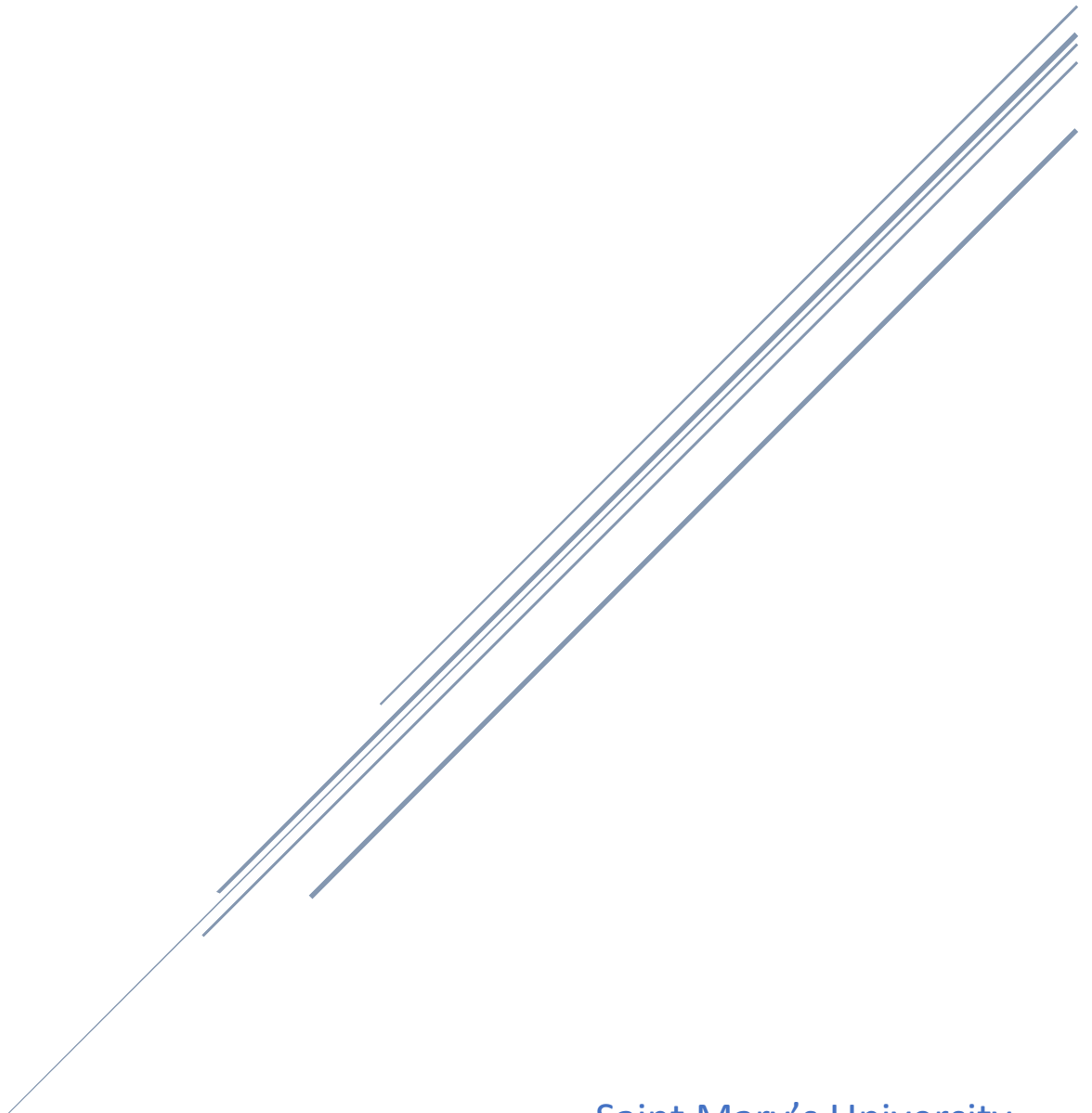# IMPROVING EFFICIENCY FOR CENTRE OF STUDENTS WITH DISABILITIES

REPORT FOR A04, UI/UX DESIGN AND EVALUATION

Saint Mary's University
MCDA 5520 - UI/UX

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GROUP MEMBERS

- Fasuyi, Morounkeji
- Leong, Madeleine Min Jing
- Neveditsin, Nikita
- Sadi, Sadman Hoque
- Shree, Bhagya
- Tong, Xinyun

ROLES/TASKS OF EACH MEMBER

Fasuyi, Morounkeji: Interview transcripts, participating in sketches design, participating in design thinking process, recording interview, taking interviews, reports review, participating in user studies

Leong, Madeleine Min Jing: Participating in sketches design, participating in design thinking process, taking interviews, reports review, participating in interview questions preparation, analyzing user studies' data

Neveditsin, Nikita: Participating in sketches design, participating in design thinking process, taking interviews, reports review, project coordination, participating in prototype design, questionnaire making, participating in interview questions preparation, participating in user studies

Sadi, Sadman Hoque: Participating in sketches design, participating in design thinking process, taking interviews, reports review, participating in prototype design, coordinating activities/meetings with CSD

Shree, Bhagya: Participating in sketches design, participating in design thinking process, taking interviews, reports review, project coordination, communicating with CSD employees, recording user interactions for UI evaluation, participating in user studies

Tong, Xinyun: Participating in sketches design, participating in design thinking process, taking interviews, reports review, project coordination, participating in prototype design, participating in interview questions preparation, online voting process organization

GENERAL DESCRIPTION OF THE PROJECT, ISSUES OBSERVED

A typical task of the employees of Centre for Students with Disabilities (CSD) is to provide support

- i.e. ensuring adequate facilities are present within the classrooms and particularly the exam rooms

- to students with disabilities who are currently within their database of students with special needs.

This is unfortunately hindered by their inability to efficiently track information about students (e.g., courses that students take, when an exam is scheduled, did students drop some courses, etc.) since students sometimes drop or add courses during the semester and may not remember to inform the CSD office regarding that. This causes the CSD employees to check up on the course registration of each student one by one using the banner platform, which is a very time consuming and laborious task for them.

The main purpose of the project is to improve efficiency of daily activities of CSD employees so that they can focus on more important problems that clients of CSD face.

METHODS OF REQUIREMENTS GATHERING

Step 1: A meeting with employees of CSD

- ➤ *Purpose:* Issues identification

- ➤ *Date:* October 12, 2018. Time: 2:30 PM

- ➤ *Place:* CSD

- ➤ *Participants:* Two employees of CSD, 5 group members

- ➤ *Core questions to employees of CSD:*

  - • "What kind of problems do students-clients of CSD have?"

  - • "What difficulties do you face during your working day?

➢ **Results:** Got two issues:

- Problem with navigation on campus (from students' side)

- Problem with efficiency of tracking students' status (from CSD side)

After long discussions and multiple voting processes the decision was made to work on the problem with efficiency of tracking students' status. It was challenging to identify a clear persona for the navigation problem.

Step 2A: A formal interview with employees of CSD

➢ **Purpose:** Requirements Gathering

➢ **Date:** October 26, 2018. Time: 2:00 PM

➢ **Place:** CSD

➢ **Participants:** An employee of CSD, 4 group members

➢ **Core questions to employees of CSD:**

- "How frequently do you check the student banner for student schedule?",

- "What is the current procedure of maintaining information about students?"

- "On an average, how many times do you check the banner?"

- "What are the core things that you would like to see integrated?"

- "What kind of information about students do you track?"

➢ **Results:** Requirements collected for the product

Step 2B: User Observation

- *Purpose:* Requirements Gathering

- *Date:* October 26, 2018. Time: 2:30 PM

- *Place:* CSD

- *Participants:* an employee of CSD, 4 group members (TODO: really 4?)

- *Question asked:* "Can you walk us through what you would do on the banner?"

- *Results:* An employee of CSD showed us what they usually do to get information about students and what kind of information it is.

User observation gave us better idea about user requirements

Step 3: Design Thinking
After voting and placing our ideas on Importance-Feasibility graph we got the following results:

- *No-brainers:*

  - Stand-alone application ← chosen after voting

  - Self-service banner add-on

- *Big Bets:*

  - Automated phone calling system

- *Utilities:*

  - Email notification system

  - Web portal for students

- *Unwise:*

  - Some additional physical person

  - Delegate problem to 3rd party company or ITSS

GATHERED REQUIREMENTS

Overview

The solution should be able to:

- Provide CSD employees with daily alerts on student activities (e.g., course drop, not showed up etc.)

- Maintain a database with all current students who are registered with CSD

- Provide a user interface that allows to browse a list of all current students who are registered with Centre and show at least the following information:

    o Student's phone number, address, e-mail address

    o List of courses

    o Schedule of classes

    o Schedule of exams

    o Special requirements

    o Emergency contact info

- The solution should interact with SMU banner system to get information about students from it

Requirements: Data Requirements

- ***Type of Data:*** persistent database storage with daily backups

- ***Amount of data:*** up to 2 gigabytes/year

- ***Accuracy requirements:*** no special requirements as working with floating-point numbers is not necessary

- The data storage should be fault-tolerant (e.g., redundant database or 3rd party data storage provider)

- Data should be secured so that no 3rd parties have unauthorized access to it

Requirements: Environmental Requirements

- **Physical**

  o No special requirements. However, solution should be accessible in terms of interaction with students if there are such interactions

- **Social:** collaboration/corporation

  o Data is shared among multiple users. Race conditions/deadlock should be avoided while manipulating data

- **Organizational**

  o Should have an intuitive interface with no additional training required. Application support should be feasible by MCDA students

- **Technical**

  o Should work on any desktop machine with modern browsers

  o Internet connection should be provided

  o Should have access to SMU Banner system

Requirements: User Requirements

- **Intended user group:** CSD employees

- **Type of user:** Casual

- **Age groups:** mature specialists (20+ years old)

- **Abilities:**

  o   Basic computer skills

  o   Knowledge of CSD working environment and daily tasks

  o   No previous experience is required

- **Special needs:**

  o   Clients are students with disabilities

  o   Might be used by future employees with disabilities

Requirements: Usability Requirements

- Reliability and responsiveness

- Field maintenance and serviceability

- Efficiency

- Intuitive design and learnability
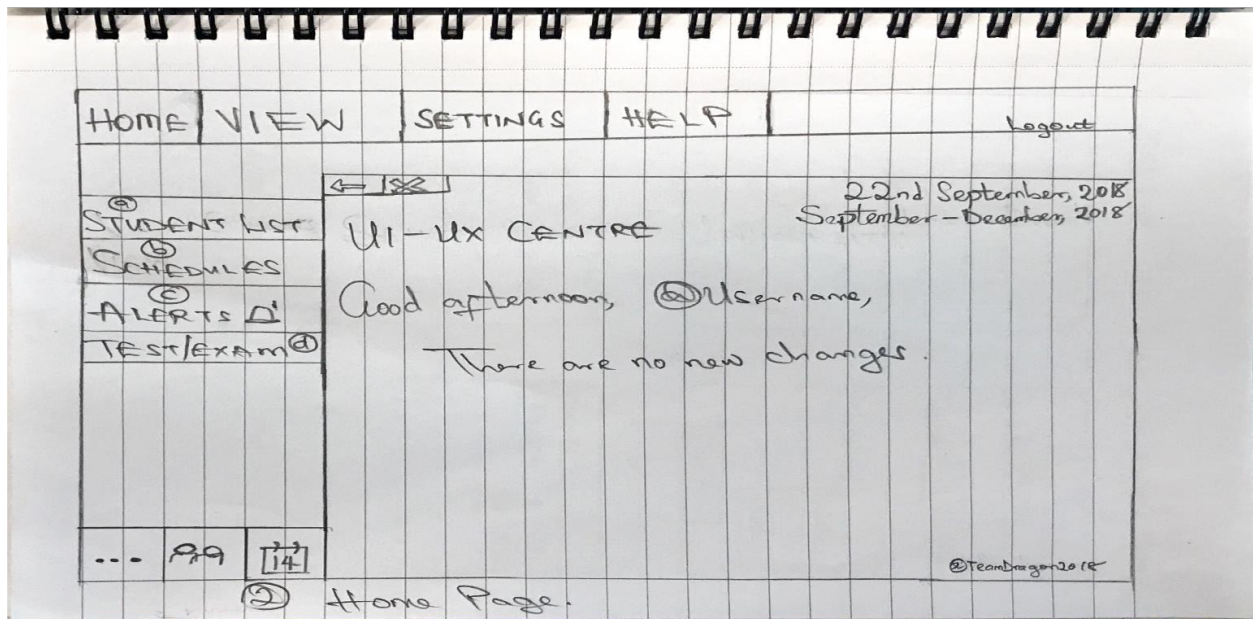
DESIGN
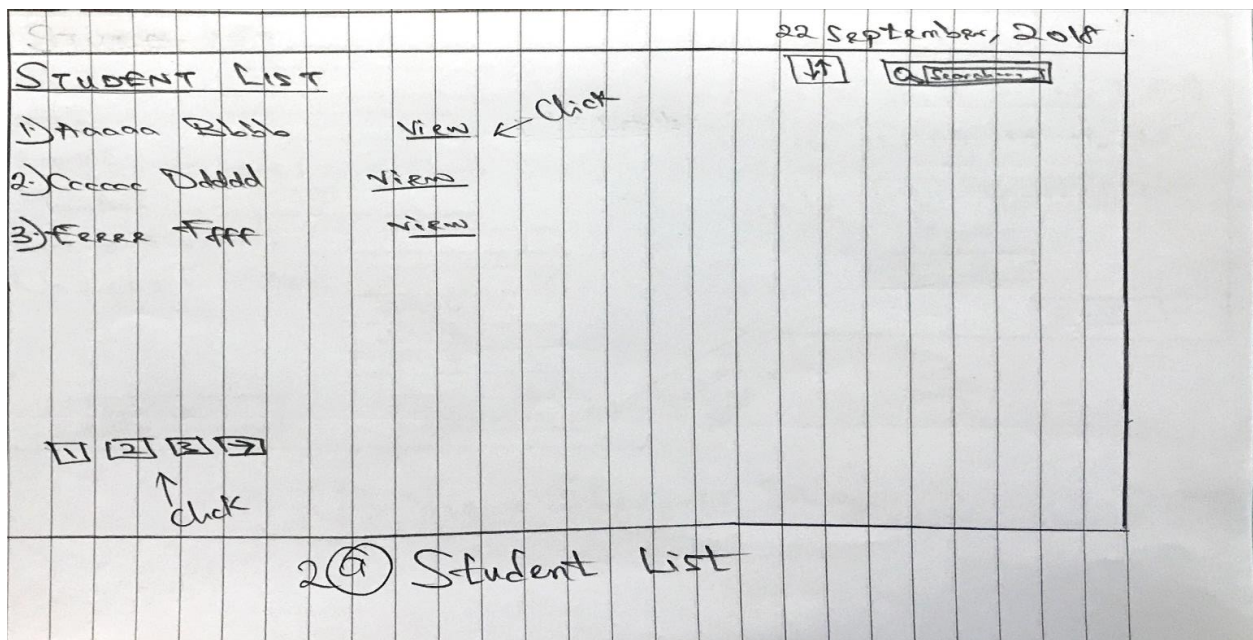## Initial Sketches

Figure 1: Initial Homepage Design

Figure 2: Initial Student List page design

Figure 3: Initial Student Info Page

Figure 4: Initial Alert Settings page

STUDENTS	DATE	Room	COURSE		
Aaaa Bbbb	10-03-19	R106	FIN2601		
Cccc Dddd	11-03-19	R107	2141		

[ADD] [SEND EMAIL]   [EXIT]

(2d) Test & Exam Notification.

Figure 5: Initial Test & Exam Notification page

Design: Heuristic Evaluations

Heuristic evaluations helped to identify the following design flaws (summary):

- Lack of confirmation messages when deleting information

- Design is too complicated: not minimalistic and not very intuitive

- Meaning of some buttons/links is hard to figure out

- Some pages have duplicate information

- Hard to navigate (e.g., hard to go to home page)

- Too many pop-up windows: kind of outdated design

- Combination of horizontal and vertical tabs may be confusing

- Poor error handling

Design: Revised Sketches

1. ***Login Page*** - The first page a user sees on launching the application.

Figure 6: Revised login page

2. ***Dashboard*** – This is the landing page after a user logs on to the system

Figure 7: Revised Homepage

3. ***Student List*** – On this page, a user can search for student by either name or A#. Drop down selections will be used to make the process faster.

Figure 8: Revised Student page

4. ***Schedule*** – On this page, the user can view scheduling information for test and exams or tasks for the day.

Figure 9: Revised Test & Exam Schedule page

5. ***Settings*** – This page is for users to configure some functionality of the system.

The frequency of the alerts received by the user either by email or SMS can be configured.
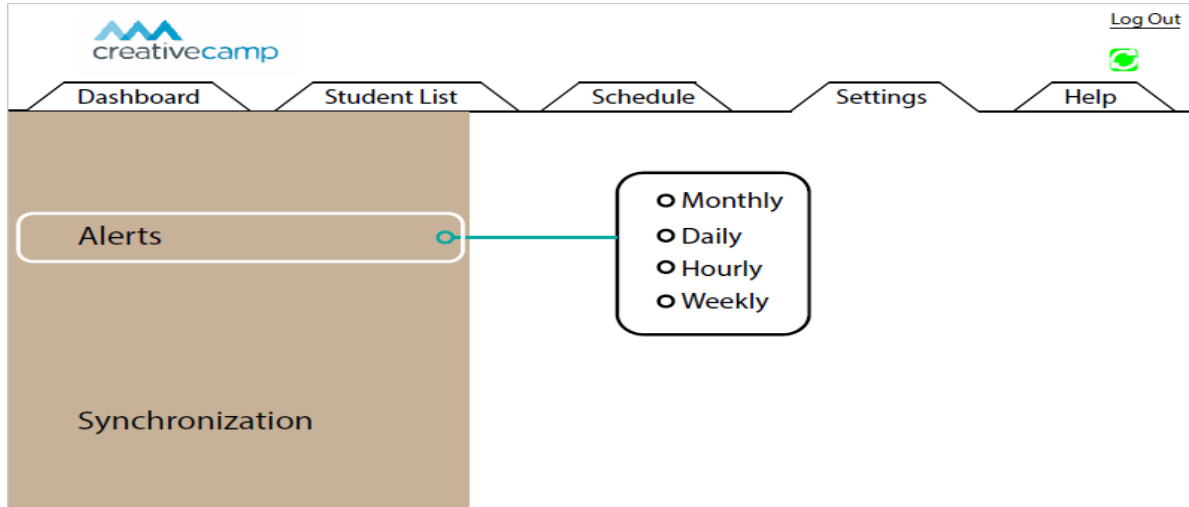
Figure 10: Revised Alerts Settings page
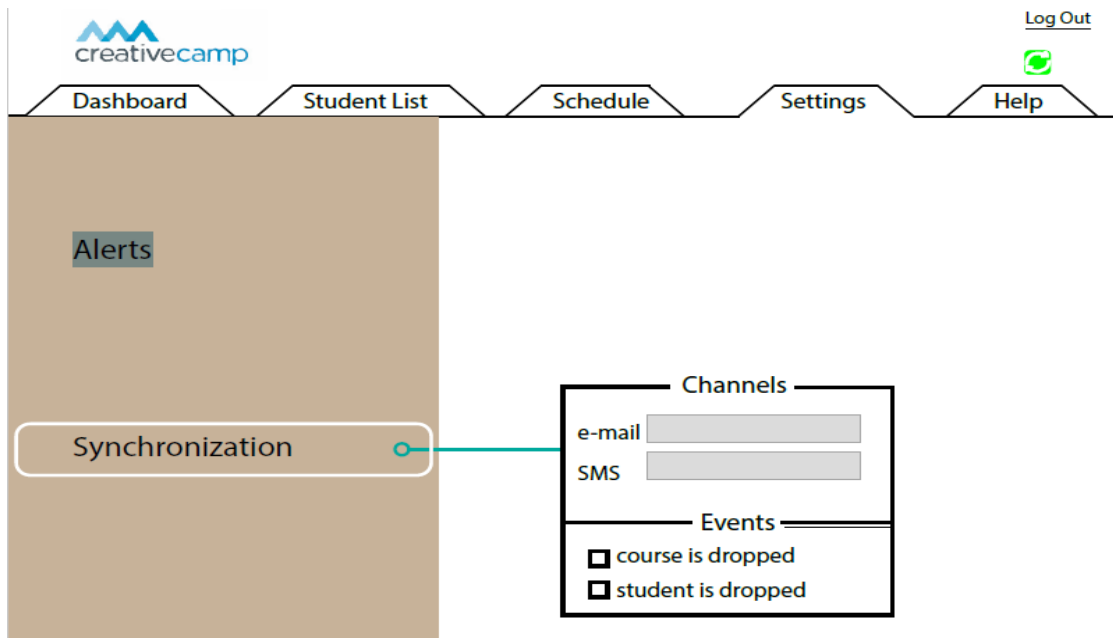
Figure 11: Revised Sync settings page

6. ***Help -*** Although we hope that a user does not have to use this feature because the interface should be easy to navigate through, we provided a help page for user support.
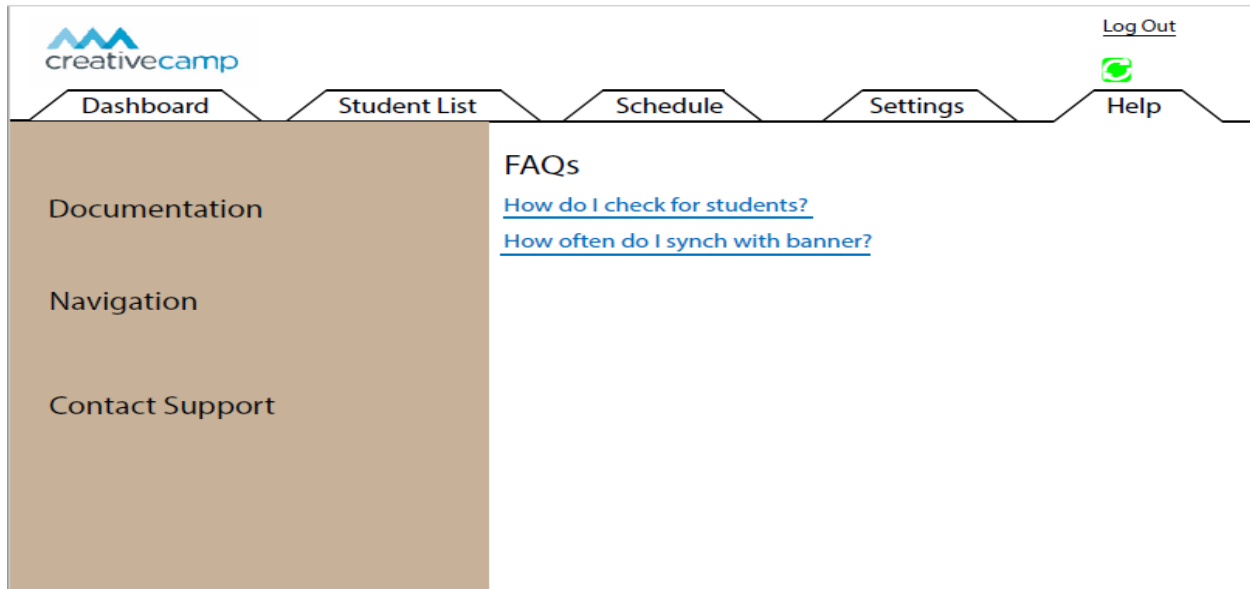
Figure 12: Revised Help page

7. ***Error Prevention –*** This is a confirmation dialog box that will pop-up after any delete action to prevent any accidents.
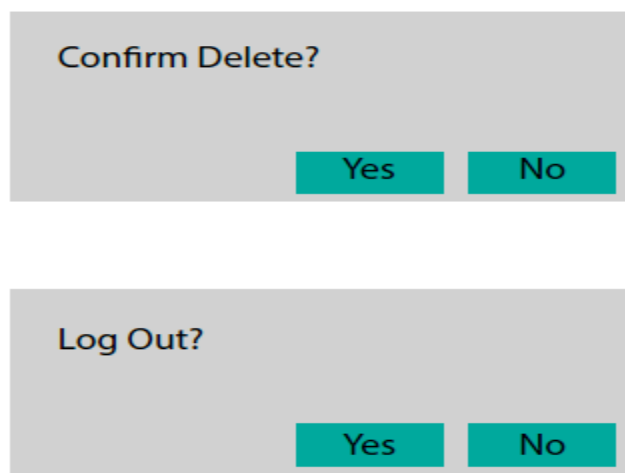
Figure 13: Revised error prevention

Design: Prototype

Prototype was created using proto.io tool

USABILITY STUDIES

Overview

➢ **Participants:** Two employees of CSD:

- *Age group:* Adults

- *Occupation:* CSD employees

- *Computer skills:* General (office applications, internet browsers)

➢ **Equipment/instruments used and environment:**

- *UI:* Prototype of web application (https://pr.to/8VRNJX/)

- *Recording equipment:*

  ▪ Laptop with screen recorder

  ▪ Audio recording equipment (mobile phone)

- *Location of the study*: CSD premises

➢ **Date of the studies:** November 23, 2018. Time: 2:00 PM

Usability studies: Task List

- Check if the proposed solution can help users of the application to get information about students faster than with the existing tools

- Check if the proposed solution can help users to schedule some event for a student faster than with the existing tools

- Make sure that the user interface is intuitive

Usability studies: Task 1

- ➤ **Task:** Check if the proposed solution can help users of the application to get information about students faster than with the existing tools

- ➤ **Question:** can a CSD employee get information about students using our application faster than with the existing tools?

- ➤ **Hypothesis:** a CSD employee should be able to get the information at least 2 times faster than with the existing tools

- ➤ **Variables:**

  - o *Dependent:* use of our prototype VS use of the existing system

  - o *Independent:* time

- ➤ **Procedure:**

  - o Prepare a laptop with screen recording software and open a prototype (team members)

  - o Ask a participant to perform these tasks on the laptop with recording software (team members):

    - ▪ Find a student in the application and get the needed information (courses, address, phone, etc.)

  - o Each participant follows the described steps (participants)

  - o Ask some related questions (see interview transcript below) //in the end of all tasks

  - o Propose to fill a questionnaire (see a questionnaire below) //in the end of all tasks

Usability studies: Task 1: Results

Participant 1	Participant 2	Average Time taken (existing application)	Average Time taken (new application)	Difference
25 sec	20 sec	1.5 min (90 sec)	22.5 sec	4.0x faster

Usability studies: Task 2

➢ **Task:** Check if the proposed solution can help users to schedule some event for a student faster than with the existing tools

➢ **Question:** can a CSD employee schedule some event for a student using our application faster than with the existing tools

➢ **Hypothesis:** a CSD employee should be able to schedule some event for a student at least 1.5 times faster than with the existing tools

➢ **Variables:**

- o *Dependent:* use of our prototype VS use of the existing system
- o *Independent:* time

➢ **Procedure:**

- o Prepare a laptop with screen recording software and open a prototype (team members)
- o Ask a participant to perform these tasks on the laptop with recording software (team members):
- o Schedule an event for some student on January 26 2019 (Task 2.1)
- o Check all events on January 24 (Task 2.2)
- o Each participant follows the described steps (participants)

- Ask some related questions (see interview transcript below) //in the end of all tasks

- Propose to fill a questionnaire (see a questionnaire below) //in the end of all task

Usability studies: Task 2.1: Results

Participant 1	Participant 2	Average Time taken (existing application)	Average Time taken (new application)	Difference
25 sec	40 sec	2.5 min (150 sec)	32.5 sec	4.6x faster

Usability studies: Task 2.2: Results

Participant 1	Participant 2	Average Time taken (existing application)	Average Time taken (new application)	Difference
15 sec	16 sec	2 min (120 sec)	15.5 sec	7.7x faster

Usability studies: Task 3

- ➢ **Task:** Make sure that the user interface is intuitive

- ➢ **Question:** is the user interface intuitive?

- ➢ **Hypothesis:** the user interface is intuitive and simple

- ➢ **Variables:**

  - o *Dependent:* our user interface design

  - o *Independent:* intuitiveness of the UI

- ➢ **Procedure:**

  - o Ask some related questions after performing Tasks 1 and 2 (see interview transcript below)

  - o Propose to fill a questionnaire (see a questionnaire below)

UI/UX Evaluation Questionnaire

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1. **How Intuitive is the user interface of the application?**
   Mark only one oval.

	1	2	3	4	5	
not intuitive	◯	◯	◯	◯	◯	very intuitive

2. **How likely would you use this application to keep track of students with disabilities?**
   Mark only one oval.

	1	2	3	4	5	
unlikely	◯	◯	◯	◯	◯	very likely

3. **How likely would you use this application to maintain schedule of students' exams/special needs for note-taking, etc.**
   Mark only one oval.

	1	2	3	4	5	
unlikely	◯	◯	◯	◯	◯	very likely

4. **How likely would you use notification feature of this application (e.g. if some student drops a course, a notification on your email is sent)**
   Mark only one oval.

	1	2	3	4	5	
unlikely	◯	◯	◯	◯	◯	very likely

5. **Do you agree that this application can improve efficiency of daily activities in your department/company?**
   Mark only one oval.

	1	2	3	4	5	
disagree	◯	◯	◯	◯	◯	strongly agree

6. **Any comments/wishes**

   _____

   _____

   _____

   _____

   _____

Usability studies: Questionnaire results
Both participants gave 5 out of 5 marks for each of the question

Open question answers:

P1: I really like the simplicity of the application. Having a snapshot of each student is very useful

P2: Interface and Banner are very important but prototype is very promising

Usability studies: Interview transcript
Team Member: Please feel free to speak up as you go through the motions. We will like to hear your though process as you go through the given scenarios.

<u>Participant One</u>

1st Scenario: Search for a Student named Tom Tong

- So, I can search by First Name or Last Name? (*Response: Yes, you can*)

- Oh, I like how the picture comes up. Because it would be nice to have a face to go with the records.

The first scenario is done. We will be recording the time it takes to perform the interaction.

2nd Scenario: Delete the student.

- Oh, so it's gone

3rd Scenario: Schedule test/exam for Jan 26th

- Okay so then to schedule an event, I'll probably go to schedule. Okay so this information is all for the same student? (*Response: Yes, it is*)

- Oh, that's nice

4th Scenario: Delete the event

- Okay do I edit for that? (*Response: No, there's a delete button*)

- Oh. Yes, there it is. The trashcan

5th Scenario: View all events previously scheduled

- Okay. Did we pass?

Participant Two

1st Scenario: Search for a Student named Tom Tong

- Okay done

2nd Scenario: Delete the student

- Sorry tom

3rd Scenario: Schedule test/exam for Jan 26th

- Are these clickable? Okay now when I add an event, it doesn't automatically put a green dot? Is it because I'm on it? (*Response: Yes. The green dot should appear after an event is made on the date*)

4th Scenario: Delete the event

- Okay done.

5th Scenario: View all events previously scheduled

- Okay

Thank you very much.

Follow-up Questions

Q: On the system being used now, how long would it take approximately to check for each student?

A: It depends on what you're looking for. Like 30 secs probably. Depends on what you're looking for though. If you're looking for their courses only, cos there are so many different screens you have to go to depending on what you're looking for.

Initially you have to log in under our faculty permissions and search their A# and then select term. So, we would say a minute. At least a minimum of a minute. To get to the main screen where you would then, depending on what you're looking for, it might be another minute or so. Because it does not give you a screenshot of everything you're looking for. You can like view their courses and then to see what time the classes are, you have to go to another screen.

Q: Do you think our protype will improve on your system?

I think so. It has all of the information on one spot. We have to log in to banner and go through all of those steps instead of having it right there. And having this interface, all of the information we're looking for is going to be available there. It's a time saver for us for sure.

Q: How do you usually schedule tests and accommodations? Do they submit on banner or a manual form and then you schedule on a screen?

They go into banner to get their exam date and time like all students do and then they submit their request in online through the website and then that comes into my email and then we're scheduling

it here just using Excel. So, we're manually making it, the student, the test, the professor, what their accommodations are etc.

Q: *Do you find that our prototype for scheduling is more convenient than Excel?*

Oh, we have all of the information there so that would save a lot time of going back and forth.

Also, if we had a better idea of the potential number of students that could be writing here? Cos the student still has to request to write here but maybe it could give you an idea of the potential number that would write there.

Because often one of the things that we do get asked is a professor just wants to know "Oh how many people do I have writing over there?" They just want the total number. We only know that if they've all put the request in. We can't do a catch all right now. There no way to catch all the students that we have that are currently registered in a particular course. Like maybe a search engine like how many people are in FIN2350?

Q: *So probably we can implement search student by course?*

Yes absolutely. That would be helpful. Because now you're looking for student themselves and if they're scheduled but if we could do it by course, and then it will list the number of students we have in that course.

Q: Is there any part of the interface that you would think is unnecessary. Like deleting the student for instance. Is that something you would do? Like if they were registered and then changed schools

We don't usually delete any students from the database. We would still need to have a record of them. Because, the physical files, w have to keep them for 6 years. So, certainly it could be something where at the end of that time, we were going through and then we are able to delete after they've been gone for that length of time. So certainly, it could be used but its not something that would be used regularly. But it could certainly help. Because if not you could have students for a great number of years when you didn't have to.

Q: So maybe it could be better if students are marked as active and inactive

Yeah certainly.

Thank you very much for your participation.

Discussion of the results

- **Pitfalls of the analyses**

  - Sample size is small which may lead to biased results

  - The time taken of performing tasks in the existing system is recorded by asking the participants but not actual measuring the time because of ethical issue that the employee cannot disclose student information

Future work

The following additional features may be useful:

- Keeping information about students for at least 5 years. Mark students as "active" and "inactive" in the system

- Implement resource management, e.g. define a set of rooms available, staff members available and use this information for scheduling activities (For example, if room SB111 is used on Friday, December 28 from 11:30 to 12:30, then users of the application should not be able to schedule another event in this room within this time frame)

- Search students by course information

- Based on feedback after prototype demo, labels on Student List page will be included. For example: Student Number before A#. The protype is designed without the labels because the primary target users are faculty members that have a knowledge of the school system