Standards Based Grading Application (SBGA)

VISION DOCUMENT

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1. Introduction

1.1. Purpose and Motivation

The purpose of this document is to plan, specify, organize, and analyze the features and requirements of the Standards Based Grading Application (SBGA). We will attempt to outline the current method of standards based grading and the problem it presents, how our app solves the problem, the stakeholders involved, detailed requirements of the app, constraints and risks, and other details of this project.

The purpose of SBGA is to provide a platform for professors to manage standards based grading for multiple courses, eliminating inefficient and redundant communication between teacher and student, and reducing student confusion while enrolled in a course with standards based grading.

The motivation for creating this application is to improve the student and teacher experience in courses that utilize standards based grading by eliminating the need to keep track of progress by hand. This will allow the benefits of the grading technique to shine through while minimizing the complications that come with such a technique.

1.2. Scope

The scope of this document encompasses the software engineering processes to be undertaken by the team to develop the application. This includes specifications for app requirements, team member duties and responsibilities, identification of stakeholders and their roles, assignment of tasks, and other details pertaining to the development and production of SBGA.

2. Positioning

2.1. Problem Statement

2.1.1. Traditional Grading System

The traditional grading system used by most universities, high schools, middle schools, and elementaries does not give students the time or incentives to fully learn and understand the concepts presented in a class because topics are quickly discussed, practiced,

tested on, and then the course moves on and the topic is not mentioned again, except maybe briefly in a final exam. For most, this is not enough time to fully learn all the concepts that make up a larger subject. This is especially true for more complicated subjects that require more time like math. Traditionally, if a student is really struggling with a certain concept, they may miss a question or two on a test, which may or may not hurt their grade much, but they move on from that concept without ever gaining a true understanding. With enough of these gaps in knowledge accumulating over time, it's possible for students to pass school without ever gaining a full understanding of any subject. Then, they are at a disadvantage at the next stage of their education or professional life. This is a problem with the traditional grading system, and may be part of the reason why young Americans are scoring lower on benchmark tests than ever before.

2.1.2. Standards Based Grading System

A Standards Based Grading System is an alternative system of grading that uses checkpoints and testpoints to measure a student's understanding of different topics throughout a course. Instead of testing on a concept and moving on, a student is provided multiple opportunities to demonstrate their understanding of a topic. After attempting a checkpoint or testpoint, the teacher may decide the student has sufficiently demonstrated their understanding of the topic, or maybe has a good understanding but a few misconceptions that simply need revisions, or that the student does not yet have an understanding of the topic and must try that point again. Their final grade is determined by the number of checkpoints and testpoints that they earn a satisfactory mark on at the end of the semester.

2.1.3. Current Standards Based Grading Implementation

Currently, in some courses offered at APSU, this system of grading is being implemented using a sheet of paper given to each student at the beginning of the semester that has checkboxes to be marked off as the student passes checkpoints/testpoints. Each new test, the student is responsible for going online and checking what they have passed so far or need to reattempt, ensuring their checklist is properly marked, and bringing their checklist to class so they know which points they need to attempt. The entire process of marking a physical checklist is tedious, confusing, and time consuming. While learning a difficult subject that's already confusing and taxing on the

mind, the added task of learning and keeping up with the Standards Based Grading system adds just enough nuance to be frustrating to deal with for students. It's also cumbersome for the teachers, who constantly have to answer student questions about the status of their various checkpoints/testpoints.

2.2. Business Opportunity

2.2.1. The Solution

A Standards Based Grading Application

Student User Interface

The app will provide a convenient dashboard for students to keep up with their checkpoints/testpoints throughout a semester.

Professor User Interface

The app will provide a convenient dashboard for teachers to add courses, topics, concepts, and students, and to easily update their students' checkpoint/testpoint statuses for multiple courses each semester.

Data Analysis

As professors use this app their data will accrue in our database. This will be important data about student performance. This data can later be reviewed to discover learning trends, train personal AI tutors, and improve courses to better meet student needs.

2.2.2. Opportunity to Scale

Wide Adoption of Standards Based Grading

With our app as an example, educational institutions may be motivated to adopt more personalized grading methods that better prepare students for their next stage. As more institutions adopt standards based grading approaches, our app can be the go-to resource for managing and tracking grades.

3. Stakeholder and User Descriptions

3.1. Stakeholder Summary

The development and implementation of the Standards Based Grading Application (SBGA) will involve multiple stakeholders who play essential roles in ensuring the app's effectiveness and adoption.

3.1.1. Types of Stakeholders

3.1.1.1. Primary Stakeholders

3.1.1.1.1. Teacher

The primary users of the app will utilize it for managing courses, tracking student progress, and maintaining standards-based grading efficiently. The app reduces redundant communication and enhances organization.

3.1.1.1.2. Student

Students will use the app to track their academic progress, eliminating the need for manual tracking through paper checklists and reducing confusion about their grades.

3.1.1.1.3. Development Team

The development team consists of four members responsible for designing, developing, testing, deploying, and maintaining the application. They play a crucial role in transforming project requirements into a functional product.

3.1.1.1.3.1. Team skills/responsibilities

Mason - 2 years experience with React/JS and web development. Responsible for frontend javascript and HTTP requests/responses.
Michael - 1 year SQL experience. Responsible for database design and implementation.
JaNiah - 1+ year ML/AI and SQL experience. Responsible for backend configuration and data analytics.

Tyler - 1 year mobile development experience and React Native experience. Responsible for UI/UX design and implementation.

3.1.1.2. Secondary Stakeholders

3.1.1.2.1. Educational Institutions

Students will use the app to track their academic progress, eliminating the need for manual tracking through paper checklists and reducing confusion about their grades.

3.1.1.2.2. Administration

School officials, department heads, and who could be involved in overseeing the implementation and management of the software within an institution.

3.2. User Summary

3.2.1. User Overview

This product could be used by any educational institution where students have a mobile phone, from middle school to high school and college.

3.2.2. Types of Users

Teachers

Teachers will be the primary users and this app will greatly benefit those who use a standards based grading approach. It will benefit them by saving them time, keeping them more organized with less effort, and freeing them from counterproductive communication with students (constantly checking status for students).

Students

Students will no longer be required to keep a physical sheet of paper to keep track of their progress, and instead will be

able to visualize their progress directly through the app, without having to contact their teacher for updates. This will save the student time and effort, and help keep them more organized.

4. Product Overview

4.1. Product Perspective

4.1.1. The Standards Based Grading Application (SBGA) is designed to be a modern solution for managing and tracking student progress in courses that use the Standards Based Grading system. This application aims to replace the inefficient manual process of tracking student progress with a digital approach that enhances usability for students and teachers. SBGA will improve the standards based grading system by providing real-time tracking, easy updates, and comprehensive data insights.

4.2. Summary of Capabilities

4.2.1. Registration and authentication - Secure login system using firebase that will allow users to register as students or teachers.

4.2.2. Student dashboard - Interface that provides real time tracking of checkpoint/testpoint progress

4.2.3. Teacher dashboard - Tools for managing courses, adding students, updating checkpoint/testpoint statuses, and viewing student progress.

4.2.4. Data analytics - Insights into student performance trends

4.2.5. Cross platform availability - Available on Android and IOS

4.2.6. Offline access - Limited offline functionality to allow users to view recent updates and sync data once reconnected

4.2.7. Notifications - Alerts and reminders for upcoming assessments, progress updates, and instructor feedback

4.3. Assumptions and Dependencies

4.3.1. Requires users to have stable internet connection for real-time data synchronization

4.3.2. Assumes users have a mobile device capable of running the application

4.3.3. Depends on Firebase for user authentication and data storage.

5. Product Features

5.1. Availability

5.1.1. Anyone with a mobile device can download our app for free from the Google Play Store or the App Store

5.2. Registration

5.2.1. Users can create an account

5.2.1.1. Upon opening the app for the first time, the user will see a registration form

5.2.1.1.1. The registration form will have fields for first name, last name, email, new password, date of birth, type of user(student or teacher), type of school (middle, high, college), and school name

If user type is student, additional fields such as grade level in school will be required.

5.2.1.1.2. When registration form is submitted, data will be sent to Firebase backend

If the user is already registered, they will be redirected to the login form and alerted that an account already exists with that email

If user does not exist, they will be saved into the Firebase database, redirected to the login page and alerted that the account was created

5.3. Login

5.3.1. Authentication service will be configured using Firebase

5.3.1.1. If a user is not authenticated but has previously logged in, when they open the app they will see the login form

5.3.1.1.1. The login form will have fields for email and password

5.3.1.1.2. The login form will have a “Forgot password?” link

5.3.1.1.3. When the login form is submitted, the data will be passed to Firebase backend

If that email is not registered, redirect the user to the registration form and alert them that that email is not registered

If the email is found, but the password is incorrect, return to the login form and alert the user that the credentials were not correct

If the email is found and the password is correct, the user will be authenticated and redirected to the homescreen

5.4. Teacher Home Screen

5.4.1. Current Semester View

5.4.1.1. A dashboard where teachers can see the semester season and year and their list of courses for that semester

5.4.1.1.1. Clicking on a course will bring up the list of students enrolled in the course

Clicking on a student will bring up their standards based grading checklist

Teachers can change the status of checkpoints/testpoints from Unattempted, to Go, No-Go, or Revisions

Checkboxes will change color to visually represent the status of that checkpoint/testpoint

Changes to the grades will immediately be reflected on the Students user interface

5.4.2. Create new semester

5.4.2.1. Add semester season and year

5.4.2.2. Add courses to semester

5.4.2.2.1. Add courses by entering the course code (4600-11) and the course name (Software Engineering)

5.4.2.2.2. Add topics to the course

Topics will be added to courses by entering in the topic title and topic description

Add concepts to topics

Concepts will be added to topics by entering in the concept title and concept description

Each concept will have a specified number of checkpoints and a specified number of testpoints. These numbers will be entered by the teacher while creating concepts and used to create the correct number of checkboxes on the grading interface

5.4.2.2.3. Add students to course

Add students by entering the students email

An invitation will be sent to the student through the app to confirm they are taking that course

5.4.2.2.3.1.1.1. Once the student confirms, they will be added to the list of students taking the course

5.4.3. Previous Semester View

5.4.3.1. Teachers will be able to view previous semester grades by selecting a previous semester, then selecting a course from that semester, then selecting a student from that course

5.5. Student Home Screen

5.5.1. Current semester view

5.5.1.1. A dashboard that displays the season and year of the current semester and shows a list of all the courses the student is currently taking

5.5.1.1.1. Courses can be selected to bring up the students' grades for that course

The student will see a checklist very similar to what the teacher saw, without the ability to edit the statuses of checkpoints/testpoints. They will see the checkboxes for each concept in each topic turn different colors as the statuses are updated by the teacher

5.5.2. Previous semester view

5.5.2.1. Students can select a previous semester, then select a course from that semester to view their grades for that course

6. Constraints

6.1. Performance Constraints

6.1.1. The App must work on both Android and iOS devices

6.1.2. An internet connection is required to access and update grades

6.1.3. Firebase API usage limits, potential performance issues with high traffic

6.2. Usage Constraints

6.2.1. Both Teachers/Students must update app to ensure proper functioning

6.2.2. Users must have a valid account to access grading data

6.2.3. App may not function on outdated/unsupported devices

6.3. Legal Constraints

6.3.1. Must meet compliance with ADA(American with Disabilities Act) standards

6.3.2. All nonessential user data must remain anonymous and any data collected is inaccessible by other users

6.3.3. The App must comply with FERPA(Family Education Rights and Privacy Act) to protect student grading data

7. Other Product Requirements

7.1. Hardware and Platform Requirements

7.1.1. Android and iOS device mobile

7.2. Performance Requirements

7.2.1. The system should handle concurrent logins and data updates efficiently

7.3. Environmental Requirements

7.3.1. SBGA is designed for use in educational institutions with reliable internet access. Offline access will be available for previously loaded data but requires periodic synchronization.

7.4. Scalability Requirements

7.4.1. The database structure should support expansion to accommodate increasing user bases.

7.5. User Experience Considerations

7.5.1. The interface must be accessible, user-friendly, and designed with input from educators and students.