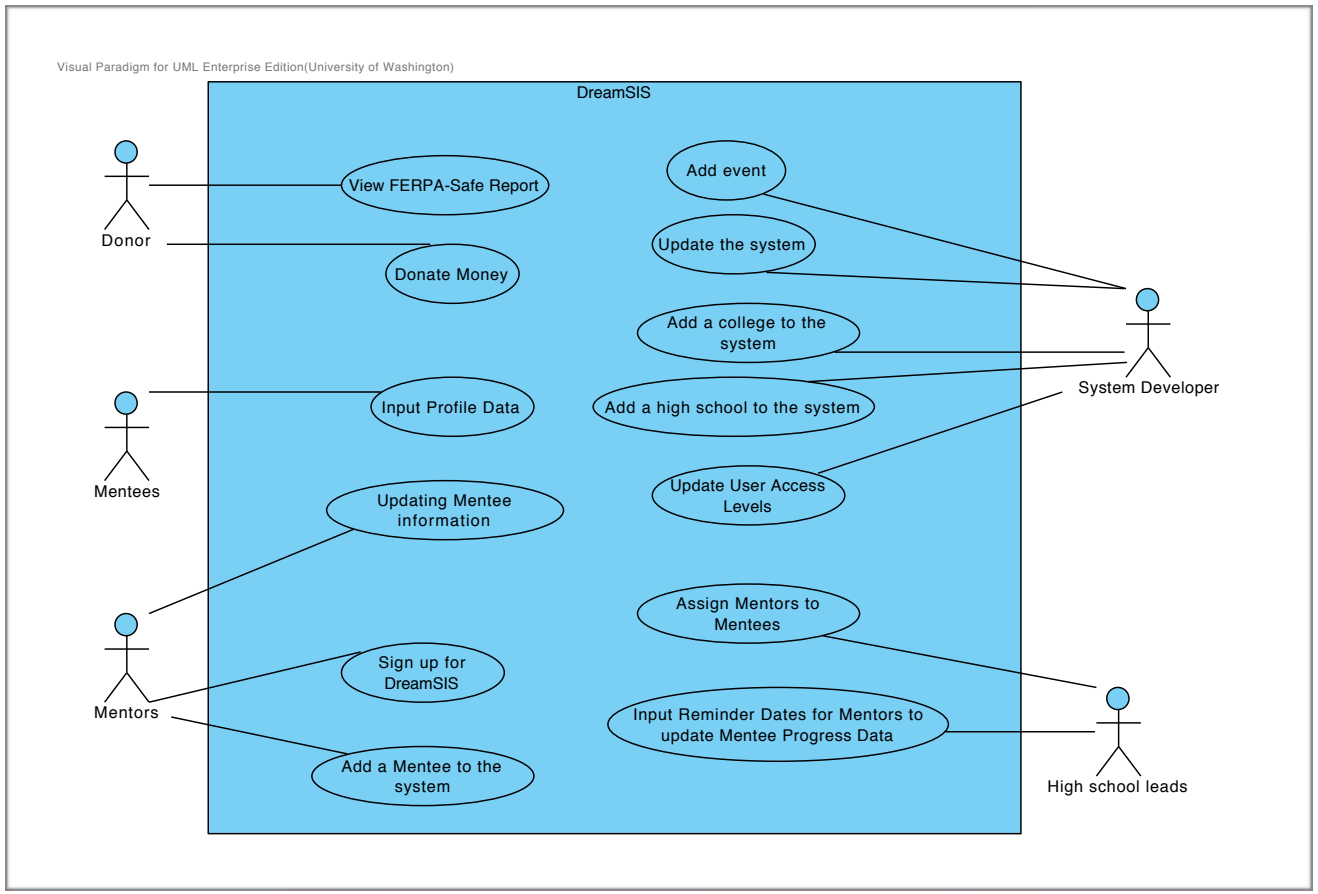
Requirement	Description	Priority (1 - 3)	Required By
Notify and remind Mentors to complete Mentee information	Most of DreamSIS's data relies on Mentors inputting data on behalf of Mentees, requiring high school leads to constantly remind Mentors. Give Mentees access to DreamSIS so that they can directly communicate with the system.	1	Mitchell Harper (Student Technical Director)
Maintain accuracy and integrity of DreamSIS data obtained from Mentee forms	inputted manually by high school leads and Mentors, but sometimes data doesn't match. Handwritten errors occur. 90% of data entry is manual and through this form. FAFSA too (one of the most important data points we get). And college apps.	1	Mitchell Harper (Student Technical Director)
Needs to make sure that all Mentee data is up-to-date	As the person who is in charge of the data, he is responsible for making sure that Mentors and high school leads are doing their jobs	1	Jason Bartlett
Make it easier to input Mentee data	This is important because it is a hastle for high school leads having to enter the data from over 100 Mentee intake surveys	1	Thomas Phan (High School Lead)
Have a standardized DreamSIS training procedure	High school leads are given control of how they want to train their Mentors on inputting data, however not all high school leads are remembering to do this, or putting a huge emphasis on this.	1	Thomas Phan (High School Lead)
Needs to be able to oversee progress of high school leads	He needs to be able to check high school leads' data progress in order to figure out who is doing their job.	2	Jason Bartlett
Reorganize the dashboard	Sort out what's important since it's currently just a long list	3	Mitchell Harper (Student Technical Director)
Reorganize Mentee profile page	Wants to be "more thoughtful about how we're displaying information	3	Mitchell Harper (Student Technical Director)
Reorganize display of Mentor management of Mentees	it's a big long list of Mentees	3	Mitchell Harper (Student Technical Director)
Automation of data input from highschools	Maintain more accurate information without relying on outside resources through interaction with Mentors, Mentees, and schools.	3	Mitchell Harper (Student Technical Director)

Behavioral Analysis & Design

Behavioral Diagrams Analysis & Revision Summary

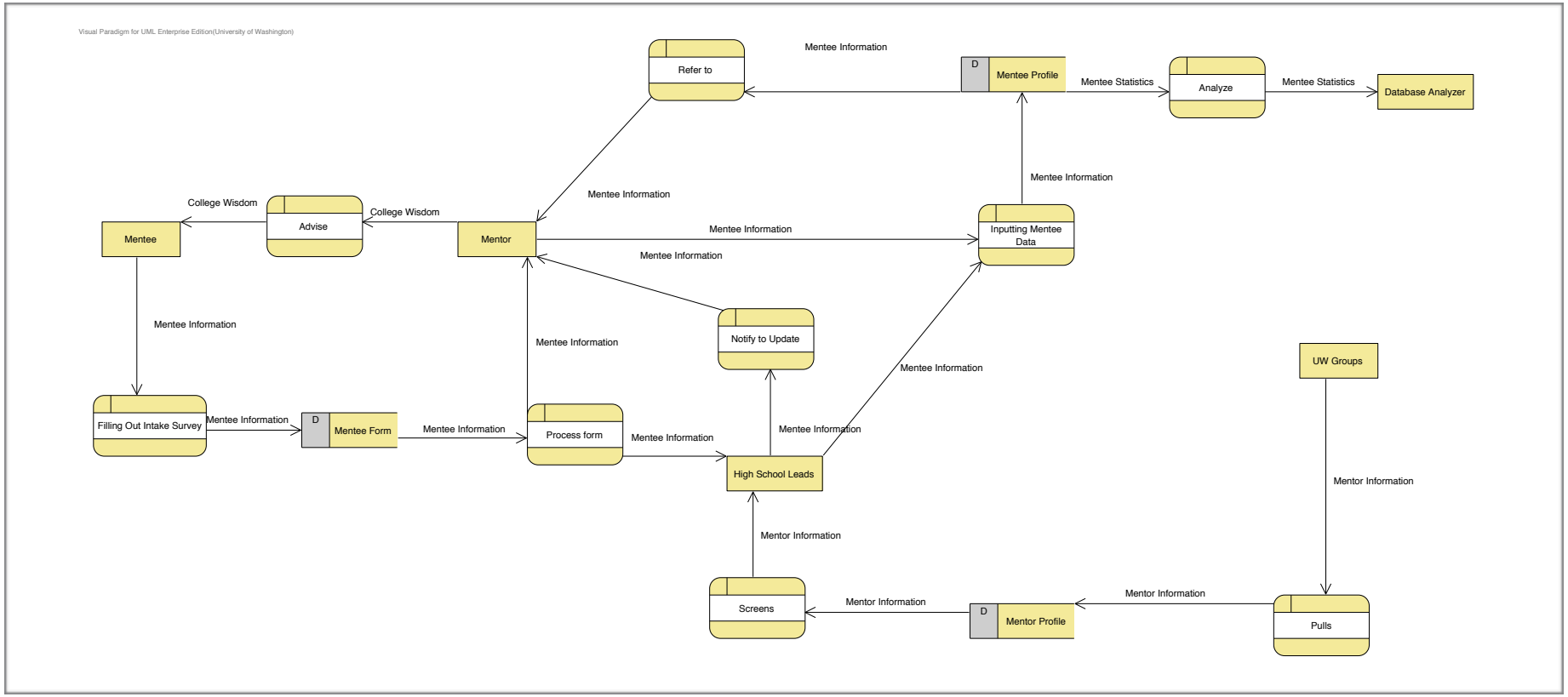


INITIAL USE CASE DIAGRAM

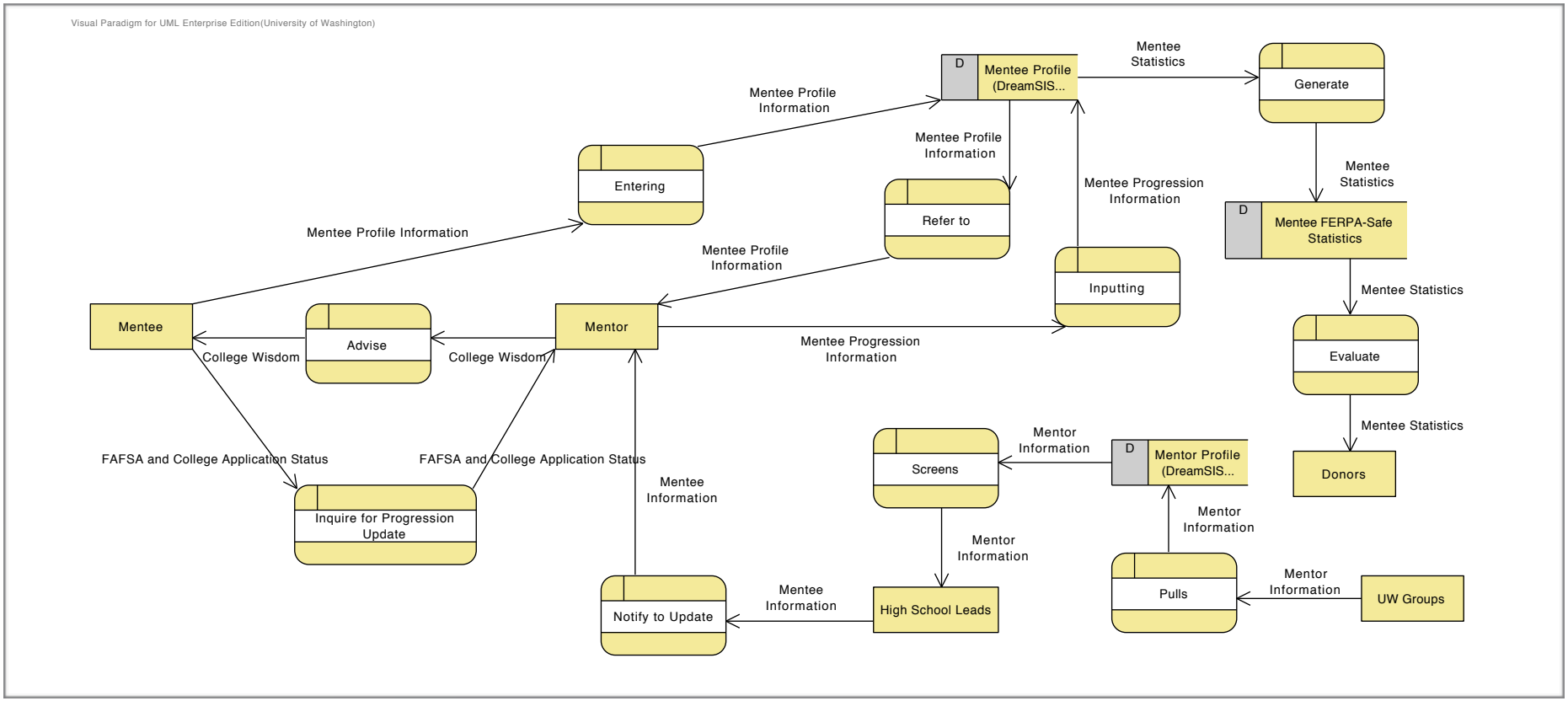


REVISED USE CASE DIAGRAM

In the revised Use Case Diagram, there is a new donor level access that includes new activities including “View FERPA Safe Report” and “Donate Money”. The previous Use Case Diagram did not allow donors access to DreamSIS to find out more information about DreamSIS. Secondly, there is a new Mentee level access. For Mentees, now there are new activities that allow them to “input profile data”. In the previous version, Mentees didn’t have access to DreamSIS, instead they filled out a paper intake form which the Mentor them inputted into DreamSIS manually. Within High School Leads, there is a new activity that allows High School Leads to“ input reminder data for Mentor to update Mentee data”. In the previous version, HSL just notify Mentors either in person or by email. This new activity is a part of a new reminder system we want to implement. Additionally, we also added another activity, “Assign Mentors to Mentees”. In this new revised version, Mentors are the only people that “add a Mentee to the system”, instead of High school leads and Mentors both adding them. Lastly, we changed Mitchell’s name to the more general title, “System Developer”.



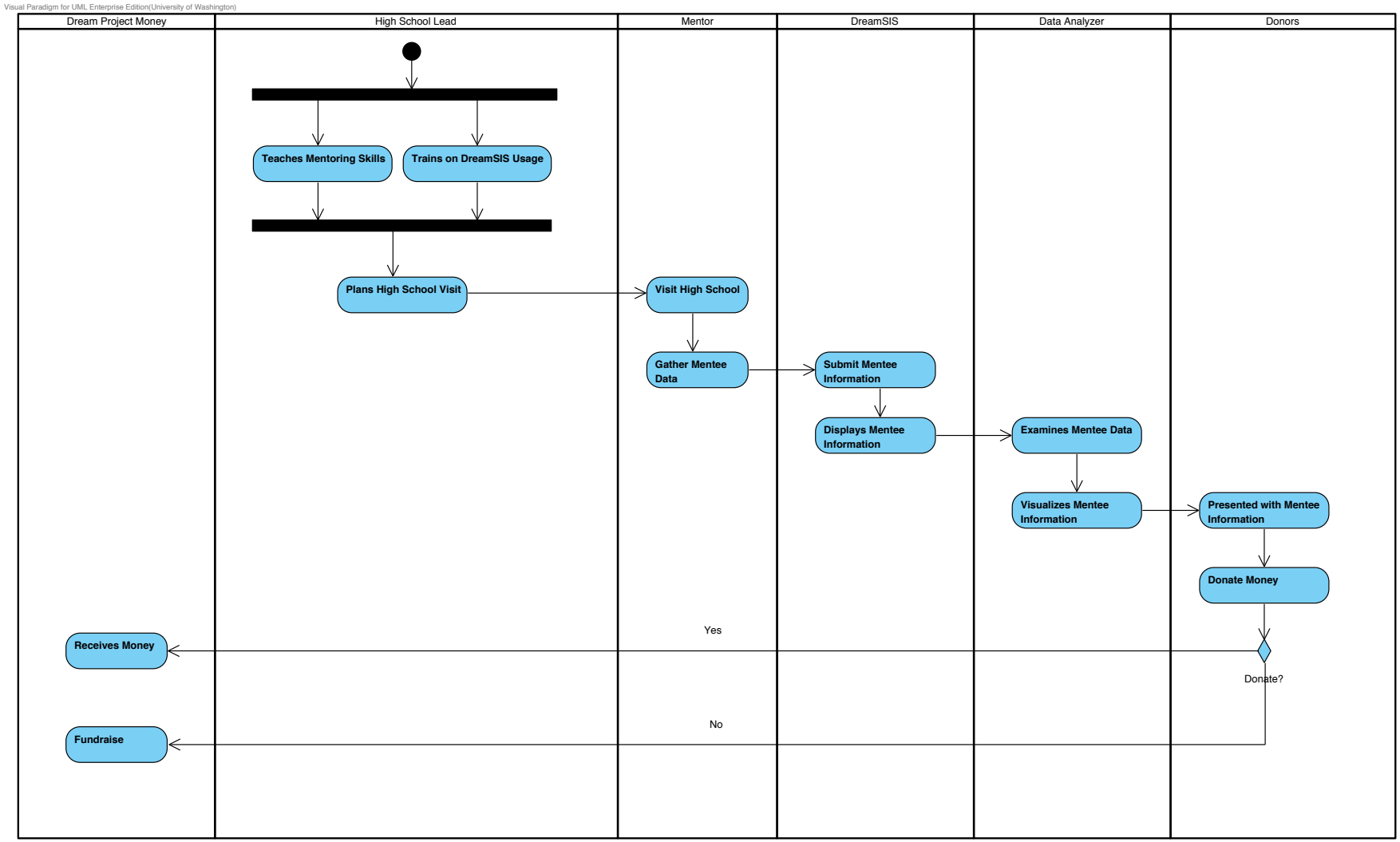
INITIAL DATA FLOW DIAGRAM



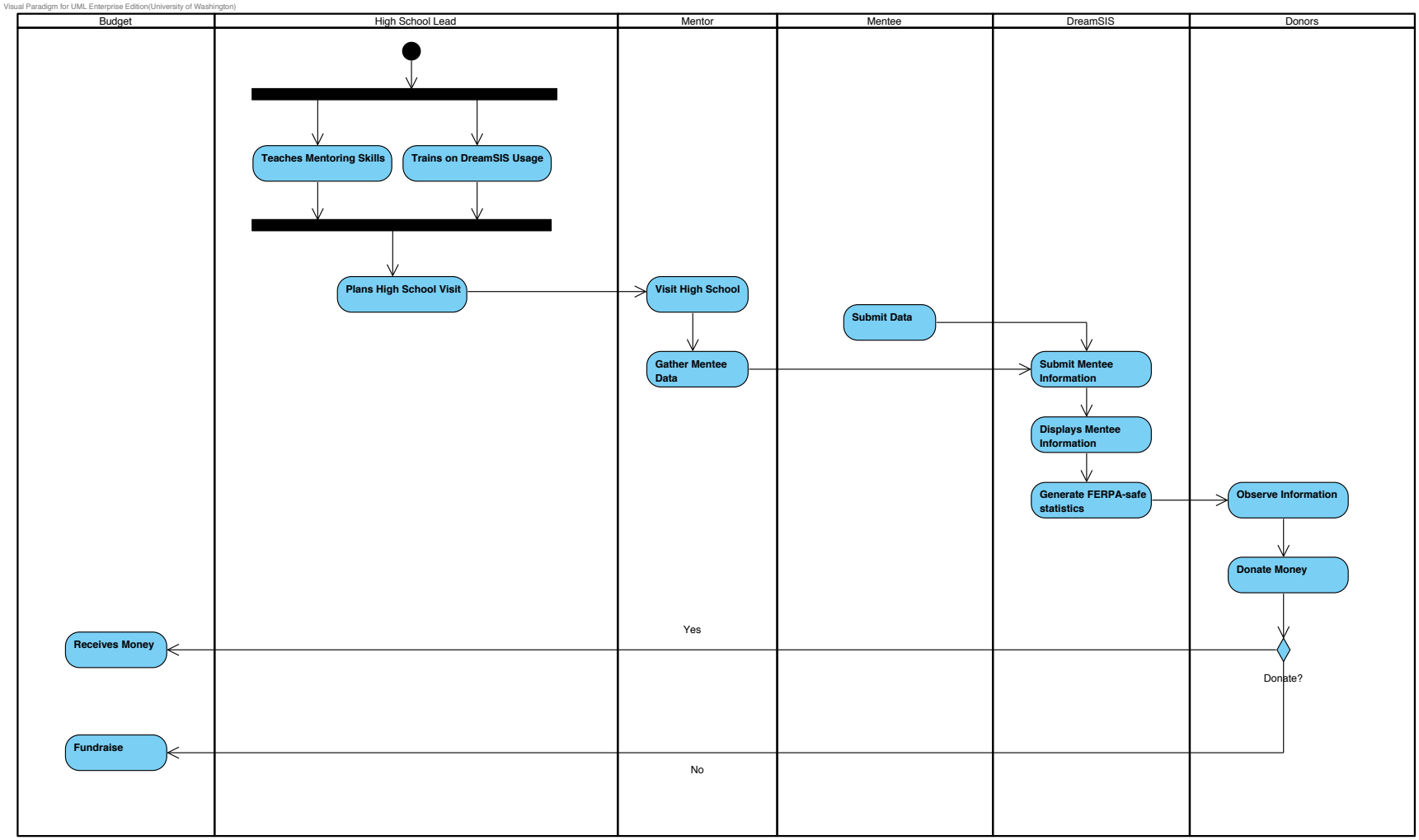
REVISED DATA FLOW DIAGRAM

Our revised Data Flow Diagram incorporated several structural changes. There is a new process between the Mentor and Mentee source/sinks which is the “Inquire for Progression update” where Mentees can request information about their FAFSA and college application status. Mentee Profile Information data input can be improved by having Mentors bring portable devices with browsers to allow Mentees to enter information themselves during Mentor visits to their Mentees’ High Schools. This improvement requires that DreamSIS provides Mentees with an interface that is both desktop and mobile friendly. As such, we simplified the Mentee information input process by having it directly transferred from the Mentee to the Mentee Profile (via the “Entering” process). As Mentors handle and oversee their Mentee’s college progression information, they now enter Mentee Progression Information to the Mentee Profile as this was poorly worded in the earlier iteration. We further specified the locations of the Mentee Profile and Mentor Profile data stores by adding (DreamSIS) to the title. We focused on providing Donors and Benefactors with more real time information on DreamProjects endeavors; hence a new data store called “Mentee FERPA-Safe Statistics” with the “Generate” process to generate Mentee statistics were added. The “Donors” data sink will “evaluate” the statistics and will be able to make better decisions

based on more frequent information. The “Data Analyzer” source/sink was removed from the system as we concluded that the role does not play a role in entering or gathering information from the system.



INITIAL ACTIVITY DIAGRAM

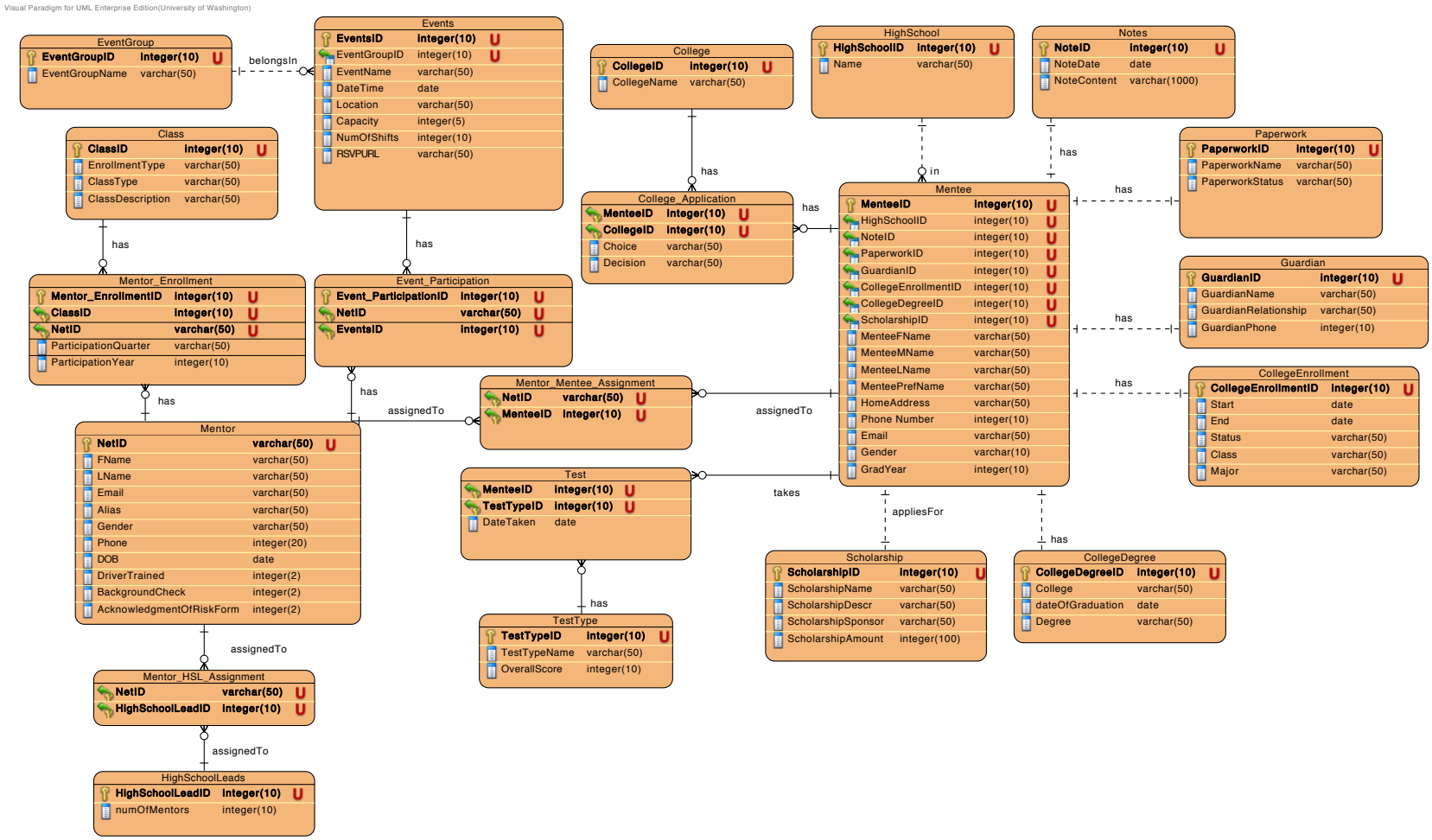


FINAL ACTIVITY DIAGRAM

After analyzing DreamSIS from an Activity Diagram perspective, we decided to implement several changes to address the issues we found. A “Mentee” swim lane was newly added to avoid opportunities for error. They are given the responsibility of submitting their own data themselves into DreamSIS instead of having them fill out a paper form and a Mentor manually inputting the information. In the Activity Diagram, this is depicted as “Submit Data” under the Mentee swim lane that goes into the DreamSIS swim lane’s “Submit Mentee Information” process. This will give the Mentee a more active role in DreamSIS, which is beneficial because Dream Project exists to serve Mentees and their academic endeavors. Another role that is modified in our revised Activity Diagram is the “Donor”. DreamSIS will have a new process to “Generate FERPA-safe statistics” to allow donors to have more oversight over DreamSIS. FERPA is vital due to privacy laws of student information, and making FERPA-safe statistical data will allow donors to make a more informed decision on whether to fund Dream Project.

Structural Analysis and Design

Initial Entity Relationship Diagram



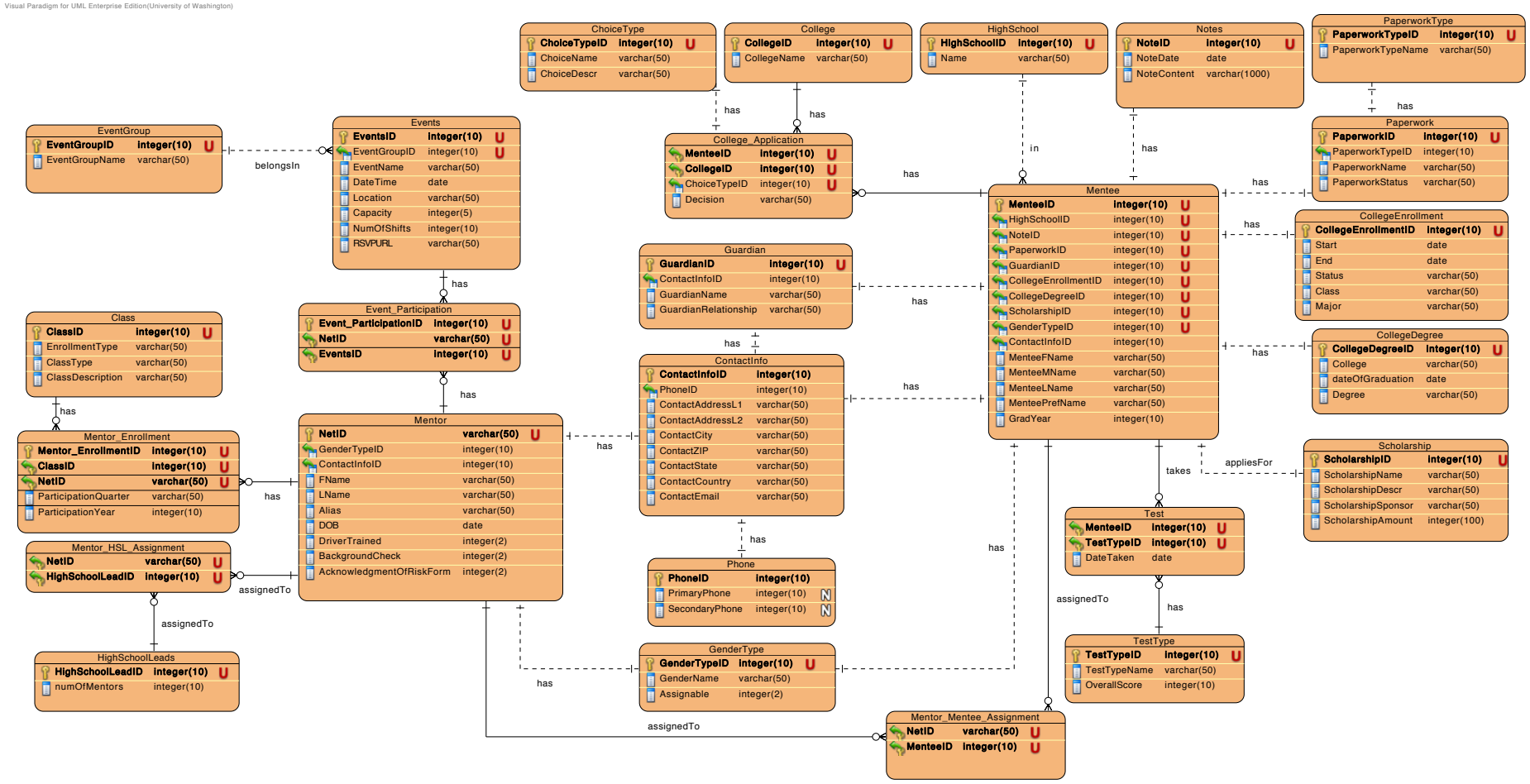
Data Structure - Current Database Problems

There were some problems that we saw when looking at the conceptual model of the DreamSIS database. In the first version of the conceptual model, there were issues with the gender attribute of the Mentees/Mentors entities. Instead of a gender attribute, there would be a separate entity that allowed Mentors or Mentees to choose to disclose their gender. This type of problem is described as an enumeration issue about the gender types of Mentor and Mentee. Secondly, we thought some of the multivalued attributes exist in our database should be broken up, such as the phone and address attributes in the table of Mentee. These multivalued attributes should be split up and added into new tables when necessary. For example, we added an entity, ContactInfo that connected to Mentor, Mentee, and Guardian. Thirdly, we found the details of Mentee and Mentor were not normalized. We should adjust our tables to make the database in the third normalization level.

Our initial conceptual data model was not sufficient for capturing the reality it was trying to model. Our ER diagram captured actions internally within the system rather than how the data was captured externally. All the entities and attributes need to be captured were currently available, although some of them may need to be normalized. we found there was one issue with our entity relationship. The Paperwork table needed to be redesigned to reflect paperwork status for each college a Mentee had applied to.

There were some limitations in our ER Diagram that would hinder the progress of the organization. First of all, some queries might be difficult to achieve, such as querying Mentees/Mentors by city, but that could be leveraged by disassembling multivalued attributes, such as the “Address” attribute. Secondly, some attributes changed very often, such as College_Application’s “Choice” attribute which needed to have a history record of changes for database durability. Also, keeping track of changes and progress of Mentees would give insight into Mentee trends. Some of the issues we mentioned above were somewhat out of the scope of our project, which focused more on how members of Dream Project interact with the database rather than reorganizing the structure. We will mainly focus on adding tables that will alleviate enumeration and solve multivalued attribute issues.

Revised Entity Relationship Diagram



Description of Changes

The changes we made were focused on enumeration and multi-valued attribute issues. Since we do not have the ability to foresee all types of genders, we created a separate gender table for Mentor and Mentees. This allows us to eventually add newly created genders to the gender table. We can also limit the gender choices (as discussed in class) with the assignable attribute in the event a new or existing gender isn't a valid choice anymore. To address false composite attributes, we broke them up into multiple attributes to be able to parse values. We decided to add a "ContactInfo" table to deal with the multi-valued attribute "Address", which can be broken up into more attributes such as zip code, city, etc. Since a phone number will always be associated with a person, we combined the phone number and address to create a new entity called "ContactInfo". This ContactInfo table is connected to Mentee, Mentor, Guardian. We also broke up attributes that deal with people names, which are composite attributes, into multiple attributes which are FName, MName, and LName.
In addition to normalizing the database diagram, we added type tables to give more context to some attributes. A PaperworkType table was created and attached to the Paperwork table to keep track of different types of paperwork such as FAFSA, college personal statements, and resumes, which are vital to the college application process of a Mentee. We also added a ChoiceType table to the College_Application table to distinguish the preferences of colleges that Mentees are applying to.

Recommendations

Introduction

This document presents an analysis of several options that Dream Project can consider to improve DreamSIS. The following tables include several system, hardware, and business process recommendations. We will also provide our own insights into which solutions are the most feasible and which should take priority when implementing. We have outlined some of the costs and benefits and analyzed these to understand which solution is most appropriate for DreamSIS to improve their system.

System Recommendations

The current infrastructure of DreamSIS adequately lays out the roles of its users. The addition of a Mentee View and a Donor View to DreamSIS' online system will bring more flexibility to DreamSIS' way of maintaining data as well as providing oversight from new perspectives.

Idea	Description	Costs	Benefits
Mentee View	An online form within DreamSIS that allows Mentees to type information about themselves to participate in Dream Project. Intended as replacement of currently used paper survey form.	1. Time spent on writing the code to implement this view and addressing potential bugs. 2. Teaching how Mentors should instruct Mentees how to input data. 3. Teaching Mentees how to input the data. 4. Writing documentation on how to use the Mentee View	Improve data accuracy because Mentees' can control the information they are putting into the database. Having portable devices will allow Mentees to be able to enter data at Dream Project offices and at their high school (see "Hardware Recommendations" section below)

Idea	Description	Costs	Benefits
Donor View	DreamSIS will newly generate a "FERA-safe statistics/report" to allow donors to have more oversight over DreamSIS. Donors will evaluate the reports generated by DreamSIS to decide if they want to invest.	DreamSIS will newly generate a "FERA-safe statistics/report" to allow donors to have more oversight over DreamSIS. Donors will evaluate the reports generated by DreamSIS to decide if they want to invest.	Allows donors to view DreamSIS data about how many Mentees end up going to college out of the Mentees that apply. This will be easier for donors to make informed decisions on whether to fund Dream Project. It will allow donors to feel like they are a part of the organization and system

Our System Recommendation

Both the Mentee View and Donor View are vital for DreamSIS, but we recommend to prioritize the implementation of the Mentee View. This is intended as a replacement for the current method of acquiring and inputting Mentee data, which is a paper form. Having a Mentee View within DreamSIS will reduce opportunities for error by having Mentees type information into DreamSIS themselves, instead of filling out a paper form and having a Mentor manually input information. Using portable devices to access the online Mentee View in order to retain the portability achieved by the paper form will further improve the system. This will be elaborated in the "Hardware Recommendation" section below.

Hardware Recommendations

Our main recommendation for DreamSIS is to invest in tablets, or any portable device that has the ability to digitize the process of acquiring Mentee data. We have a few options for how Dream Project can go about acquiring these tablets.

Options	Description	Cost	Benefits
Option 1 (Cheap)	Look for corporate sponsor to provide tablets for Dream Project	The corporate sponsor money could be spent on scholarships instead, which is more closely fits the goal of the organization. Also, Dream Project is a non-profit so they might not be interesting in partnering with a corporate company.	Receive new technology without having to increase their budget.
Option 2 (Midrange)	Renting tablets/computers from Classroom Technology (http://www.css.washington.edu/)	There may not always be a tablet spare to borrow from UW, so it isn't as reliable as having Dream Projects own tablets. It also costs some amount of money to borrow the tablets.	Quick way to access hardware that can be taken to the high school that same day. Not as expensive as buying tablets.
Option 3 (Expensive)	Buying new tablets for Mentors to bring to the High Schools for Mentees to update their personal progress	It costs a large amount of money to buy brand new tablets.	More accurate statistics because more Mentors and Mentees will be inputting data. Improve efficiency of data input.

Our Hardware Recommendation

We recommend that Dream Project should initially start with Option 2, by renting tablets from Classroom Technology at UW. It would be a more efficient way of collecting intake survey data compared to the paper forms. This would make collecting data more immune to mistakes. It is also a faster process of collecting information. Once the option of borrowing tablets is successful, we recommend Dream Project lean towards Option 3 down the road, if Option 2 becomes successful. Option 2 is a test run for Option 3, because borrowing tablets is much cheaper than the organization buying their own tablets.

There are some important results of DreamSIS using tablets. Primarily, Mentors can give these tablets to the Mentees for updating their progress on applying to colleges at the Dream Project office or at their high school. Additionally, Mentees can also add personal information about themselves on DreamSIS, in person, contributing to the integrity of the data.

Business Process Recommendation

The current business process of DreamSIS lacks some efficiency and flexibility on the interaction among Mentors and Mentees. The additions we put here help DreamSIS standardize the way Mentors interact with DreamSIS, ensure Mentors and Mentees update their data in time and control the behaviors of Mentees and Mentors in a higher efficiency.

Idea	Description	Costs	Benefits
Documentation	Help Mentors use DreamSIS in an agreed, common standardized way by creating a written set of instructions.	It may take a lot of time to write the documentation needed.	High School Leads spent less time training Mentors how to use DreamSIS. Rather, they can present a quick introduction and then refer them to the documentation.
Create notifications / Requests System	1. Mentors receive notifications reminding them to input/update information about their Mentees via DreamSIS. 2. Mentees will have a more active role in updating DreamSIS data by being able to request that their data be updated too (ie FAFSA, college app statuses, etc). 3. High School leads will have the ability to schedule notifications for Mentors 4. This replaces the old way of High School Leads reminding Mentors in person or by email.	1. Time spent on writing the code to implement this view and addressing potential bugs. 2. High School Leads may forget to schedule notifications for Mentors 3. Mentors still might ignore these notifications to update data	It spreads the workload across time so that the Mentors don't have to upload all the information about Mentees last minute at the end of the quarter.
Giving control to Mentors to add Mentees	Mentors will be the only users that can add Mentees, instead of both Mentors AND high school leads to reduce redundancy.	Mentee information may not be updated immediately if high school leads have different users' information from Mentors but they don't notify Mentors in time.	Keep data consistency and integrity. Reduce redundancy and avoid mode potential errors.

Our Business Recommendation

Our main recommendation for DreamSIS is to implement and create a notification or request system to remind Mentors to input/update their Mentee data. This is a high priority for DreamSIS, given that that accuracy of their data is important for presenting their impact on the high school students they are Mentoring. Having an abundant amount of data that is accurate will help Dream Project demonstrate the effect of their services to potential donors or the general public. Additionally, this will give High School Leads more time to accomplish other duties by helping prepare Mentors in the quiz sections, instead of constantly reminding Mentees to update their data.

Closing Thoughts

By implementing these recommendations and features, DreamSIS will be able to focus their energy more on helping students than worrying about the integrity of the data within the system. Instead of having Mentors and high school leads deal with the system and data issues, they can focus their efforts on the actual training and personal work with their Mentees.

Dream Project and its members have our greatest gratitude for participating in our system analysis. We would especially like to thank Mitchell Harper for his commitment and contributions to the improvement of DreamSIS.