# Project Stat

Customer Requirements Version: 1.1

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## Team X

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## Stakeholders

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# Version History:

| Date | Version | Description | Authors |
|---|---|---|---|
| 11-6-2019 | 1.1 | In the section User Functionalities, the teacher's functionality of registering students for the course was expanded on, to ensure that one could derive the technical requirements of said feature. | Patrick |

# Project Background:

Partnered with the Army Educational Outreach Programs (AEOP), our project will aim to provide STEM enrichment opportunities to middle school aged students to adults, especially those that are educationally disadvantaged. With individuals in science, technology, engineering, and mathematical fields underrepresented, AEOP has the vision of increasing these numbers by providing competitions, research lab apprenticeships, and scholarships within the STEM field to keep individuals competitive and engaged. Despite their attempts to bring these numbers up, according to annual AEOP evaluation data, reports have indicated that many students that participate in these programs are from underprivileged urban areas and do not have access to strong research design and statistical instruction necessary to fully utilize these opportunities.

Our project is to create a multi-module web interface that will provide interactive content, teaching statistics on a easy-to-use platform as a free, online educational resource. With this implemented, we can provide the teachings necessary for students participating in AEOP and hopefully eliminate the knowledge gap of statistics in particular. On our website, we will be providing lessons to teach the content, labs to reinforce the learning, and quizzes to test their understanding of the many modules that will be available.

# Users:

## User Persona:

- Guests - An individual that has not signed up for our statistical website. A guest may be using our website's statistical calculator or reviewing our website's content to see if they would like to sign up for the course.

- Students - An individual that has signed up for our statistical website to partake in an online course to learn statistics. A student would ideally have at least an eighth-grade education, but can be of any age. The student's objective is to learn the fundamentals of statistics by completing the online course, which can be achieved through engaging with lesson plans, modules, and quizzes. Upon completion of each lesson, the student will receive a badge/certificate.

- Teachers - An individual that has signed up for our statistical website that educates students in a classroom environment and is seeking additional resources to aid in helping their class learn about statistics. A teacher's motive in enrolling their students for this website is to monitor and facilitate their class's performance,

providing their students with additional aid where needed.

- Admins - An individual that has an interest in researching the effectiveness of online learning or monitoring how well the course educates students about the fundamental principles of statistics. The goal of the admin is to observe the efficiency of this online statistical course and update the course accordingly in future releases/updates.

## User Functionalities:

- All Users (Guests, Students, Teachers, Admin):
  - All users will be able to view all static pages (e.g. home & about)
  - All users will be able to use the website's statistical calculator
  - All users will be able to contact the stakeholders for additional information about the course

- All Signed In Users (Students, Teachers, Admin):
  - All users will be able to view and participate in an interactive learning module
  - All users will be able to test out of interactive learning modules by passing a preliminary quiz
  - All users will be able to view and complete labs related to the interactive learning modules
  - All users users will be able to view and complete quizzes related to the interactive learning modules
  - All users will be able to receive badges/certificates for each interactive learning module they complete successfully
  - All users will be able to change their account information (e.g. name & password)
  - All users can share their accomplishments with others through the badges or achievements page

The following permissions are exclusive to the groups below:

- Guests:
  - As a guest, users will be able to sign up for the course as a student or teacher

- Students:
  - As a student, users will be able to identify their teacher in order for the teacher to monitor their progress
- Teachers:
  - As a teacher, users will be able to register their classes for this online statistical course by pasting a list of emails into a text area. The list of emails will then be separated using delimiters, and invitations will automatically be sent out.
  - As a teacher, users will be able to monitor only the students they have registered for this online statistical course
- Admins:
  - As an admin, users will be able to monitor all participants on the website
  - As an admin, users will be able to export the database into a CSV or CSV like (e.g. JSON)

# Features to be Implemented:

## Functional Capabilities

| Capabilities | Functionality Description | Potential Users |
|---|---|---|
| Sign Up Functionality | A sign up feature shall be implemented to give users the option to make an account to access the course | - Guests |
| Login Functionality | A login feature shall be implemented in order for users who have created an account to keep track of their progress | - Students<br>- Teachers<br>- Admins |
| Registering Classes | Teachers shall have the ability to register their students for the course. This will allow the system to know that it is a class and these students belong to that specific teacher. | - Teacher |
| Statistical Calculators | A statistical calculator shall be developed using Open Source code to provide a tool where students can perform simple statistical functions. These formulas shall include z-test, one-sample t-test, | - All Users |

| | independent samples t-test, dependent samples t-test, pearson correlation, simple regression, and chi-square. | |
|---|---|---|
| Interactive Modules | Content for each unit module shall be repackaged into interactive lessons. Potential interactive activities shall include answering questions and dragging and dropping choices into buckets. Answers will pop-up on screen after user clicks submit. | - Students<br>- Teachers |
| Quizzes | ● Pre-Quiz: Before each module, students shall have the option to test out of the module if the student has prior knowledge of the lesson. Students will have to score a 100% to test out.<br>● Post-Quiz: After each module, students shall be tested on their retention of the lesson's information in the form of a quiz. This quiz will be the same as the pre-quiz.<br>● All quizzes will be 10 questions with potential question format being multiple choice and true/false | - Students |
| Labs | Per each module, students shall have the ability to complete labs to ensure they are retaining the information. Upon completion of the interactive module and labs, students shall be given access to the post quiz. | - Students |
| Badging System | Students shall be able to receive badges in the following ways:<br>● Completing each module's quiz<br>● Completing every module in a given unit<br>● Completing the full course | - Students |
| Automatic Grading | Student quiz answers shall be graded automatically in which students will be able to receive their scores and badge at that time | - Students<br>- Teachers |
| Answer Pop-Ups | Pop-ups shall aid students in the understanding of the answers to the questions in each module. Submitting their answer during the lesson shall trigger the correct answer to be shown as well as an | - Students |

| | explanation for it | |
|---|---|---|
| Progress Tracking Tool | Students shall have the ability to track their individual progress within the modules. Teachers shall have the ability to track the progress of all students they register. Admins shall have the ability to track any user using the website. | - Students<br>- Teachers<br>- Admins |
| Printing Capability | Users shall have the ability to print out the quizzes and labs to work on them. Any content printed from the site will be watermarked. | - Students<br>- Teachers |
| Exporting Information | Admins shall have the ability to export the database of all users who are signed up for the course. This information shall include the information they entered upon sign up. Admins can also export progress of all users. Exported files will be in a CSV format. | - Teachers<br>- Admin |
| Contacting Admins | Users shall have the option to contact the admins, Dr. Sondergeld and Dr. Stone, through a contact us page if additional information is needed. | - Students<br>- Teachers |

## Non-Functional Capabilities

| Feature | Functionality Description | Potential Users |
|---|---|---|
| Performance | Response time and throughput when interacting with modules, loading lessons, and in general, browsing the website should be within a reasonable timeframe. Load time is aimed for a minute at most as is the standard set by Youtube. | - All Users |
| Understandability | Users should be able to navigate the website interface through without much difficulty or guidance. We aim to have a website that is simple enough to understand much like Khan Academy is from the start page but included in that would also be instructions for anyone who doesn't understand so that anyone who needs can use the website. This includes UI scaling. | - All Users |

| Security | The website and database both need to be secure to prevent unauthorized access and in an even worse scenario the access of administrator abilities by outside entities. Included in this would be teaching people the basics of security to keep their data from being leaked, a minimum requirement that all passwords be changed every 6 months, you cannot repeat the last 5 passwords, and a complexity requirement on the passwords. Additionally we would have a password limit for how many times you can try to log in before it sends you a password reset email, and for teachers a two factor authentication. As us the standard on many websites | - All Signed In Users |
|---|---|---|
| Privacy | We need to ensure the privacy of the users and prevent any data from being leaked. As is the industry standard due to most leaks coming from password security or a faulty back end we will need to ensure the database is secure. | - All Signed In Users |
| Storage | The data and information of the users and curriculum need to be stored. Thus we need to create a database for the information to be stored on and accessible from. The size we have is dependant on how much we have to work with from the stakeholders. | - All Signed In Users |
| Data Integrity | Data should be accurate and reflective of the information entered/collected. By this we mean all data that we have should be uniform to ensure there are no inaccuracies on the website. | - All Users |
| Manageability | Users should be able to manage their accounts through settings, where they can change their password or update their email. | - All Signed In Users |

## Features not to be Implemented:

| Feature | Functionality Description | Reason |
|---|---|---|

| User Profile Customization | A feature that allow users to personalize their profiles with avatar, background and biography. | Storage space is limited and reserved for course content. |
|---|---|---|
| Discussion | A feature that lets users participate in a community or in class discussions. | The course is led with a hands-off approach, so there will be little to no moderation in these channels. |
| Knowledge Base/ Help | A feature that allow users to look for documentation on how to use the website. | The course strives to be as user-friendly as possible and as mentioned above, the website is not heavily monitored by admins once handoff is complete. If additional help is required, they may inquire through the contact page. |
| Quiz Question Type: Short Answer, Essay | A specification of quizzing method that users could approach in quizzes, labs, and interactive modules. | Quizzes, labs and interactive modules are automatically checked for the right answer. Short answers and essay questions cannot be automatically graded. |