Requirements Document

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Team
Jasper

Project
Jabulani School Simulation Portal

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Accepted as baseline requirements for the project:

_____   _____   _____   _____

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Introduction

With today's ever increasing diverse population, there is now a new inquiry into how instructors can embrace the diversity of their student body — whether it is between a traditional face-to-face class, or one that is taught online. Current research suggests that diversity in a traditional classroom is a powerful asset, providing that the instructor is sensitive to individual students' backgrounds. However, it can prove difficult to deal with the diversity gap between students and teachers. To allow these teachers to engage with their students respectfully, teachers must know their students and their academic abilities individually in order to be able to respond in a culturally, socially, and linguistically appropriate manner. The best approach for teachers to obtain knowledge for handling specific diversity-related circumstances is by connecting to the experience on a personal and professional level of students with various backgrounds.

Our sponsor, Gretchen McAllister, is a Professor of Education at NAU. While teaching abroad in South America, she contemplated the idea of developing a school simulation portal that could amplify and fully encompass diversity sensitivity in an academic setting. This portal, appropriately named "Jabulani" — the siSwati (Kingdom of Swaziland) word for happiness, is to made to lay the foundation for the future of diversity training in academia. McAllister's idea of the portal is to highlight a few of the key challenges and concerns regarding diversity, and illustrate ways to gain an understanding of diversity in the classroom and beyond.Much discussion about diversity focuses on the following forms of marginalization: race, class, gender, and sexual orientation — and rightfully so, given the importance of these forms of difference. In fact, students come to the classroom with different backgrounds, sets of experiences, cultural contexts, and world views. So far, McAllister has accumulated 600 virtual student profiles in a Excel sheet, expanding many different diverse backgrounds. Along with these students profiles, she has also developed scenarios where these "teachers in training" will be able to interact with multiple diversity situations and address them accordingly. The concept of the portal is to allow both faculty and students to log in to the portal; faculty members can drag and drop from the online virtual database to create their own virtual classroom and assign scenarios and exercises to the students accordingly.

To address these challenges, we have been working on developing a virtual training space called "The Jabulani School Simulation Portal". This portal will allow teachers in training to access potential classroom scenarios and allow them to address the scenarios in the most appropriate manner. The solutions to such scenarios will be reviewed by the admin or instructor, since these responses are never as simple as "right" or "wrong". To

enable this portal we are going to create a web application where faculty members and students can login to access this virtual classroom. Faculty members will be able to deploy a virtual classroom to further expand the student's academic experience. One of our tasks is to convert the 600 virtual student profiles excel spreadsheet into a online database where the faculty members can filter out or drag and drop virtual students into their own customizable virtual classroom. Along with their customized classroom, faculty members will be able to assign exercises and scenarios to them. From there, students will be able to login and interact with their assigned virtual classroom. As of now, Dr. McAllister resorts to using Google Classroom with the collected data to create simplified diversity scenarios/assignments. Our goal is to design a system that allows educational faculty to create and deploy individually customized classroom simulations, which are then used as the basis for a series of training exercises that allow education majors to gain hands-on experience with diversity issues they will typically face in a diverse classroom.

Our portal will be similar to that of Bblearn when it comes to authentication and system initialization. Students and faculty will be able to log in to the portal with their credentials and will be granted separate privileges. Faculty will have admin controls, where they can set up their virtual classrooms and teachers-in-practice will be able to self-enroll in one. From there, faculty will have the privilege of grading their exercises and enable them to advance.

This document will assess the details of how we intend to deliver our product and the requirement specifications. We will describe all the system requirements in detail and the intended purpose for development. This document will fully describe what the portal will do and how it will be expected to perform.

Problem Statement

Promoting diversity is a goal shared by many in American schools and universities, but actually achieving this goal in the classroom is often difficult. America's schools have been struggling for years to close the 'diversity gap' between students and teachers. Our client, Gretchen McCallister's goal is to create a portal where these teachers in training can attain hands-on experience with diversity issues that they will face in a common classroom. McCallister originally created a portal with NAU faculty members about a decade ago. The system had multiple issues and our client biggest complaint was that it was not user-friendly and overall difficult to navigate. The page itself before it was

outdated, not organized and had an unattractive layout. Consumers use your website to judge you, your company and your products before deciding whether or not they want to take a chance on you — it is important that the web portal makes a good impression. Our client helped the process of developing the portal, and she still didn't even know how to navigate within the system. Users couldn't figure out how to simply login with their credentials. When landing on an outdated website that looks ugly, old or neglected, many assume some things about the company behind the website; many of these assumptions are negative. A decade ago, the web was a completely different place and Smartphones didn't exist. Simpler and customer-oriented web application are highly expected now. Below is the original portal created almost a decade ago.
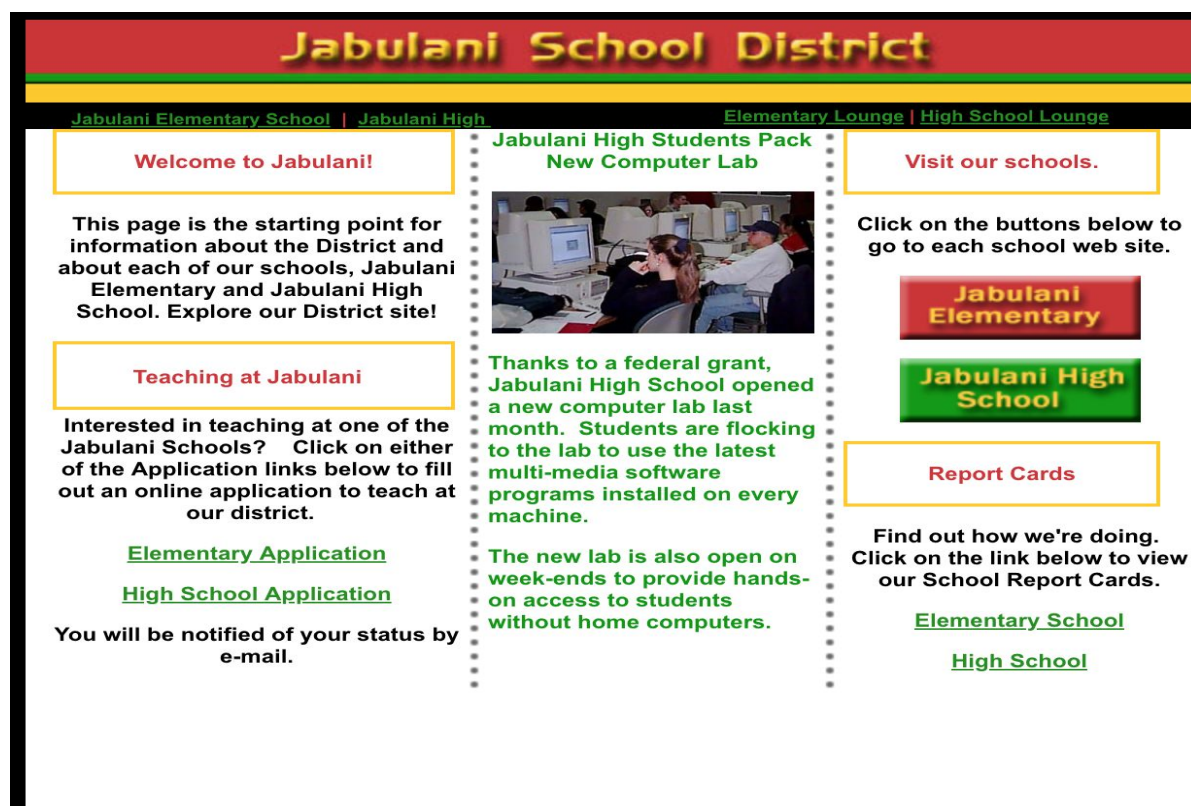
Another issue that our client dealt with is when the people maintaining the website left NAU. They didn't leave our client any admin access prior to leaving. When the IT staff running the web application left, the portal ended. A typical requirement for websites is to allow some user (authenticated users) to have certain privileges to run the website. The website itself had fallen to the domino effect. A failure in one location affected other spots in ways one may not expect. Web development is expediting at an aggressive rate. Better and user-friendly interfaces are in demand. When it comes to developing a successful web application there are a number of factors defining that success.

Solution Vision

Usability, or User Experience, is the art of making our web application simple, user-friendly and easy to use. Understanding our customer's online behavior gives us insight into what works and what doesn't. Once we have a prototype and a working interface, we are going to be testing our system with faculty members and attaining their opinions and critique. For example we will ask, do links and buttons appear clickable, as they should? Does the website flow logically? Is it abundantly clear where important information can be found? If not, then we will update the portal accordingly.

Our user-friendly web application will also be accessible to everyone including blind, disabled or the elderly. These users typically use screen-readers to access the Internet. We plan on using right contrast between the background of the web application and the content. We also plan on organizing the content accordingly so that the user shouldn't have to hunt for a way to navigate through the site. Menu bars will be visible and their purpose should be obvious.

To solve the problem of allowing someone else having the task of maintaining the portal, we will use roles to manage user access to Web pages. Roles enable us to apply the same access rules to a group of users, such as managers, administrators, members, and so on. To use roles, we will create new roles, assign individual users to one or more roles, and then grant access permissions to the role. Every user in that role is granted the permissions that are defined for that role. For example, we will create an administrator role, add users to the role and set up access rules that allow only users in the role to see administrator's page. Users who are authenticated but are not assigned to the administrator role will not be able to access the pages that you configure only for administrators.

Project Requirements

Functional Requirements

Though we are developing a web portal, its various aspects must work together in order for the whole thing to function properly. These certain aspects are listed below and are considered mandatory along with other requirements requested by the client. The

functional requirements describe the aspects of our project that are necessary for expected behavior.

FR1 — Administrator vs. Student teacher features:
Depending on whether an administrator or teacher-in-training is logged in, features and privileges should be separated accordingly.

    1.1 - Administrators have access to most features:
- Access/edit student profile data
- Create/share scenarios
- Create/share virtual classrooms and edit their permissions
- Grade exercises assigned to teachers-in-training

    1.2 - Teachers-in-training have lesser access to features:
- Can only view partial student profiles from assigned virtual classrooms
- Can only submit solutions to assigned scenarios
- Can only access virtual classrooms assigned by administrators

FR2 — Secure login authentication:
As with most user credentials, a secure method for logging into the web portal must be implemented. Since there are plans to sell versions of this web portal to other institutions, it is imperative that all logins are authenticated and secure.

    2.1 - Encrypt and secure all user logins:
- User login information should be encrypted upon being submitted
- Submitted information should be sent to a database through a secured site

    2.2 - Store encrypted data securely in a database:
- The database itself should be secure and preferably separate from the server holding the web portal's files

FR3 — Virtual classrooms:
A requested client requirement for this project is the creation and management of virtual classrooms populated with virtual students. The virtual students consist of student profiles selected from the database.

    3.1 - Populate virtual classroom with virtual students:
- Administrators should be able to handpick student profiles from the database to use in a virtual classroom.

- Administrators should be able to use or share predefined student population sets created by other administrators

3.2 - Add or revoke profile-viewing privileges to teachers-in-training:
- Administrators should be able to allow or prevent individual student traits from being viewed by teachers-in-training

3.3 - Assign virtual classrooms to teachers-in-training:
- Administrators should be able to assign teachers-in-training as a "teacher" for a virtual classroom
- Teachers-in-training should be able to be assigned multiple virtual classrooms as needed

3.4 - Add scenarios/exercises to virtual classrooms:
- Administrators should be able to add one or multiple created scenarios for teachers-in-training to complete after viewing in-class student profile data.
- Teachers-in-training should be able to submit solutions of scenarios to their assigned administrators, as well as look at limited student data to plan their best solution

FR4 — Interactive database:

Another key requirement for this simulation portal is a modular and interactive student profile database. Along with this are sections of the database which hold data invisible to users, such as passwords and profile data.

4.1 - Add/create student data profiles (and import initial 600 Excel profiles):
- Administrators should be able to create new student profiles on demand
- The 600 student profiles that were previously created should be seamlessly transferred into the database

4.2 - Edit or delete entries and traits from profiles:
- If necessary, administrators should be able to easily delete student profiles
- Administrators should be able to edit, delete, or add entry/trait information to student profiles

4.3 - Search and sort student profiles by specific traits:
- Student profiles should be searchable by specific profile traits
- A procured list of searched profiles should also be sortable by specific profile traits

4.4 - Store standard user login and profile data:
- Login credentials for all web portal users should be encrypted and stored onto the database
- Profile data and preferences for every individual user should be stored and applied on login

FR5 — Scenario use/creation:

A requirement that works along with virtual classrooms is the ability to easily create scenarios/exercises. These scenarios detail a problem that teachers-in-training should solve based off the current knowledge they have from student profiles.

5.1 - Create scenarios using student profile data:
- Administrators should be able to create scenarios for teachers-in-training to complete after viewing in-class student profile data
- Administrators should be able to create out-of-class scenarios by just using student profiles pulled from the database

5.2 - Share or use created scenarios:
- Administrators should be able to share any created scenarios to the database for other administrators to use
- When assigning scenarios, administrators should be able to search scenarios shared by other administrators

5.3 - Assign scenarios:
- Within a classroom, administrators should be able to assign scenarios to teachers-in-training based off of in-class profiles
- Outside of a classroom, administrators should be able to assign scenarios that are shared by other administrators to teachers-in-training. The students in these scenarios are not specific to a classroom

Performance Requirements

The non-functional requirements describe the aspects of our project that are essential for desired performance and how they will be measured.

NFR1 — Accessibility:

As a system focused on being inclusive, it is important for users of many backgrounds to be able to access the web portal. We will include the following to ensure that this is the case:

- The web portal will feature a switch for the user to toggle between UI settings that will accommodate various forms of colorblindness.
- This will be tested by having a colorblind user interact with the system in the same ways non-colorblind users will.

NFR2 — Usability:

Our client has informed of that the previous iteration of the web portal fell short in usability, and many faculty had difficulty navigating through the site. To ensure this will not happen, we will include the following qualities:
- The system must include an intuitive design for users spanning various levels of technical backgrounds
- The user should take less than one minute to sign into their account.
- The user should take 2 seconds after completing a submission (scenario or response to scenario) to submit their response.
- The user should take 5 seconds to modify, search, delete, or add to the database.
- Users must have the ability to get expected results from each click. The user will take 2 seconds to simply navigate from one page to the next.

NFR3 — Reliability:

Given the amount of expected traffic and simultaneous use of the web application, it is extremely important that the system is always accessible to users at all times.
- The web application must load in less than 60 seconds at all times and each page following the landing page should take less than 5 seconds to reach.
- Due to the host that is being used, it is unlikely that a user will experience problems with reliability.

NFR4 — Maintainability for future refinement:

After the project has been completed, an external group will be making changes to the UI and overall design of the web application. As a result, the system will need to be easily modified by non-members of team Jasper. The following are required:
- Code will include comments that are easily deciphered by non-technical users and easily modified by minimally experienced programmers
- There be leeway given in areas the client has expressed the intention to expand upon and comments indicating this.

Environmental Constraints

The environmental constraints are factors that will limit the performance requirements. This includes:

ER1 — Cross-platform compatibility:
- The web application will ideally display and function identically among different browsers and operating systems. However, this likely can't be completely guaranteed with users on legacy browsers and operating systems

ER2 — Parsing of original Excel File:
- The parsing of the original Excel file that contains the 600 student profiles will rely completely on the formatting of the data.
- Since this is a one-time process, this will require complete and accurate extraction.

ER3 — Scenario entries and grading:
- While administrators will create scenarios based off student data, the scenarios themselves are somewhat open-ended and not in a specific format. Most likely we'll be storing the scenarios as text with few technical options
- Similarly, our client wants to avoid an automated grading process which means grading will likely be a manual process. Administrators will manually assign or revoke student profile privileges to teachers-in-training based off manual grading.

Potential Risks

As with all softwares, there are many potential risks that are involved. Considering that our software will not be life-threatening if it fails, ours is relatively low risk. That being said, there are still many impacts of some potential risks that we will try to avoid.

Being that our software technologies are new to most of our team members, there is a risk that we may not learn what we need to in a timely enough manner to deliver on our requirements. The impacts of this could be major. It could result in us delivering an incomplete, unusable product. Diving deeper, there are many risks involved with the user authentication system. This is one of the most important pieces of this software in terms of ensuring its security and stability. It must be very secure, or else there is a risk of it getting hacked and information leaking out. There is also a risk regarding functionality of

the user authentication system. For example, if our system cannot perform a password recovery mechanism properly, user's passwords may be lost forever.

As with any website hosted on the world wide web, there is a risk of hacking attempts being made on it. One of such that is very common is DDoS, or distributed denial of service attack, where the server experiences heavy traffic until it cannot work anymore. For all users, our website will be unusable and they will be inconvenienced. If a teacher in training is trying to complete their exercises, they will not be able to. Other types of attacks may arise in the future as well. Luckily, the information encompassed in our software is not personal or sensitive outside of passwords to our system and basic contact information. But with hacking, there is always an element of unknown with the risks involved - they may be able to use our information as a trace to more sensitive information on user's computers, or steal the entire software.

One of the more likely risks that we foresee occurring is in regards to the UX (user experience) and UI (user interface) components. Users must be able to easily understand how our system works and where to find things they need. They also must feel comfortable in interacting with the JASS system overall. A poorly designed UX or UI could result in confusion and frustration for the users. It may also "make or break" the future of the software as whole. If our software fails to appear professionally designed or attract and keep enough users engaged with it with a well-designed UX and UI, people may not continue to keep using it and the software may never take off.

A risk with a potentially bad outcome is failure on part of the team to successfully meet ADA compliance. ADA compliance means that we must make our website usable by persons with disabilities such as blindness or deafness. For these users, if they cannot use our website, they can become frustrated or feel discriminated against. This could then result in notifications being sent to us about it, or potentially even a lawsuit filed against us.

Project Plan

In order to develop our schedule, we first need to define the activities, sequence them in the right order, estimate the resources needed, and estimate the time it will take to complete the tasks. The scheduling aims to predict the future, and it has to consider many uncertainties and assumptions. As a result, many people believe it's more of an art than a science. Sometimes you start a project without knowing a lot about the work that we will be doing later. That's why we decided on using the rolling-wave planning, it lets

us plan and schedule only the portion that we know enough about to plan well. When we don't know enough about a project, we will use placeholders for the unknown portions until we know more. These are extra items that are put at high levels in the WBS to allow us to plan for the unknown. We also plan on using Teamweek, which is a a project management software to help us get the best overview.

January 14 — January 20 | Convert Excel Spreadsheets into Web Database Application

January 21 — January 27 | Create Graphical User Interfaces (GUIs) collectively for the front-end of the web page

January 25 — January 28 | Test and connect the Web Database with the User Interface

January 26 — January 31 | Develop Login Page and User Authentication

February 1 — February 14 | Design and develop Virtual Classroom Simulation

February 12 — February 19 | Testing Frontend with Backend and implementing Virtual Classroom

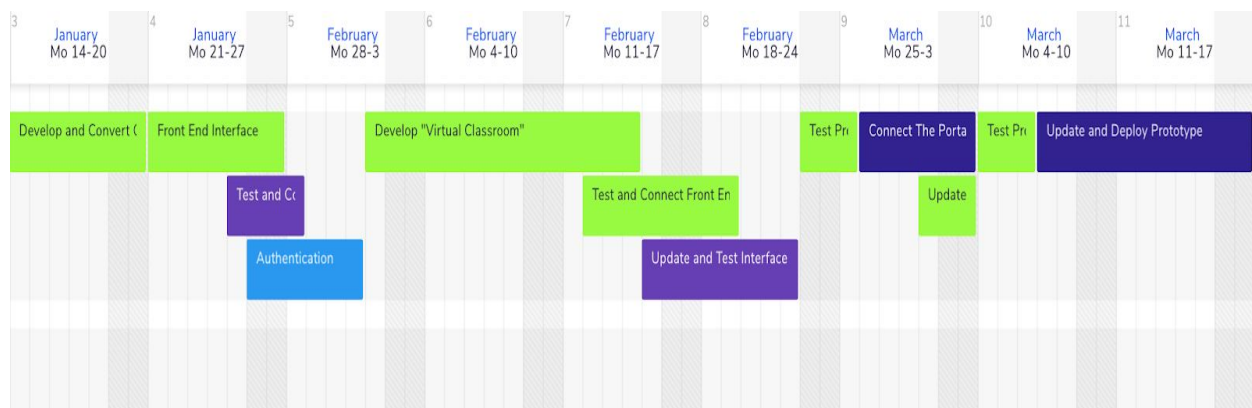**February 15 — February 22** | Update and Test Interface

February 23 — February 25 | Test Prototype with Users

February 26 — March 3 | Connect the Portal with Virtual Classroom

March 1 — March 3 | Update the User Interface

March 4 — March 6 | Test Prototype with Users

March 7 — March 17 | Update and deploy Prototype

Conclusion

The increasing diversity in education has required teachers to become more aware of their classrooms and how to conduct them respectfully. The mission of our sponsor and our team is to create a tool that will facilitate this experience interactively. This web application will be a crucial aspect of diversity training for student teachers throughout NAU. In addition, the client has goals of expanding its use to schools throughout the United States, furthering its impact. This portal will create a space for faculty to share scenarios with student teachers using student profiles to better their teaching performance. Given our complete understanding of what is required to complete this project, we are excited to begin the implementation process to help make this all possible.

This requirements specification document has provided overall clarity of the project requirements and details the expectations that are to be met. It has projected future dated highlights that will be faced next semester as well as what must be done to materialize the vision.