SOFTWARE REQUIREMENT SPECIFICATION (SRS)
FOR

Mobile Application of Continuing Professional Development

Version 1.0

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Document History

Version	Name of Person	Date	Description of Change

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Document Sign-off

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Contents

1. Introduction

1.1. The Purpose of Document

This document describes, the constraints, document conventions, product scope, perspective, operating environment, system features, non-functional requirements and all other dependencies needed and used in SVSS.

1.2. Intended audience

This document is intended for the stakeholders like; project supervisors, managers and the respective management authorities involved with the development of the System. This project is a mobile application for Continuing professional development intended to be used in government primary schools. This has been implemented under the guidance of supervisors and requesting organization.

1.3. Document Convention

The font and font size that this document will be using is Times Roman and 12. It will use line spacing of 1 unit between lines.

1.4. Project Scope

The final product will enable the teachers and guide teachers allocated under CPD model, to access material like manuals, lesson plans, fill out rubrics and use observation tools for monitoring the class teachers.

Observation tools will include interaction of student and teachers, movement of teacher in class, how students are verbally engaging in class, number of questions asked during lecture, rate the teacher on the basis of lesson competencies, voice pitch of teacher and to keep track of how children stay on task, or go off task.

1.5. Not in Scope

Some observation tools like observing body language of teacher and word selection during lecture are not in scope of the application, as it needs surveillance system and NLP.

Overall System Description

1.6. Background

The main aspect of education is teachers' professional development as teachers play main role in building an educated society. So, for teachers' professional development, there is need of learning management systems. There are many learning management systems already built to facilitate teachers as well as students for remote learning which helps in gaining efficiency in learning. These learning management systems provide useful content, enable students to submit their work and many more. Some common learning management systems are Sukkur IBA LMS, Coursera, Khan Academy and there are many more. But all these learning management systems work either for student assessment or provide the course content, none of them is particularly for teachers.

There is a problem of teachers' assessment, which can mainly be done through observation tools which examine the way of teachers' communication, interaction style and knowledge delivery. So, for these purposes there is need of observation tools which identify how the teachers are interacting during the classroom. Secondly providing course content, manuals and these observation tools in a single platform would be beneficial for both teachers and students. The main goal of this project is to provide a platform for teachers which will help in their assessment through observation tools and provide manuals and course content(Lesson Plan) in a single application.

1.7.Objectives

The main objectives of this project are to provide a platform for teachers to discuss the queries, offer observation tools that will evaluate teachers' interaction style, provide course content, manuals, lesson plans and rubrics in form of checklists. To make all these objectives presentable, we will make a mobile application that would facilitate senior faculty to assess their juniors through checklists and finally get the performance report. The functionality which will make this mobile application unique is the observation tool feature, which will note the teacher's way of transferring knowledge during class.

The main goals of our project are;

1. Providing a centralized platform for teachers to access and share material regarding particular courses i.e. manuals, lesson plans.
2. Offer observation tools that can observe the teachers' interacting style in the classroom There would be total seven observation tools that would be used to note the teacher's teaching style.

The observation tools are:

1. **Teacher Engagement**
   It is hectic for the teachers to understand their own tone, body language and general engaging manner without seeing themselves. This observation tool will help them identify their own classroom interacting style at runtime by using microphones which will identify the teachers' pitch and show them alert if its too high or too low according to the defined benchmark.

2. **Teacher Movement**
   Here the teacher's movement would be recorded. The guide teacher (Observer) would enter total number of students, then the application would create the classroom sketch according to total students present in the class. Finally, the observer would draw lines to connect the student dots with the teacher dot to note down the teacher's movement in given time period. In the result, a sketch would be generated which will show that how teacher interacts to students, like is he only focusing on left rows or the front rows or whole class.

3. **On/Off Task**

   The purpose of this tool is to keep track of how children stay on task, or go off task, during a part of the lesson. The observer would write student names in the already given boxes. He would decide a time stamp in which he will observe students' and teacher's activities. If a student is doing the assigned task, the observer would add plus to his box, and if he is not doing the task the observer would add minus to his box and if the observer cannot see what the student is doing, the observer would add question mark. Likewise, he will perform this step for each student in the class and repeat the whole process 3-4 times. For this process, our application would provide automated interface that will make this whole process easier and manageable. At the end, an automated report would be generated, which would further be analyzed by the TEI faculty member.

4. **Children Engagement: Verbal Involvement**

   This tool helps the observer to identity which children in the class are responding verbally and which are not. So, we will draw an interface which will show a diagram representing teacher and arrows, pointing towards the table that holds names of students

5. **Children Engagement: Opportunities to Respond**

   In this observation tool student will be expected to verbally engage with the teacher. System will use the following code to indicate what opportunities the children must respond:
   T – Teacher calls on child; C – Child raises hand and speaks; CO – Child calls out a response without raising hand; BR – Brief Response; LR – Long Response.
   In our application, squares would be drawn, representing desk of each student and all the student responses would be noted under each student's portion.

6. **Use of Questions**

   When teacher will be interacting with the class, System will provide opportunity to script questions that are used to engage the children. Once questions are scripted, categorize them using Bloom's taxonomy. Observer would categorize each question asked by teacher into a table according to types which are; evaluation, synthesis, analysis, application, comprehension or knowledge. In the end, the system would generate a graph which would comprehend the quality of questions asked.

7. **Lesson Competencies**

   This observation tool help guide teacher to Observe an entire lesson and rate the Teacher in given lesson competencies. This would be kind of rubric table that would decide lesson competency into 3 categories that whether it needs improvement, or it is satisfactory or it is competent.[i]

1.8. Stakeholders

The people who will use the application are the teachers, TEI faculty and students. The people who are involved in the development of the application are the group members, project

manager/supervisor and the co-supervisor. Students of primary school will be indirect stakeholders who will ultimately get benefit of quality education.

1.9.Operating environment

This application will work on Android as well as iPhone smart phones. For development, minimum supported hardware recommended is core i5. Further things included in operating environment are:

- **Operating System** Windows
- **Program execution** Flutter for frontend and spring for backend
- **Smart Phone** Apple phone or android smart phone with minimum 7.0 version.

1.10. System Constraints

Software Constraints

Our system's performance is limited to smart phones only. This mobile application can only works on phones having touch screen which will be used in observation tools mostly.

Hardware Constraints

Hardware constrains of this project include not having enough memory to install this mobile application. Smart phone must have a microphone to record the voice.

Environmental Constraints

The sitting arrangement of students in classes may differ. In some observation tools guide teacher may need to assume students arrangement and change their sitting arrangement accordingly.

User Constraints

User should have good understanding about using observation tools and extracting manuals and should be aware of using such mobile applications.

1.11. Assumptions & Dependencies

- User have sufficient knowledge of smart phone and mobile applications
- The users know the English language, as the user interface will be provided in English
- Standard of sitting arrangement of students will be followed in mobile application based on assumption that students are sitting accordingly.

2. External Interface Requirements

Our system contains different requirements for its various interfaces. These requirements can be understood better with the help of context diagram given in figure. Other interface requirements include following:

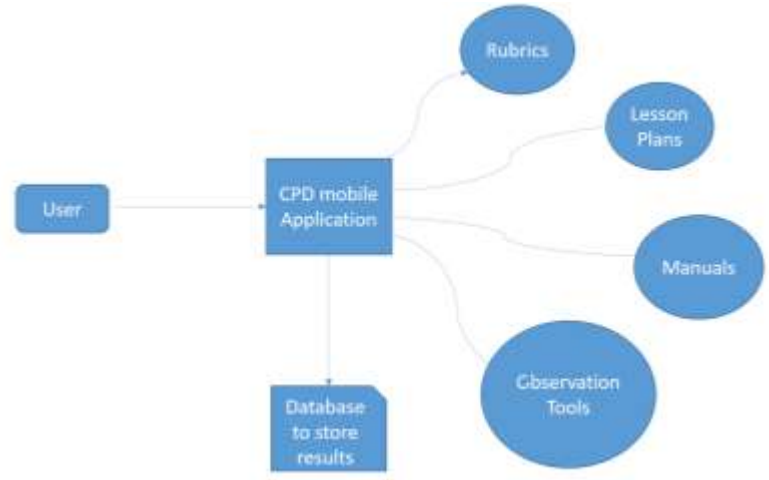

Figure 1: System Interface

2.1. Hardware Interfaces

This project is intended to use smart phone that people use in their daily routine work. User should give access to this application to use microphones.

2.2. Software Interfaces

Software	Version
Flutter	3.21.0
Dart	3.21.1
Star UML	4.0.1
Firebase	27.0.0
Visual Studio Code	1.55

Table 1: List of software Used

2.3. Communication Interfaces

Not Applicable

3. Functional Requirements

3.1. Functional Hierarchy

Requirement 1: The application will contain a home page which will give a way to reach 3 different functionalities (Lesson Plan, Educational Manuals, and Observation Tools).

Requirement 2: User shall enter the manual section, it will provide all the course content categorized subject wise.

Requirement 3: User shall enter the rubrics section, it will show the checklist on that basis the teachers' performance would be marked and it will also enable a snapshot option which would directly save the snapshot to gallery.

Requirement 4: User shall go to lesson plan section, it will display the outlines according to the subject and grade.

Requirement 5: The lesson plans shall show all flow of the subject that how it would be continued in the whole month. This section would be updated every month by the teacher.

Requirement 6: Observation tool section shall it will have 7 different observation tools(Use of Question, Lesson Competencies, Teacher Engagement: Personal Affect, Classroom Management: On Off Task, Children Engagement: Verbal Involvement, Classroom Management: Teacher Movement, and Children Engagement: Opportunity to Respond)

3.2. Use Case Diagram

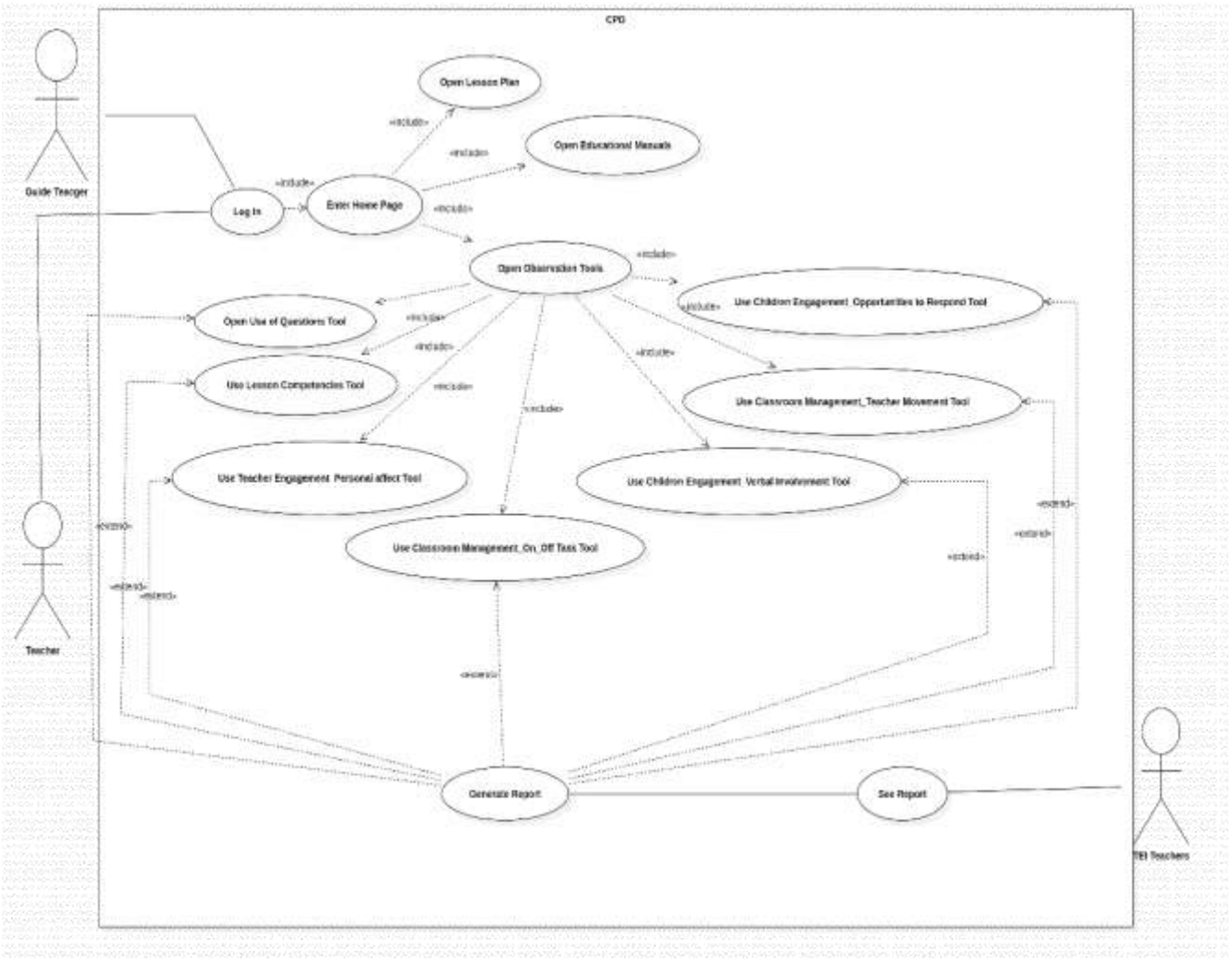

Figure 2: Use Case diagram

3.2.1 Use Case Login

Login		
Use case Id:	Login	
Actors:	*Guide Teacher, Teacher*	
Feature:	Username and password authentication	
Pre-condition:	*Open mobile Application* *Enter Username* *Enter Password*	
Scenarios		
Step#	***Action***	***Software Reaction***
1.	User will enter username	System show error if username is empty string.
2.	User will enter password	System show error if password is empty string.
3.	User will click login button	System will authenticate username and password.
Alternate Scenarios: ***No Alternate Scenario***		
Post Conditions		
Step#	***Description***	
	If user credentials are invalid, system will ask to enter credentials again.	
	If user is authenticated Home Page Screen will be visible.	
Use Case Cross referenced	-	

Table 2 Narrative of Login Usecase

3.2.2 Use Case Enter Home Page

Home Page		
Use case Id:	Enter Home Page	
Actors:	*Guide Teacher, Teacher*	
Feature:	When teacher login, home page will be visible	
Pre-condition:	*Open mobile Application* *Enter User credentials* *Login to the application*	
Scenarios		
Step#	***Action***	***Software Reaction***
1.	User will select one main functionality out of three.	System will show 3 main functionalities in home page
Alternate Scenarios:		
No Alternate Scenario		
Post Conditions		
Step#	***Description***	
	Open observation tools if user select observation tool section.	
	Open Lesson plan if user select lesson plan section.	
	Open Educational Manuals if user select manual section.	
Use Case Cross referenced	Login, open observation tools, open lesson plans, open educational manuals.	

Table 3 Narrative of Enter Home Page Use case

3.2.3 Use Case Open Lesson Plan

Lesson Plan		
Use case Id:	Open Lesson Plan	
Actors:	*Teacher*	
Feature:	When user select lesson plan in home page, this section will show the dynamic subject topics outlines	
Pre-condition:	*Open mobile Application* *Open home screen* *Select Lesson Plan option*	
Scenarios		
Step#	***Action***	***Software Reaction***
1.	Teacher will select his class	System will show subject outline of selected outline.
2.	Teacher will mark covered topics.	System will tell about the course pace and give time limitations to cover particular topics.
Alternate Scenarios:		
No Alternate Scenario		
Post Conditions		
Step#	***Description***	
	Teacher will save the data	
	Display final report to Guide Teacher and TEI faculty	
Use Case Cross referenced	Enter Home page	

Table 4 Narrative of Lesson Plan Use case

3.2.4 Use Case Open Educational Manuals

Educational Manuals		
Use case Id:	Open Educational Manuals	
Actors:	*Guide Teacher, Teacher*	
Feature:	When user select Educational Manuals in home page, this section will show the manuals of different subjects	
Pre-condition:	*Open mobile Application* *Open home screen* *Select Educational Manual option*	
Scenarios		
Step#	***Action***	***Software Reaction***
1.	Teacher will select his course	System will all the manuals related to that course
Alternate Scenarios:		
No Alternate Scenario		
Post Conditions		
Step#	***Description***	
	Guide teacher will download the manual	
Use Case Cross referenced	Enter Home Page	

Table 5 Narrative of Educational Manual Use case

3.2.5 Use Case Open Observation Tools

Observation Tool		
Use case Id:	Open Observation Tool	
Actors:	*Guide Teacher, Teacher*	
Feature:	When user select Observation tools in home page, this section will show the different observation tools to monitor teacher's performance.	
Pre-condition:	*Open mobile Application* *Open home screen* *Select observation tool option*	
Scenarios		
Step#	***Action***	***Software Reaction***
1.	Guide teacher will choose observation tool to monitor teacher.	System will open that particular observation tool.
Alternate Scenarios:		
No Alternate Scenario		
Post Conditions		
Step#	***Description***	
	Selected Observation tool will be opened	
Use Case Cross referenced	Enter home page	

Table 6 Narrative of Observation Tool Use case

3.2.6 Use Case Open Classroom Management: Teacher Movement Tool

Open Observation Tool		
Use case Id:	Open Classroom Management: Teacher Movement tool	
Actors:	*Guide Teacher*	
Feature:	Observation tool to monitor movement of teacher	
Pre-condition:	*Open mobile Application* *Open home screen* *Select observation tool option*	
Scenarios		
Step#	***Action***	***Software Reaction***
1.	Guide teacher will enter total no of students in class	System will draw that number of circles (dots) representing students
2.	Guide teacher will draw structure of teacher's movement in class	Graph-type structure will be drawn
Alternate Scenarios:		
No Alternate Scenario		
Post Conditions		
Step#	***Description***	
	Guide Teacher will save the data	
	Teacher's movement in classroom data will be saved in database.	
	Display final report to TEI faculty	
Use Case Cross referenced	Open Observation Tool	

Table 7 Narrative of Open Classroom Management: Teacher Movement Tool Use case

3.2.7 Use Case Open use of Question Tool

Open Observation Tool		
Use case Id:	Open Use of Question Tool	
Actors:	*Guide Teacher*	
Feature:	Observation tool to monitor how many questions teacher ask and from which context those questions belong.	
Pre-condition:	*Open mobile Application* *Open home screen* *Select observation tool option*	
Scenarios		
Step#	***Action***	***Software Reaction***
1.	Guide teacher script questions that are used to engage the children	System will keep record of questions asked at particular time.
2.	Guide teacher will categorize them using Bloom's taxonomy.	System will develop a chart telling no of questions asked in particular category.
Alternate Scenarios:		
No Alternate Scenario		
Post Conditions		
Step#	***Description***	
	Guide Teacher will save the data	
	System will ask guide teacher to give remarks for teacher's performance	
	Display final report to TEI faculty	
Use Case Cross referenced	Open Observation Tool	

Table 8 Narrative of Open Use of Question Tool Use case

3.2.8 Use Case Use Children Engagement: Verbal Involvement Tool

Observation Tool		
Use case Id:	Use Children Engagement: Verbal Involvement Tool	
Actors:	*Guide Teacher*	
Feature:	*Observation tool to monitor the verbal involvement of students*	
Pre-condition:	*Open mobile Application* *Open home screen* *Select observation tool option*	
Scenarios		
Step#	***Action***	***Software Reaction***
1.	Guide Teacher will answer the asked question	System Save those answers
2.	Guide Teacher will enter number of students in class	Draw a diagram that indicates where each child is sitting and where the Teacher (ST) is standing
3.	When teacher ask general question to the whole class	Draw an arrow from the teacher to the top of the page
4.	When a child responds	Draw an arrow from that child towards the teacher.
5.	When the teacher asks a specific child	Draw an arrow from the teacher to the child.
Alternate Scenarios:		
No Alternate Scenario		
Post Conditions		
Step#	***Description***	
	Analyze the image drawn.	
	Give remarks on teacher can improve	
	Display final report	
Use Case Cross referenced	Open Observation Tool	

Table 9 Narrative of Use Children Engagement: Verbal Involvement Tool

3.2.9 Use Case Use Lesson Competencies Tool

Observation Tool		
Use case Id:	Use Lesson Competencies Tool	
Actors:	*Guide Teacher*	
Feature:	*Rate the teacher*	
Pre-condition:	*Open mobile Application* *Open home screen* *Select observation tool option*	
Scenarios		
Step#	***Action***	***Software Reaction***
1.	Guide Teacher will rate the teacher on different lesson competencies	System mark the rubrics
Alternate Scenarios:		
No Alternate Scenario		
Post Conditions		
Step#	***Description***	
	Save the rubric report.	
	Guide teacher give remarks on what teacher can improve	
	Display final report to TEI Faculty	
Use Case Cross referenced	Observation tool	

Table 10 Narrative of Use Lesson Competencies Tool

3.2.10 Use Case Open Teachers Engagement: Personal Affect Tool

Open Observation Tool		
Use case Id:	Open Teachers Engagement: Personal Affect Tool	
Actors:	*Guide Teacher*	
Feature:	Observation tool to provide opportunity to Teachers with a sense of how they engage with the children.	
Pre-condition:	*Open mobile Application* *Open home screen* *Select observation tool option*	
Scenarios		
Step#	***Action***	***Software Reaction***
1.	Teacher will enable microphone.	System show notification of enabling microphone.
2.	Teacher will start this tool to analyze his voice pitch.	System will analyze the voice pitch and alert teacher when voice go down or above the given threshold.
Alternate Scenarios:		
No Alternate Scenario		
Post Conditions		
Step#	***Description***	
	Teacher will set his voice pitch accordingly.	
Use Case Cross referenced	Open Observation Tool	

Table 11 Narrative of Open Teachers Engagement: Personal Effect Tool Use case

3.2.11 Use Case Open Children Engagement: Opportunities to Respond Tool

Open Observation Tool		
Use case Id:	Open Children Engagement: Opportunities to Respond Tool	
Actors:	*Guide Teacher*	
Feature:	Observation tool to monitor how students are verbally engaging with teachers.	
Pre-condition:	*Open mobile Application* *Open home screen* *Select observation tool option*	
Scenarios		
Step#	***Action***	***Software Reaction***
1.	Enter number of students in class.	System will draw boxes of that number in screen, each box representing a student.
2.	Guide teacher use codes to indicate what opportunities the children have to respond (T – Teacher calls on child; C – Child raises hand and speaks; CO – Child calls out a response without raising hand; BR – Brief Response; LR – Long Response.)	System will show pressed code in box of particular students' box.
Alternate Scenarios:		
No Alternate Scenario		
Post Conditions		
Step#	***Description***	
	Teacher will be asked for remarks.	
	Generate and save table.	
	Display table to TEI Faculty.	
Use Case Cross referenced	Open Observation Tool	

Table 12 Narrative of Open Children Engagement: Opportunities to Respond

3.2.12 Use Case Open Classroom Management: On/Off Task Tool

Open Observation Tool		
Use case Id:	Open Classroom Management: On/Off Task Tool	
Actors:	*Guide Teacher*	
Feature:	Observation tool to keep track of how children stay on task, or go off task	
Pre-condition:	*Open mobile Application* *Open home screen* *Select observation tool option*	
Scenarios		
Step#	***Action***	***Software Reaction***
1.	Guide Teacher will 'sweep' the room for data.	Next to Sweep 1 System will write down what the teacher is doing.
2.	If the student is on task, teacher put a (+) in the top of the block	System will mark student as working.
3.	If the student is off task, teacher put a (–) in the top of the block	System will mark student as not working.
4.	If teacher cannot see what the child is doing, put a (?) in their block.	
Alternate Scenarios:		
No Alternate Scenario		
Post Conditions		
Step#	***Description***	
	Teacher will be asked for remarks When were the children most or least engaged?	
	Generate and save table.	
	Display table to TEI Faculty	
Use Case Cross referenced	Open Observation Tool	

Table 13 Narrative of Open Classroom Management: On/Off Task Use case

4. Non-functional Requirements

So far, we have identified following non-functional requirements. While working on this software, we will encounter some more non-functional requirements and, will add them by the time.

4.1. Performance Requirements

The application must be interactive, user friendly and the delays involved must be less. So, in every action-response of the system, there are no immediate delays. Notification should be fast enough so that user can take appropriate actions.

4.2. Safety Requirements

Not-Applicable

4.3. Security Requirements

As we all know that everyone need security. So, personal data of teachers will not be stored outside the application's storage system. And only particular user can access his/her data.

4.4. User Documentation

User manual will be made available for help. The user manual will contain detailed information about the usage of the application from a layman perspective.

Reference

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