

Software Requirements Specification

Participation Tracker

Prepared by “Team Krutz”:

Alex Bogart

Joshua Woodward

Piper Chester

Yura Kim

Table of Contents

Table of Contents	
Revision History	
1. Introduction	
1.1 Introduction	
1.2 Project Scope	
2. Overall Description	
2.1 Product Perspective	
Figure 1. High-level context diagram of the Participation Tracker system in use by a teacher.	
2.2 User Classes and Characteristics	
2.2.1 Potential Target Users	
2.2.2 Optional Users:	
2.3 Operating Environment	
2.4 Design and Implementation Constraints	
2.5 Assumptions and Dependencies	
3. System Features	
3.1 High Level Feature Description	
3.1.1 System Configuration	
3.1.2 Assignment Tracking	
3.1.3 Teacher and Parent Reporting	
3.2 Use Case Diagram	
3.3 Use Case Descriptions	
4. External Interface Requirements	
4.1 User Interfaces	
4.2 Hardware Interfaces	
4.3 Software Interfaces	
4.4 Communications Interfaces	
5. Quality Attributes	
5.1 Performance	
5.2 Security Requirements	
5.3 Safety Requirements	
5.4 Usability Requirements	
Other Requirements	
Appendix A: Glossary	
Appendix B: Acronyms	
Appendix C: Models/Diagrams	
Figure 3. UC_04: sequence diagram	
Figure 4. UC_04: class diagram	
Figure 5. UC_05: stereotype diagram	
Figure 6. UC_05: sequence diagram	
Figure 7. UC_05 class diagram	

Revision History

Name	Date	Reason For Changes	Version
Team	2/16/2015	Start initial draft	0.1
Team	3/1/2015	Add content to sections for draft submission	1.0
Team	3/4/2015	Incorporate initial feedback for draft resubmission	2.0

1. Introduction

1.1 Introduction

The purpose of this document is to give a detailed description of the requirements for the “Participation Tracker” (PT) software. It will illustrate the purpose and complete declaration for the development of system. It will also explain system constraints, interface and interactions with other external applications. This document is primarily intended to be proposed to a customer for its approval and a reference for developing the first version of the system for the development team.

1.2 Project Scope

For teachers who need to track participation in the classroom but cannot easily do so during the class and may forget after the class, this system will allow them to monitor student behavior by tracking them quantitatively. This system will allow teachers to easily add simple grades and/or written notes to specific students due to the application being tablet-based. Teachers can also use the application to track things such as effort, attendance, and progress throughout the week.

2. Overall Description

2.1 Product Perspective

The Participation Tracker is both a replacement for an existing system and a completely new one as there is no established universal system in place, and what does exist does not adequately perform its desired function. While teachers are often required to track their students' participation, effort, etc., it is primarily done ad-hoc since the teacher has to wait until class is over to make any notes about participation. Initial research and requirements elicitation implies that teachers usually don't follow a standard grading form for participation. This results in teachers having to assign participation grades to students based solely on memory or their best guess. The potential for integrating the Participation Tracker into a larger grading system and framework has been discussed; however, this extension is outside the initial project scope.

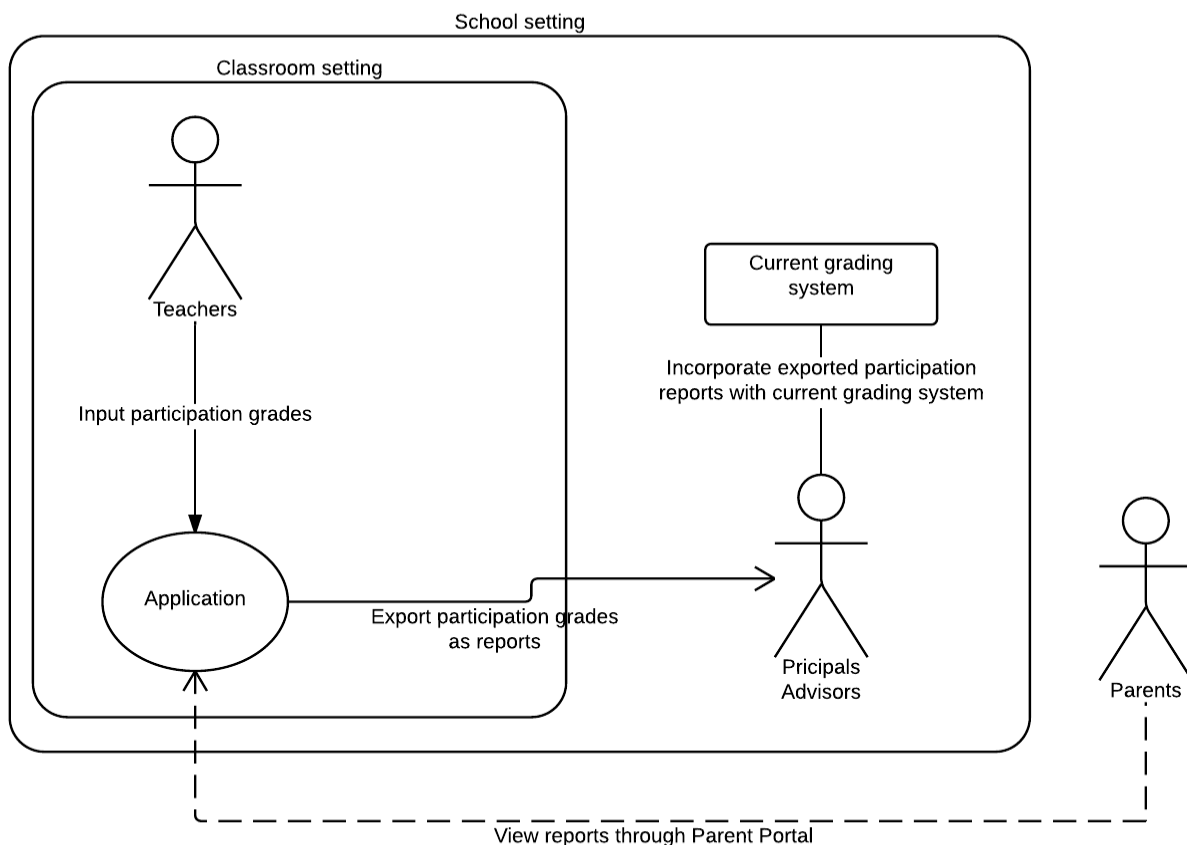


Figure 1. High-level context diagram of the Participation Tracker system in use by a teacher.

2.2 User Classes and Characteristics

2.2.1 Potential Target Users

Teachers

- High frequency of use; approximately at least 10 times per class per day
- Uses the grading feature to record participation, etc. for students
- Low, medium, or high technical literacy expected
- May have aversion to the application for any number of reasons
 - May have an aversion to technology
 - May not want to change their personal process
 - May be cautious about the effects of using technology in the classroom because students might take it as a sign that cellphone and tablet use is okay
 - May be cautious about hardware theft in classroom

Principals and Advisers

- Low frequency of use; would most likely only use the application to check a student's history when necessary
- Uses review feature to track student's participation
- Medium or high technical literacy expected

2.2.2 Optional Users:

Parents and Students

- Could potentially be used to provide progress reports to parents

Further research is required to determine the following information:

- What is the average teacher?
- What is the technical literacy level of the average teacher?
- Does the average teacher have an aversion to technology or change in the classroom?
- Is there an age correlation to a potential aversion of technology and/or change?

2.3 Operating Environment

Environment:

- Classroom (for data input during and immediately following class)
- Offices (for review & setup)

Hardware:

- Tablet
 - Our clients (particularly the principals) have stated that they would prefer the device to be developed for a tablet rather than a smartphone. The reasoning is

that having a teacher using a smartphone would encourage students to use their phones in class as well, which is discouraged. They believe a tablet would not elicit this reaction. While the operating system would be the same as most any other mobile (Android) device, there are optimizations that can be made for a tablet.

OS:

- Android

2.4 Design and Implementation Constraints

Constraints:

- The data shall be synced on a network.
 - It is inadvisable to attempt to store large amounts of data in a mobile application.
- Total task duration for adding a participation grade to a student (including selecting the student) should take no more than ~5 seconds.
- The application shall be secured against unauthorized attempts to access data with a 0% unauthorized data retrieval success rate (not including unauthorized attempts).
- Shall allow system-level configuration where teachers can create assessments
 - Pushed towards creating a web interface for external users

Concerns:

- As the data is synced on a network, the user will be unable to record data while disconnected from the network.
- The participation reports that the application exports may be incompatible with the existing grading systems.
- The school(s) where the application is deployed may not have sufficient environment to support the network/database.

2.5 Assumptions and Dependencies

Assumptions:

- Teachers will be provided with tablets from the school using the PT system
- The quality attributes and functionality of the web-based component of the PT system will not vary across schools
- The project shall primarily be used by teachers
- These teachers' students shall be relatively young such that the use of a tablet by the teacher will not encourage disruptive behavior among students
- The participation tracking will work on an arbitrary scale.
- Teachers will prefer using the application over existing manual methods
- The application will increase efficiency of tracking behavior
- The application will decrease the tedium of tracking said behavior

Dependencies:

- Ease of use/acceptance for less technically literate users
- Synergy with existing grade tracking methods
- The app contains no pitfalls that make it slower/more difficult than the existing method

3. System Features

3.1 High Level Feature Description

3.1.1 System Configuration

Account Creation: Both teachers and parents will have the ability to create a user account by providing email and password credentials.

Configuration of System Entities: The pre-configuration of the following entities: (Classes, Students, Rating Scales, Assignment Types) will yield a quick and successful tracking session.

3.1.2 Assignment Tracking

Performing a “tracking” Session: By providing a name, assignment type, and a class, a teacher is able to instantiate a tracking session. Progress is made on the session as ratings are applied to each individual student of the class. Session is complete when every student has been rated.

3.1.3 Teacher and Parent Reporting

Teacher using data for grading: Teacher is able to produce a quantitative report of students' performance during tracking sessions. Reporting filter criteria is subject to change, and correlates to a teachers' grading needs.

Parent accessing child's information through web portal: As various tracking sessions are “published” or made available by teachers, parents are able to access reports detailing aggregate and individual data regarding their child's performance. Teachers will have control over which tracking sessions are visible, and parents will control how the information is represented.

3.2 Use Case Diagram

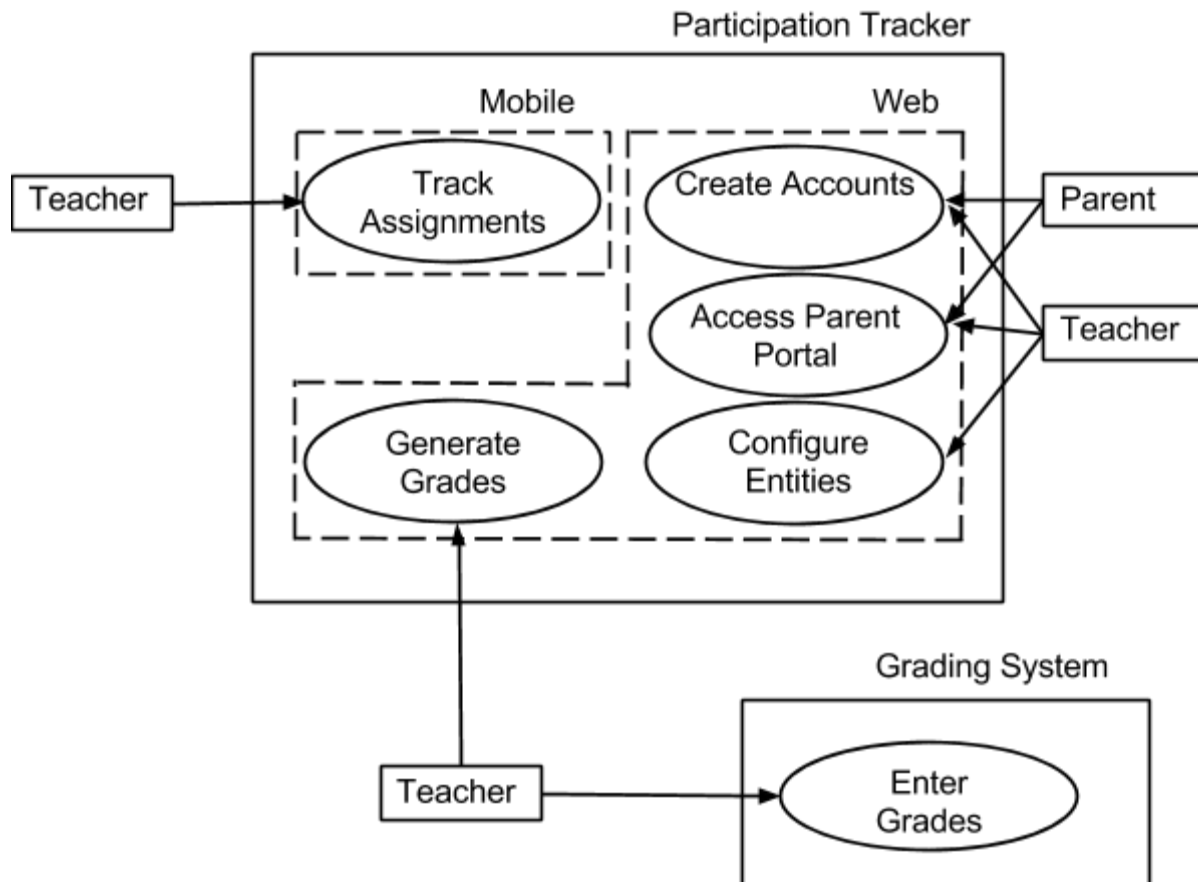


Figure 2: Use case diagram

3.3 Use Case Descriptions

Name	Create Accounts
ID	UC_01
Description	Teacher creates account for each student in classroom. The account is a way for the teacher to monitor growth individually.
Actors	Teacher/Instructor, Parent

Preconditions	<ol style="list-style-type: none"> 1. The web-based component of Participation Tracker has been launched 2. Teacher is using the primary “Home” screen of the application
Post Conditions	<ol style="list-style-type: none"> 1. An account for the target student has been created 2. The account information and surrounding meta data is stored in the cloud <ol style="list-style-type: none"> a. Associated meta data consists of student name, student age, student’s teacher, student’s class, additional “note” field b. The account will track student participation data; however, this value is initialized to null during the initial account creation. The teacher is not prompted for an initial participation value
Main Course	<ol style="list-style-type: none"> 1. Teacher indicates they would like to create a new account by selecting appropriate corresponding menu option. 2. System presents the “Account Creation” interface <ol style="list-style-type: none"> a. This form-like page includes several fields for the teacher to fill out 3. Teacher enters student name into field prompt (see EX1) 4. Teacher enters student age into field prompt 5. Teacher enters class associated with student (see EX2) 6. Teacher enters teacher associated with student 7. Teacher indicates they would like to finish creation of the account by selecting submit account action 8. System presents the “Home” view to the teacher
Alternate Courses	None
Exceptions	<p>EX1 Student already exists in the system</p> <ol style="list-style-type: none"> 1. User is prompted that student already exists in the system. Return User to Main Course step 8. <p>EX 2 Class does not exist</p> <ol style="list-style-type: none"> 1. See “Class Creation” Use Case.

Name	Configure Entities
ID	UC_02

Description	Teacher configures information within the system. Relevant actions include standard CRUD actions associated with the following entities: Students, Classes, Assessment Types, and Rating Scales.
Actors	Teacher
Preconditions	1. The application has been launched
Post Conditions	1. Configuration of information as performed in the Main Course has immediate corresponding and persistent updates in the cloud
Main Course	<ol style="list-style-type: none"> 1. User navigates to main menu of the application 2. User selects which entity they would like to edit. <ol style="list-style-type: none"> a. Students (See AC-1) b. Classes c. Assessment Types d. Rating Scales 3. User will be taken to an Interface specific to the information type with which they are interacting. 4. Presented to the user is a listing of existing objects for the information type in context. (I.E. if “Classes” entity was selected in Step 2, a list of configured “Classes” will be provided to the user) 5. Users may add new object of the current information type (See AC-2) 6. Users may edit existing object of the current information type (See AC-3). 7. Users may delete existing object of the current information type (See AC-4).
Alternate Courses	<ol style="list-style-type: none"> 1. User would like to edit Student <ol style="list-style-type: none"> a. User performs UC_01 to complete action 2. User would like to add new object <ol style="list-style-type: none"> a. User will be presented with a blank form specific to the information type they would like to add. b. User is expected to complete all fields of form. c. User submission of form will validate fields and attempt to submit new record. d. An unsuccessful submit will bring the user to step 2.b of this process, expecting updates to the form e. A successful submit will insert the record into the database and navigate the user to Step 3 of UC_02's main course.

	<ol style="list-style-type: none"> 3. User would like to edit an existing object <ol style="list-style-type: none"> a. User will be presented with a form specific to the information type they would like to edit, with fields pre-populated with existing values. b. User is expected to complete all fields of form. c. User submission of form will validate fields and attempt to edit existing record. d. An unsuccessful edit will bring the user to step 3.b of this process, expecting updates to the form e. A successful edit will update the existing record in the database, and navigate the user to Step 3 of UC_02's main course. 4. User would like to delete an existing object <ol style="list-style-type: none"> a. User will be presented with a confirmation dialogue regarding the deletion of the object in question. b. If the positive action is clicked, the record will be deleted from the database, and the user will be navigated to Step 3 of UC_2's main course. c. If the negative action is clicked, the dialogue will disappear, and no system action will be taken.
Exceptions	None

Name	Track Assignments
ID	UC_03
Description	Teacher completes an evaluation of a particular class given a particular evaluation type.
Actors	Teacher
Preconditions	<ol style="list-style-type: none"> 1. The Participation Tracker mobile application has been launched 2. Student Accounts have been created (UC_01) 3. Classes have been created (UC_02) 4. Assessment Types have been created (UC_02) 5. Rating scales have been created (UC_02)
Post Conditions	<ol style="list-style-type: none"> 1. A new instance of an assessment has been created.

	<ol style="list-style-type: none"> 2. Ratings (as described by the Rating Scale) have been associated with each student of the chosen class 3. Assessment Information described in Post Conditions Steps 1 + 2 exists in the cloud, and is available for immediate retrieval by relevant reports.
Main Course	<ol style="list-style-type: none"> 1. Teacher will be able to create a new evaluation. 2. Interface will prompt teacher for the following fields: <ol style="list-style-type: none"> a. Evaluation Name (Text) b. Evaluation Type (Select of pre-configured evaluation types) c. Rating Scale (Select of pre-configured rating scales) d. Class (Select of pre-configured classes) 3. An individual interface will be presented for each student in the chosen classroom 4. Based on the evaluation's rating scale, the teacher will be expected to provide an evaluation value. (See EX1) 5. The evaluation may be interrupted by pausing the evaluation, exiting the application, or experiencing a network error. (See AC1) 6. The teacher will receive confirmation that the evaluation has been completed and will be navigated to the application home screen once a rating has been provided for each student.
Alternate Courses	<ol style="list-style-type: none"> 1. Evaluation has not been completed, and is exited due to pausing the evaluation, or experiencing an application exit or network error. <ol style="list-style-type: none"> a. Teacher will have an interface on their main screen that will indicated uncompleted evaluations. b. Teacher will be able to resume existing and incomplete evaluations starting in Step #3 in the Main Course of UC_03, maintaining existing evaluation progress.
Exceptions	<ol style="list-style-type: none"> 1. During evaluation of a particular student, teacher attempts to continue with the evaluation and a value has yet to be determined through interaction with the particular rating scale. <ol style="list-style-type: none"> a. User will be alerted that they must interact with rating scale elements to provide a rating value for a particular student.

	b. Upon successfully providing input and continuing with the evaluation, user will be navigated to Step #4 in the Main Course of UC_3
--	---

Name	Configure Evaluation Visibility
ID	UC_04
Description	Teacher elects to make a particular set of evaluations available to the parent portal
Actors	Teacher
Preconditions	<ol style="list-style-type: none"> 1. The web application has been launched 2. Student (child of Parent in context) has an existing account with the system. 3. Student account information has been shared with parent. 4. Evaluation data exists for student in context. 5. The user is logged in to the system.
Post Conditions	<ol style="list-style-type: none"> 1. Evaluation reporting on a student has been produced for a parent's use.
Main Course	<ol style="list-style-type: none"> 1. User enters new confirmation for an evaluation's eligibility to be viewed in the parent portal in the following ways: <ol style="list-style-type: none"> 1.1. User may have all reports be eligible for the parent portal by default, upon completion of the evaluation. 1.2. User have have all reports be non-eligible for the parent portal by default, upon completion of the evaluation. 1.3. An "eligibility interface" will be provided from the user's main screen in which the eligibility for any completed evaluation may be toggled. 2. The page submits this new configuration to the parent portal controller. 3. The controller attempts to update the parent portal settings to match this new configuration with the possible outcomes: <ol style="list-style-type: none"> 3.1. The configuration is valid and is saved.

	3.2. The configuration is invalid and is rejected.
Alternate Courses	None
Exceptions	None

Name	Access Parent Portal
ID	UC_05
Description	Parents will generate reports on evaluation data specific to their child.
Actors	Parents
Preconditions	<ol style="list-style-type: none"> 1. UC_04 2. The user is logged in to the system.
Post Conditions	<ol style="list-style-type: none"> 1. Evaluation reporting on a student has been produced for a parent's use.
Main Course	<ol style="list-style-type: none"> 1. Parent will be prompted for relevant filter criteria for which to run the report. 2. Parent will enter relevant filter criteria. 3. The page will request a report from the report controller. 4. The controller will attempt to retrieve the report from the select student account. 5. The controller will confirm that the user has permission to view the report. <ol style="list-style-type: none"> 5.1. Parent has permission and the page will display the report. 5.2. Parent does not have permission and the page will display this information as an error.
Alternate Courses	None
Exceptions	None

Name	Generate Grades
-------------	-----------------

ID	UC_06
Description	Teacher generates grades for each student in classroom.
Actors	Teacher, Instructor
Preconditions	<ol style="list-style-type: none"> 1. The web-based component of ParticipationTracker has been launched 2. Students have pre-created accounts 3. Students have pre-existing grades in the system
Post Conditions	The grade report for a student has been generated.
Main Course	<ol style="list-style-type: none"> 1. User is at system main menu. 2. User navigates to student profile on the web application. 3. User selects report grades. 4. Grade report is queried from the cloud database. <ol style="list-style-type: none"> a. The grade report includes the associated metadata from the student (see UC_01) as well as progress graphs visually depicting the student growth b. The progress graphs are used by the teacher to trace and track student participation over time, and to identify any potential reasons why the participation may have increased or decreased. This information may be discussed with the parent of the student at a later date. 5. User is able to save report as PDF. 6. User is returned to system main menu.
Alternate Courses	None
Exceptions	None

4. External Interface Requirements

4.1 User Interfaces

The entirety of the user interface will be designed in accordance with the [Android Design Guidelines](#). They include both a broad style and overview as well as many detailed mock ups as examples. The documentation includes precise interface specifications.

4.2 Hardware Interfaces

The system shall be run on a Android tablet device and the appropriate API will be used to create the system. The system will take advantage of the touch screen capabilities to create an intuitive design. The system will take advantage of the screen size to display as much data per screen.

4.3 Software Interfaces

Data such as participation, attendance, and comments will be collected by the system. The majority of the data will be stored on a network server. Data will be pushed and pulled from the system as needed: when information is added, edited, or deleted. This makes the system highly dependent on a stable network connection. In the future, this could be mitigated by allowing data to be stored locally on the device and pushing it once a network connection with the server is established. However, this could cause issues with syncing if multiple people modify or create the same information. For the purposes of the first iteration, we will assume that the network is stable and connected at all times.

4.4 Communications Interfaces

The system shall connect to a network server through a secure connection protocol to ensure no information is leaked. The system may eventually be able to communicate with existing grading systems. However, this is not a requirement, but one that may be considered in a later release.

5. Quality Attributes (Non-Functional Requirements)

5.1 Performance

The device requires a connection to the Internet to function since it will need to have access to the a cloud-based database to update students' information. This choice was made to avoid any potential issues from having devices off the network come back on with inconsistent data and attempting to merge them into the database. The updating does not need to be instantaneous, but it should be apparent once the user attempts to update the data whether it was saved to the database or not. There could potentially be a local repository for a limited number of actions that would not affect other users (such as adding a note to a student, but not moving a student to a different class).

As user data will be stored remotely in the cloud, the importance of minimal latency from data pushes and fetches is paramount. The user should be able to quickly add "grades" to individual students on the fly as they walk around the classroom. This leads into the second most important attribute, usability. If the teacher cannot consistently and easily identify and select the desired student, the application loses its speed. Other attributes that have some relevance to the application include ease of learning (for older/less technically literate users), availability (due to its network restrictions), and portability.

5.2 Security Requirements

There should be systems in place to ensure that students' information is kept secure and visible to only those who have the permission to do so, and that the appropriate level of information is visible as well. This should extend beyond network security to include side channel protection, such as locking the device after a period of time so a student could not access information if a teacher forgets to lock the device manually.

5.3 Safety Requirements

This follows the same mentality as the security requirements. So long as access to the information is controlled, there is no concern for safety.

5.4 Usability Requirements

The older generation and those with limited technical literacy require the application to have ease of learning. A simplistic interface would help users understand the application's function. For example, rather than having the user enter numerical values, allowing them to choose from thumbs up/down or stars or a sliding scale would be ideal. Responsiveness and efficiency should be quick satisfy and encourage users to continue using the application. General usability

issues such as colorblindness, limited vision, and limited dexterity should be taken into account, especially since the application will run on a touchscreen.

Other Requirements

Appendix A: Glossary

ID	Term	Definition
G1	Evaluation	Teacher-generated assessment of a particular student
G2	Report	A custom view of an evaluation intended for parents, etc

Appendix B: Acronyms

ID	Acronym	Phrase
A1	PT	Participation Tracker

Appendix C: Models/Diagrams

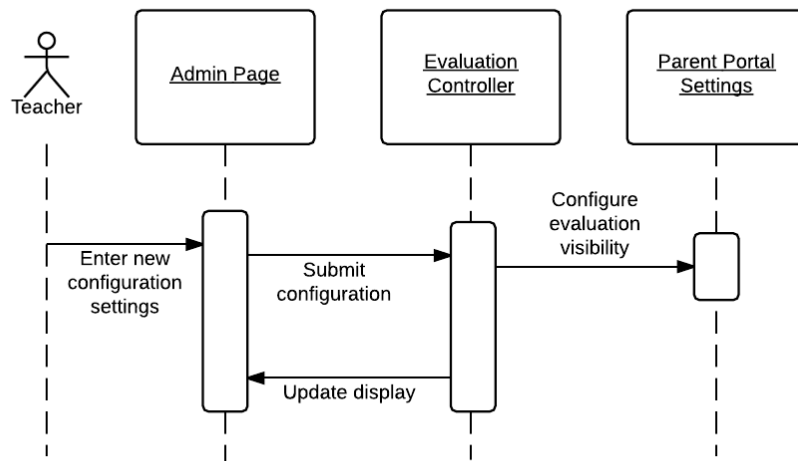


Figure 3. UC_04: sequence diagram.

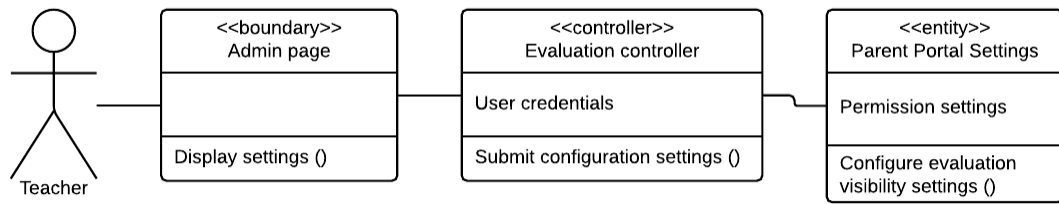


Figure 4. UC_04: class diagram.

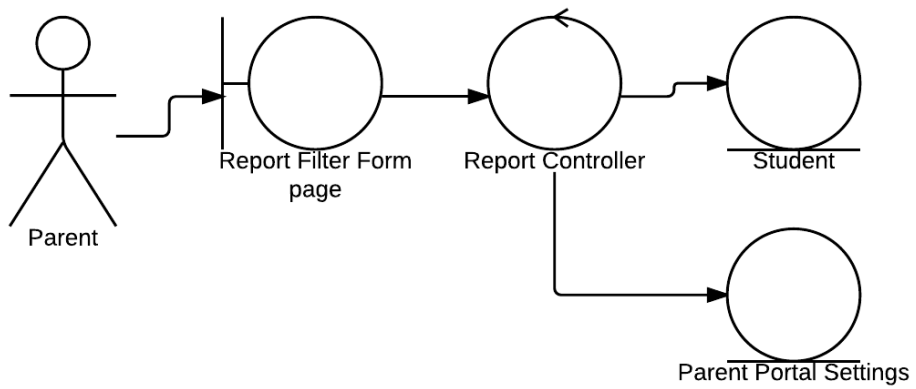


Figure 5. UC_05: stereotype diagram.

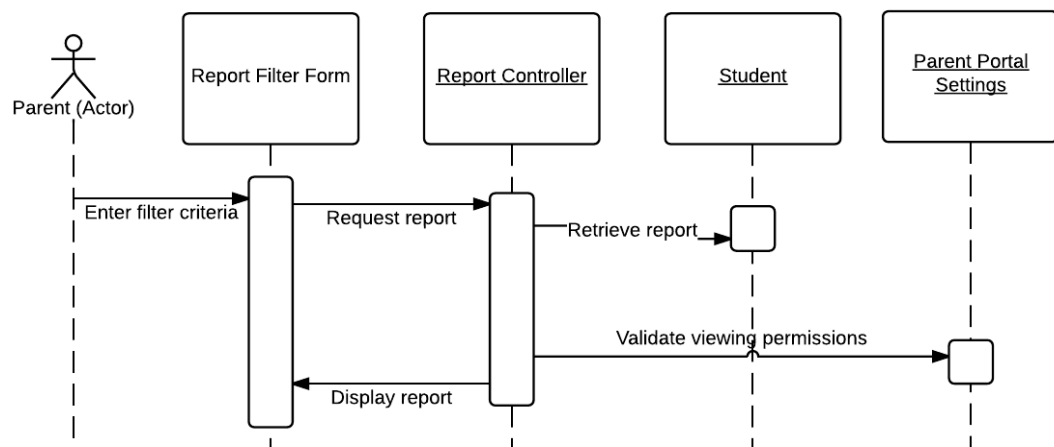


Figure 6. UC_05 sequence diagram:
Teacher accesses student information through parent portal.

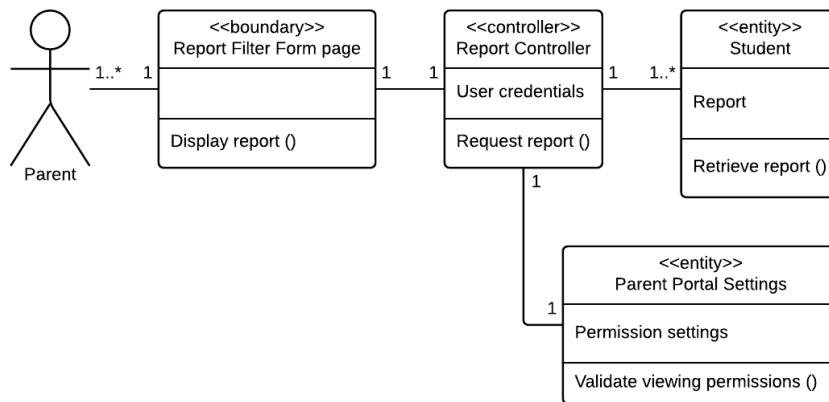


Figure 7. UC_05 class diagram