Software Requirements Specification

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Revision History

Name	Date	Reason For Changes	Version
Initial	10/24/2020	Initial Document	1
Revised	12/06/2020	Slightly revised	1.2

1. Introduction

1.1 Purpose

This document provides a comprehensive layout of the software specification requirements of *STEM Inclusivity Lab* carried out by a group of three undergraduate students at New York University Abu Dhabi (NYUAD) during the Fall 2020 Computer Science course "Software Engineering". It gives a detailed description of all features within the system, its interfaces, its capabilities and its responses to external stimuli. It contains the functional and nonfunctional requirements, and clearly outlines the potential boundaries and operational constraints of the system. It aims to serve as the primary document of specifications for the first version of STEM Inclusivity Lab (v1.0) for the development team, the stakeholders and the future users. After reading this document, the developers, the future users, the testers and the clients would gain enough knowledge about "STEM Inclusivity Lab" which would enable them to have a smooth experience interacting with this project and further help them make the most out of this system. This document will be proposed to Professor Mai Oudah for approval.

1.2 Document Conventions

- The terms "website", "platform" and "system" are frequently used in this document and they all refer to the STEM Inclusivity Lab project.
- Statements written in **bold text** implies that the reader needs to pay specific attention to the information that is being currently conducted. This information has high-priority; it is important and relevant for further explanations in the document.
- Statements written in *Italic text* suggest that they are currently in the process of discussion and have not been finalized yet.
- Statements written in red text refer to particular uncertainties in the project. They will mostly be used for the design and implementation parts of the system.

1.3 Intended Audience and Reading Suggestions

This document is intended for a wide range of readers, including developers, users, testers, project managers, marketing staff, documentation writers, and anyone else who would want to get a better understanding of STEM Inclusivity Lab. In the beginning, it contains an overall

description of the system and continues with a detailed elaboration on the product's specifications to be developed. These product specifications are clearly organized into three main sections - External Interface Requirements, System Features and Nonfunctional Requirements. Thus, the readers are advised to familiarize themselves with the general overview of the project first, and depending on their interest and task, read specific sections or subsections of this document.

Nevertheless, this SRS could be particularly helpful to the developmental team since they would have a compact overview of the technical requirements within the project. For instance, the User Interface developers could instantly gain a comprehensive understanding of the functionalities they need to focus on during the development stage thanks to Section 3, which contains the User Interface requirements. It is also worth mentioning that in case a member joins our team later on during this project, this SRS would enable them to quickly grasp the overall product, its design and implementation requirements.

1.4 Product Scope

"STEM Inclusivity Lab" is a multilingual, open source platform for young girls and womxn interested in STEM containing a variety of materials relevant to the field. These resources were created and used throughout the 5-year existence of the NYUAD's Student Interest Group, STEM, and this project aims at making them accessible to a greater audience within the MENA region by translating them in Arabic, Slovenian and Turkish. We, as students coming from the EMEA region, have noticed the lack of multilingual resources available for the STEM fields and would like this project to be a step toward filling this gap, and raising awareness on the position of female, non-binary and otherwise marginalized STEM individuals in the EMEA region.

1.5 References

- Our GitHub repository: https://github.com/mariamelgamal/westem-inclusivity-lab
    - This SRS, the System Request, the Feasibility Study, the Project Development work plan, the information regarding the Process Model customized for this product, the UML Diagrams and the code of STEM Inclusivity Lab, can all be accessed through our private GitHub repository.

- Website GitHub Repository: https://github.com/steminclusivitylab/steminclusivitylab.github.io
    - Used to host the site on github pages.

- The weSTEM's website: http://www.westemnyuad.org/
    - Where are our project's materials coming from? The answer to this question and any background information about the purpose, the mission and the activities of weSTEM can be found on the weSTEM's official website.

2. Overall Description

2.1 Product Perspective

STEM Inclusivity Lab would be a new, self-contained website *to be embedded in the currently existing weSTEM website*. Since there are currently many open source projects in the market related to STEM fields, we recognize that the competition is large. STEM Inclusivity Lab stands out in this pool of existing products with its unique ability to operate in four different languages: English, Arabic, Slovenian and Turkish. Thus, it is specifically tailored to individuals from the EMEA region. STEM Inclusivity Lab is also uniquely dedicated to NYUAD's weSTEM mission - it contains resources that have already been used and proven to help young girls and womxn in STEM succeed on their path toward pursuing careers in the field. Hence, STEM Inclusivity Lab guarantees quality and efficient contents.

2.2 Product Functions

The system's functions were determined based on the survey results found in *Project Proposal and Supporting Documents* file and can be found below:

- Allow users to search through the documents on the website.
- Allow users to add, and update materials and projects to the site.
- Administrative approval is required for any addition or updates to materials on the website.
- The website interface will support four languages - English, Arabic, Slovenian and Turkish while *the documents will be in English*.
- Create a forum to encourage user engagement.
- Supports admin privilege to take down the comments on the open forum in case of inappropriate content.
- Supporting feedback collection through access to messaging the administrators.

2.3 User Classes and Characteristics

There are three primary end users for this software:

1. Admin

- The admin is the back end user. It refers to the system administrators (i.e. members of the developmental team) who will be in charge of the approval and categorization of the added materials on STEM Inclusivity Lab.
- They will also have the task of actively enforcing the code of conduct in the forums, monitoring all the activities and maintaining the system.

2. Signed-in user
    - The sign-in user has the privilege to view, download, add and update materials on the website.
    - They are also able to post comments on the forum.

3. Guest
    - The guest is a non signed-in user and they have the ability to view and download materials.
    - If they would want to add and update materials, and post comments on the forum, they would need to create an account and sign up on the website (i.e. become a signed-in user).

We made this selection of user classes based on their privileges within the system while also taking into consideration the security of the product. We want to make sure that anyone who adds and updates materials on STEM Inclusivity Lab, and posts on the forum, is a user that has previously made an account on our platform.

Nevertheless, we anticipate that a wide range of people with different backgrounds, technical expertises and education levels will take advantage of our system and fall into one of the above mentioned user classes.

2.4 Operating Environment

STEM Inclusivity Lab is an advanced web application expected to be operating on different web browsers with access to the Internet. Compatibility with other platforms is a priority - compatibility with the currently existing STEM website is a must since we plan to append our product to weSTEM's website.

2.5 Design and Implementation Constraints

- Having prepared all STEM materials (i.e. going through the process of de-identifying, naming and categorization of the documents) and getting the STEM Inclusivity Lab running by the end of this semester is a limitation. Thus, we need to prioritize certain STEM materials and system functionalities over the others.
- Translation of the materials and the website operations from English to three other languages is a constraint that can be resolved by prioritizing certain language(s) and/or materials.
- The admin has to constantly monitor the activities on STEM Inclusivity Lab, approve and categorize the added materials, enforce the code of conduct in the forums (i.e. put down contents, if necessary) and maintain the system 24/7.
- All the members of the development team have not previously worked on a web development project. Their first-time exposure to technical skills, such as HTML and CSS, required to deliver this website is an implementation constraint that they will be actively working on improving throughout the course of this project.

2.6 User Documentation

The following user documentation components will be delivered along with the software:

- README file - a text file that explains the project and all the commonly used functions;
- Code of conduct - a document that the user needs to read and agree on upon using the add, upload and post on the forum functionalities;
- Website pop ups - on-line help that offers on-spot guidance for first time users through all the website's functionalities.

2.7 Assumptions and Dependencies

    - Factors which could affect the requirements started in this SRS are below:

- Expert's feedback - depending on professor Mai Oudah's feedback, certain components within the design, functionalities and/or documentation of the project could be modified or completely neglected;

- Feedback section - getting users' feedback through the forum and the comment section will be used in order to discover certain issues around the development and/or operating environment;
- *Integrating weSTEM's website with STEM Inclusivity Lab - reusing certain components from STEM's website and making the both compatible with each other;*
- The ongoing pandemic - an external factor that could impact our project plan.

3. External Interface Requirements

3.1 User Interfaces

Users will be required to sign up or sign in, in order to be able to share or upload resources on the website and to interact with the community on the forum. Users do not need to have an account to view or download any public resources or projects on the website. The sign up form will ask for a username, email, password, name of affiliated institution/company/organization, country, and a drop-down list of the primary types of users which include:

1. high school student
2. undergraduate student
3. graduate student
4. faculty
5. tech industry
6. tech non-profit organization
7. other

Primary types of users categorization is important for analytics for targeted marketing and improved material.

For sign in, the users will be prompted to enter their username and password. Once login is successful, users will have the freedom to access, upload and share material, as well as post and comment on discussions in the forum.

The homepage displays the most downloaded material and resources on the website as well as any promotional material from industry or educational sponsors.

There is also a navigation bar displayed at all times at the top of the page, where users can navigate to code of conduct, contact the STEM Inclusivity Labs team for feedback, search for resources and material on the website, and main resources and projects categories.

A *search interface is always displayed on the top as part of the navigation bar or the left side of all pages* for the user to search or navigate to different content on the website by typing in the title of the desired material or resources. If the material is not available or cannot be found then the website displays the following information “cannot find material under this name”.

Some of the standard buttons and functions on our website will include: upload, share, download, update, post, comment, language, and feedback. The upload, share, download and update buttons are going to be specific for the project and resources upload and sharing on the website. The upload button will be used for uploading the user’s local files and resources to their designated project folder. Once the user is sure of their upload, the user can then use the share button to share their project folder publicly on the platform with other users. Before the shared folder is available publicly on the website, a public share request is sent to the website administrator once the user clicks share. The website administrator will review the content of the website to ensure that it passes the community’s code of content and categorize the document under the appropriate project categorizations (e.g. workshops, career development, K12 outreach, etc.). Once approved, the shared folder will be accessible by all the users. The download button will be used by all users to download current projects and material already available on the website for their independent use.

As part of the forum feature, the users will be able to start a new discussion or thread using the post button after writing in the designated textbox. Users will also be able to attach media, such as videos and pictures, to their posts if they are interested. The comment button will be used by other users to participate in current or past discussions on the forum. Administrators will have the authority to remove or delete a post or a comment on the forums if it violates the code of conduct written on the website. The language button is specific for our multi-language feature. Once the user clicks on the language feature, they will be able to select their language of choice from a drop-down menu. The feedback button is going to be specific for users to report any website issues, report any community conduct violations or give feedback to the website administrators.

Users will be able to see projects based on different criteria which they can select from a drop-down menu. Projects can be sorted based on “most downloaded”, “most recent

uploads", "alphabetic order", "chronological order". Specific projects can also be selected by category. Some of the main project and resources categories our website will have are:

1. Workshops (e.g. Arduino workshop)
2. K12 outreach (e.g. High School Conference)
3. STEM gender gap (e.g. Addressing unconscious bias in the workplace conference, STEM Gender Gap conference 2018)
4. Speaker series (e.g. Alumni Series, Professional Speakers)
5. Career development and more (e.g. CV workshop)

Projects can be classified under one or more categories.

3.2 Hardware Interfaces

This project is focused on developing a software product which allows our clients to share material and resources with the larger women-in-tech community. While the website's primary use is expected to be on PCs/laptop devices, we will ensure to have the web pages and components displayed on the website adjust according to the dimensions of the physical device used, including handheld devices such as cellphones and tablets.

3.3 Software Interfaces

The platform will be supported by all mainstream web browsers, including chrome, safar, firefox and internet explorer. The media and content on the website will be stored in a MySQL web database. The user requests are sent to server node, where the session information is recorded and the user's credentials are verified to check the user's authorization when needed in case of upload and update (user must be signed-in to have access). In case of viewing or downloading content or files from the website, the server will send requests to the database and return the files and content needed on the web page.

The messages coming into the system are as follows:

Messages	**Responses**	**Purpose**
username and password	Homepage	login

project title or category (string)	content or folder of this project or display “cannot find material under this name”	to search for material and resources on the website
files and project name (string)	if upload is successful and await admin authority to publish publicly or not	to upload or update a document
project title (string)	project folder/file	to download folder/file
post (string)	if the post is successful and await admin authority to publish publicly or not	to post on the forums
comment (string)	if the comment is posted or not	to comment on an existing post on the forums

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3.4 Communications Interfaces

Reliable internet speeds are required for the website to function optimally, we will be using wireshark for testing and verifying the internet speeds required as well as the website traffic. The front-end and backe-end frameworks of the system will communicate using HTTP protocols.

4. System Features

4.1 Log-in

4.1.1 Description and Priority

Users will be able to log-in in order to access specific features of the website, such as uploading the materials and participating in forums. The priority of this feature is **high.**

4.1.2 Stimulus/Response Sequences

Use Case: Register

This use case starts when the user attempts to sign-in, but does not have a valid account. Or when the user attempts to upload a document, but is not logged-in.

1. System prompts the used for the username and password or to register a new account
2. User selects the 'create a new account' option.
3. System asks user for registration information (name, last name, type of user outlines above, age, username, password, repeat password)
4. User enters the information.
5. System verifies the information and creates the account.
6. End of use case.

Use Case: Sign-In

This case starts when the user presses the Sign-In button or attempts to upload the document but is not signed in.

1. System asked the user for the username and password
2. User enters the username and password.
3. The system verifies the information: making sure that the username exists and that the password matches the username.
4. The user is signed-in and returned to the homepage.
5. End of use case.

Use Case: Forgotten Password/Username

This case starts when the user pressed the forgotten password in the Sign-Up window

1. System asks the user for the email address
2. User provides the email address they used to register.
3. The system checks if the email address exists in the database.
4. The system sends an email with username and password information to the user's email address.
5. End of use case.

4.1.3 Functional Requirements

REQ-1: **User Database.** All the user information should be stored in a database, both the personal information and the username and password combination. Each user input in the database should have a name, last name, age, user type, email address, username and password associated with it.

4.2 Discussions

4.2.1 Description and Priority

Users will be able to participate in the discussion via forums. They will be able to both post the prompts for discussions and comment on other posts. This feature has **low** priority.

4.2.2 Stimulus/Response Sequences

Use Case: Make a post

This use case starts when the user pressed the button to make a post in the forums section of the website.

1. The System opens a new page that prompts the user to enter the title and description.
2. The user enters the required information.
3. The System sends the post to the Admin for approval.
4. The Admin approves/rejects the post.
5. The system notifies the user of approval/rejection by sending an email.
6. The system makes the approved post available.
7. End of use case.

Use Case: Make a comment

This use case starts when the user pressed the ‘comment’ button under a post.

1. The System opens a new page that prompts the user to input the comment. This new page displayed the post.
2. The user enters the required information.
3. The system makes the approved comment publicly available.

4. End of use case.

Use Case: Delete a comment

This use case starts when the Admin pressed the ‘delete comment’ button under a comment.

1. The System issues a warning and requires the confirmation.
2. The Admin confirms the actions by clicking the ‘confirm’ button.
3. The System removed the comment.
4. End of use case.

4.2.3 Functional Requirements

REQ-1: **User Database.** All the user information should be stored in a database, both the personal information and the username and password combination. Each user input in the database should have a name, last name, age, user type, email address, username and password associated with it.

REQ-2: **Post/Comment Database**: All the post and comments should be saved in a database that records the author, date & and time when the post/comment was published, tags for both posts and comments, and relation to the post for the comments.

4.3 Accessing Materials

4.3.1 Description and Priority

Users and guests will be able to search, download, upload and update the materials. All the materials will be in the pdf format and will be available to everyone, there will be no restrictions on the download and upload process in terms of quantity. The priority of this feature is **high**.

4.3.2 Stimulus/Response Sequences

Use Case: Search the materials

This use case starts when the user/guest indicates that they wish to look up certain materials either by category, by name of the document or both.

1. User/guest inputs the string of the name of the document and/or selects the category of the documents they wish to look up.
2. The system finds the documents in the database that contain any of the words from the search input and/or are tagged by the specific category.
3. The system displays all the documents that fit the criteria.
4. End of use case.

Use Case: Download the document

This use case started when the user/guest pressed the download button next to the document displayed.

1. The user/guest indicates that they wish to download the document.
2. The system gets the document information from the database.
3. The system initiates the download process.
4. User is able to access the document.
5. End of use case.

Use Case: Upload the document

This use case is used for the users to upload the documents to the database to be displayed on the website. It starts when the user indicates the action by pressing the ‘upload document’ button.

1. The System opens a new page to collect the information.
2. The User inputs the required information and uploads the document.
3. The System stores the document information in the database.
4. The System displays the document on the website.
5. End of use case.

Use Case: Update the document

This use case is initiated when the user presses the ‘update’ button. This button only appears if the document was uploaded by the user.

1. The System checks if the document was uploaded by the user.
2. The System prompts the user to change the information by opening a new window with the current information of the document preloaded.
3. User changes the information.
4. The System updates the information in the database.
5. The System displays the updated document information.
6. End of use case.

4.3.3 Functional Requirements

REQ-1: **User Database.** All the user information should be stored in a database, both the personal information and the username and password combination. Each user input in the database should have a name, last name, age, user type, email address, username and password associated with it.

REQ-2: **Materials Database.** All the documents should be saved in a database that records the author (user that uploaded the document), time and date of the upload, name of the document, file, category(s) associated with the document.

4.4 Feedback

4.3.1 Description and Priority

Users and guests will be able to provide feedback on the website by sending messages to the website owner/admin. The priority of this feature is **low**.

4.3.2 Stimulus/Response Sequences

Use Case: Send Feedback as User

This use case is started when a user (logged-in) reaches the feedback page.

1. The System verifies the username.
2. The System asks the User to input the comment.
3. User inputs the information.
4. The System sends the information to Admin.

5. The System sends the confirmation message to the user.
6. End of use case.

Use Case: Send Feedback as Guest

This use case is started when a guest (not logged-in) reaches the feedback page.

1. The system asks for the contact information and comment.
2. The user inputs the required information.
3. The System sends the information to Admin.
4. The System sends the same information to the Guest via email.
5. End of use case.

4.3.3 Functional Requirements

REQ-1: **User Database.** All the user information should be stored in a database, both the personal information and the username and password combination. Each user input in the database should have a name, last name, age, user type, email address, username and password associated with it.

5. Other Nonfunctional Requirements

5.1 Performance Requirements

The website needs to be up and running 24/7 and the system should allow multiple files to be uploaded, updated and downloaded in parallel. The system should have flexible capacity, where we expect a surge in traffic at the beginning of each academic semester when student groups plan their events. We also expect higher traffic surges during the fall semester than the spring semester, since most internships, conference, jobs and scholarship applications deadlines tend to be during the fall semester.

5.2 Safety Requirements

While updating already existing files or content on the website, it is crucial for the admin to authorize the update using version control to mitigate any loss of information or content. It is also necessary for the admin to monitor interactions on the forum in order to enforce the code of conduct in case of violations, to maintain the website as a safe and respected platform for collaboration and empowerment of women-in-tech. Users are also encouraged to report any issues or give feedback to the website admins using the feedback feature.

5.3 Security Requirements

The server on which the projects and their categorization resides will have its own security to prevent unauthorized write/delete access (only administrative access allowed). There is no restriction on read access of the projects and resources already authorized by the administrator to be shared publicly. All usernames and passwords will be securely stored to minimize the likelihood of any security breaches, violations, or information tampering or loss.

5.4 Software Quality Attributes

- Adaptability
    - Although STEM Inclusivity Lab is operating with materials from NYUAD's weSTEM, its resources can and will be expanded with materials from SIGs in other educational institutions with similar STEM missions. The range of materials can expand to other fields as well.
- Correctness

    - STEM Inclusivity Lab guarantees the correctness and quality of its materials since the admin is familiar with the currently existing STEM resources, and will review the added and uploaded materials from users before allowing their publication on the website itself.
- Usability
    - User-friendly interface with few and concise functionalities. The on-spot, pop-up instructions will ensure smooth user experience.

5.5 Business Rules

The distinction that needs to be made is between the three different user classes - Admin, User and Guest. Admin is mainly there to control the entire process and approve, whereas, the User and Guest contribute in different capacities. It is important to have distinctions as we need different levels of information for each of them. The admin should take on the responsibility of moderating the content to assure that the code of conduct is followed, that the content is respectful. All of this is necessary to fulfill the business requirements of acquiring ad revenue and partnerships to support the work of the platform.

6. Other Requirements

None so far.