Software Requirements Specification

for

E-Learning Management System

Version 1.0 approved

Prepared by

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SECTION A

1. Purpose

The main purpose of our system is to create software for the E-Learning Management System (EMS). It will eliminate/reduce the hardships faced by the existing system. It will also help organizations in better utilization of resources and managing information about students registered for their respective subjects, assignments, grades, etc. It will comprise several types of data regarding labs, tutorials, lectures, and other online resources.

2. Intended Audience and Reading Suggestions

This SRS (System Requirement Specification) describes how the E-Learning Management System extracts and stores information from students, teachers/professors, and other stakeholders involved in the education sector. It is primarily written for developers, software users, and for future references.

3. Product Scope

This software aims to make the E-learning Management System more efficient and robust while maintaining its actual structure.

It has the following functionalities :

- This software intends to provide a smooth e-learning experience to students.
- Students can register themselves by providing their details and also can enroll in provided courses.

- Instructors can upload resources, assignments and can keep track of the students' performance.
- TAs can evaluate assignments submitted by students and can give grades to them.
- The software helps in easy maintenance and management of the available data which remains updated with any new insertions/deletions in the database.

4. Description

Given below is the description of the E-learning management system to fulfill the requirements of the organization.

Product Functions

- An EMS (E-learning Management System) needs to keep details of its students, staff, the courses that are offered (static) along with online classes/labs links, and the performance of the students (dynamic).
- Information about each student is initially recorded during registration. This includes the student's identification number, name, year of registration issued at the, etc.
- The information recorded for each member of the TA groups (subject-wise if required) must include the TA id, name, and program which he is pursuing. Each student has one TA (per subject), allocated at registration time, who supports the student throughout the semester.

Operating Environment

- Students, teachers, and TAs can be provided with mobile/desktop applications in which they can do their respective work. Admin can be provided with an application where all privileges can be given to admin.
- The software can run on various platforms and gives all features to organizations that are required for e-learning management.

SECTION B

1) Background Readings

Reference 1

https://classroom.google.com

Google classroom is a website where teachers can upload course materials and make important announcements. Students can access materials and they can also communicate with teachers regarding doubts they may have. But in Google classrooms, teachers can not do all the things which are required by organizations like declaring results for every standard.

Reference 2

https://www.educause.edu/ir/library/pdf/DEC0302.pdf

This document provides details about challenges that are there in current e-Learning management systems. This document also describes issues to be addressed (i.e. Content management, Cost, Assessment). The scope of this document also expands to the effect of an e-Learning management system in future.

Requirements gathered from background readings

- The system must be robust in nature.
- e-Learning management systems should be low in cost so that every organization can adopt it.
- The system should be flexible to add/remove features in it.
- The system should be interoperable.
- There should be a way to efficiently manage the data at high scale.

2) Interviews

Interview 1 (Instructor) Plan

System: E-Learning management system

Interviewee: Mayurbhai Gajera (Role Play)
Designation: Principal at Oxford School of Science
Contact Details: 9924975xxx
Organization Details: Oxford School of Science - Amreli

Interviewer: Gautam Ajugiya
Designation: Student at DAIICT (project developer)

Meetkumar Mungra
Designation: Student at DAIICT (project developer)

Date: 5/10/2021 **Time:** 5:00 PM

Duration: 30 minutes

Place: Virtual meet

Purpose of Interview:

Preliminary meeting to identify problems and requirements regarding instructors and students' needs for better E-Learning experience.

Agenda:

- Problems facing with current online management system and any other concerns
- Exams data management
- Students requirements
- Follow-up actions
- Understand students registration procedure

Documents to be brought to the interview:

- Data sheets of students marks to analyze
- Rough outline
- Students registration blueprint

Summary:

After having an interview with Mayur Sir, we came to know that from an instructor perspective it is very important that we maintain the registration data very carefully because it is very important for the whole admission process. He explained how this can be very

problematic if we don't have proper functionality related to the registration process.

He told us that in school/colleges maintenance of time tables and also the lecture links is quite challenging in this virtual mode of education so here we got another feature that we should consider in proper manner.

Interview 2 (Student) Plan :

System: E-Learning management system

Interviewee: Darshan D. Ajugiya (Actual)
Designation: Civil Engineering Student at Government Polytechnic - Ahmedabad
Contact Details: 9712267XXX
Organization Details: Government Polytechnic - Ahmedabad

Interviewer: Gautam Ajugiya
Designation: Student at DAIICT (project developer)

Date: 5/10/2021 **Time**: 18:00

Duration: 30 minutes

Place: Personal meet

Purpose of Interview:

Meeting to identify problems and requirements regarding online labs/classes , online exams and also online assignments submissions for the better experience.

Agenda:

- Problems facing with current online management system and any other concerns
- Online assignment submission management
- Students requirements
- Follow-up actions
- Online exams
- Marks /grading schemes

Documents to be brought to the Interview:

- Rough outline

Summary:

After having an interview with Darshan , I came to know that as a student he has the same requirements as I have because we are facing almost all issues and going through almost the same situation. In the whole discussion the key feature was that we should add the assignment reminder feature which gives reminders before and after the assignments submission deadline. Also I found that for students it is very important that assignment submission should be very smooth. Exams and grading should be very quick and if possible should be visible transpentaly.

Interview 3 (Teaching Assistant) Plan:

System: E-Learning management system

Interviewee: Devesh Bhaiya (Role Play)
Designation: M.Tech. student at DAIICT (CT303 - TA)
Contact Details: 9979175XXX
Organization Details: DAIICT - Gandhinagar

Interviewer: Gautam Ajugiya
Designation: Student at DAIICT (project developer)
Kamal Tulsiyani
Designation: Student at DAIICT (project developer)
Shyam Butani
Designation: Student at DAIICT (project developer)
Meetkumar Mungra
Designation: Student at DAIICT (project developer)

Date: 5/10/2021 **Time:** 22:00

Duration: 30 minutes

Place: Virtual meet

Purpose of Interview:

Virtual meeting to understand the current students' mark updation system and assignment submission and checking work

Agenda:

- Understand teaching workflow
- How to avoid clashing between their lectures and teaching sessions
- Marks data management
- Follow-up actions
- Attendance data management

Documents to be brought to the interview:

- Rough outline

Summary:

After having an interview with Dev bhaiya, TA at DAIICT, We came to know that from a TA perspective it is very important that we maintain student's assignment data very carefully because it is very important for the whole assignments submission process.

Interview 4 (Developer) Plan :

System: E-Learning management system

Interviewee: Donat Gaudreau (Role play)
Designation: Senior Database Designer at science soft
Contact Details: inquiry@sciencesoft.com
Organization Details: sciencesoft pvt. Ltd. - Bengaluru

Interviewer: Gautam Ajugiya
Designation: Student at DAIICT (project developer)
Kamal Tulsiyani
Designation: Student at DAIICT (project developer)
Shyam Butani
Designation: Student at DAIICT (project developer)
Meetkumar Mungra
Designation: Student at DAIICT (project developer)

Date: 7/10/2021 **Time**: 18:00

Duration: 60 minutes

Place: Virtual Meet

Purpose of Interview:

- Meeting to identify problems and requirements regarding database design and better understanding of the optimized application
- UI/UX design of the interface

Agenda:

- Problems facing with current online management system and any other concerns
- Optimal design
- Follow-up actions
- Privacy concerns about student and instructor
- Improve functionality
- How to prevent – dummyness and provide reliability
- Make available mobile and desktop app
- Improve UI
- Discuss facial analysing features
- Provide a better interface for all the users
- Make the environment smooth

Documents to be brought to the interview:

- Rough outline

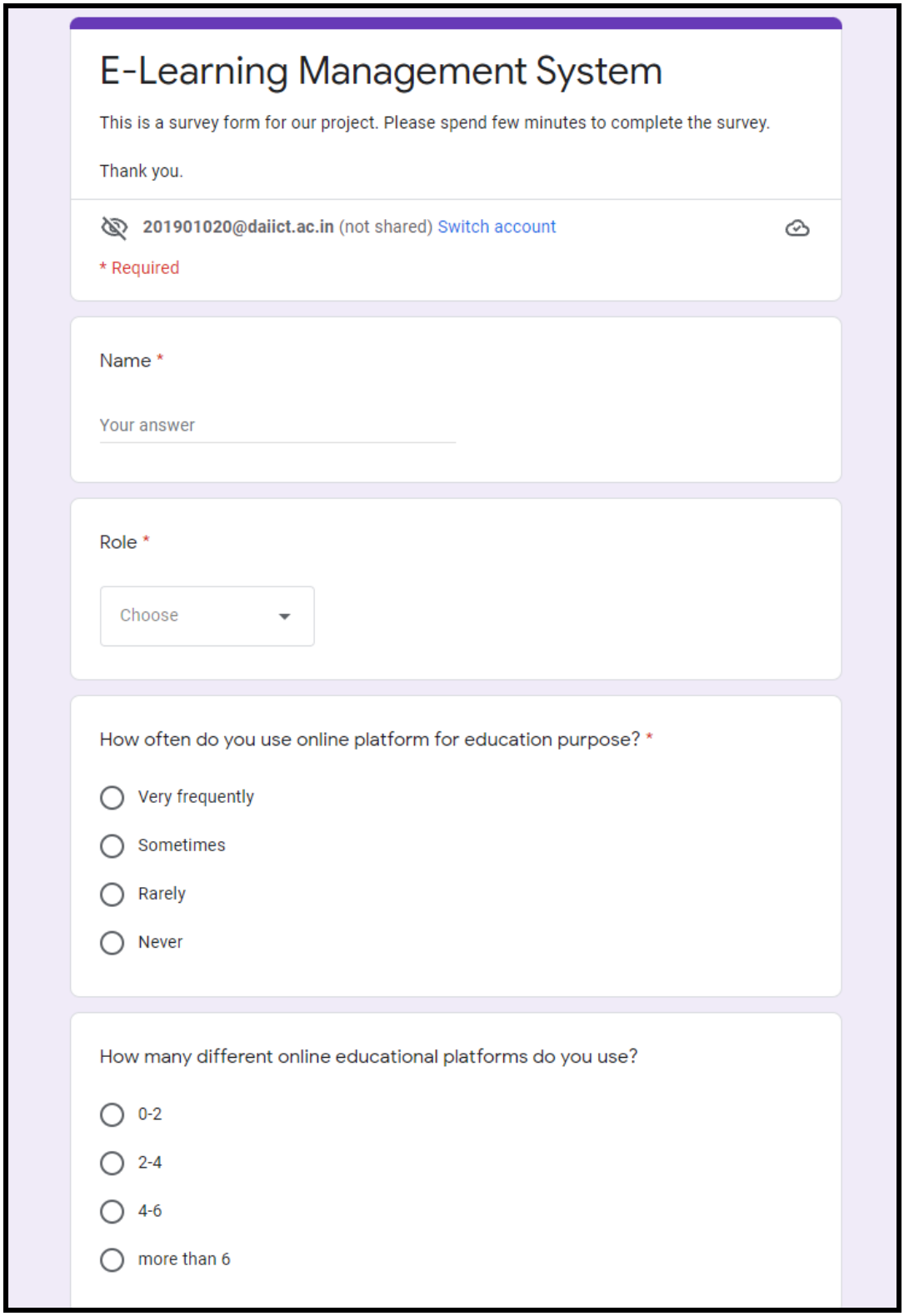
Summary:

After having an interview with Mr.Gaudreau, we came to know that as a developer we should make optimal designs for smooth performance. He also told us that "*jo dikta hai na beta… wohi bikta hai… yaad rakhna*". So, we realized that we should make the UI as attractive as possible. Moreover, He suggested that we also focus on implementing some privileges and security features.

Requirements:

- Efficient Management of Registration data, Lecture Materials, Exams and grading data.
- Reminder system
- Efficient assignment submission management
- Make mobile and desktop app available
- Make lab and lecture boards available
- Improve UI-UX
- Provide better interface to all users

3) Questionnaire



E-Learning Management System

This is a survey form for our project. Please spend few minutes to complete the survey.

Thank you.

201901020@daiict.ac.in (not shared) Switch account

* Required

Name *

Your answer

Role *

Choose

How often do you use online platform for education purpose? *

- Very frequently
- Sometimes
- Rarely
- Never

How many different online educational platforms do you use?

- 0-2
- 2-4
- 4-6
- more than 6

Which online platforms do you use currently? *

- [ ] Moodle
- [ ] Google classroom
- [ ] College Intranet
- [ ] School Mobile application
- [ ] Other:

What kind of issues do you face in these platforms?

- [ ] Slow retrieval of data
- [ ] Storage issues
- [ ] Uploading issues
- [ ] Other:

What do you like most about these platforms?

Your answer

Would you like to see more security in the E-Learning management system?

- ( ) Yes
- ( ) No
- ( ) Don't mind

Please mention any suggestions for improving E-Learning management system.

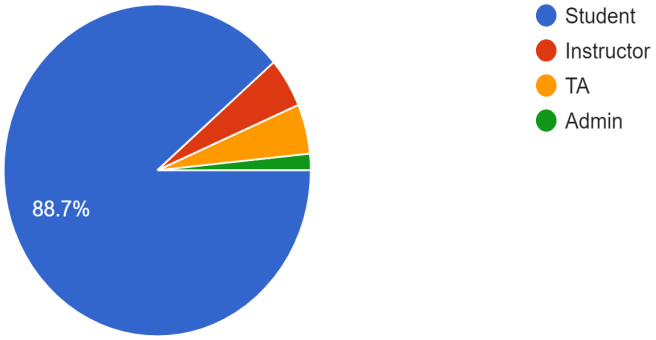
Your answer

Submit Clear form

Responses

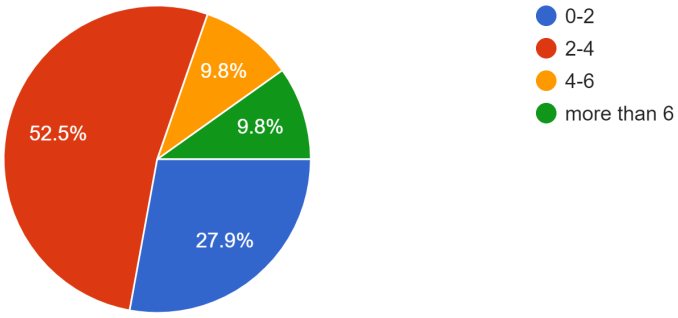
Role

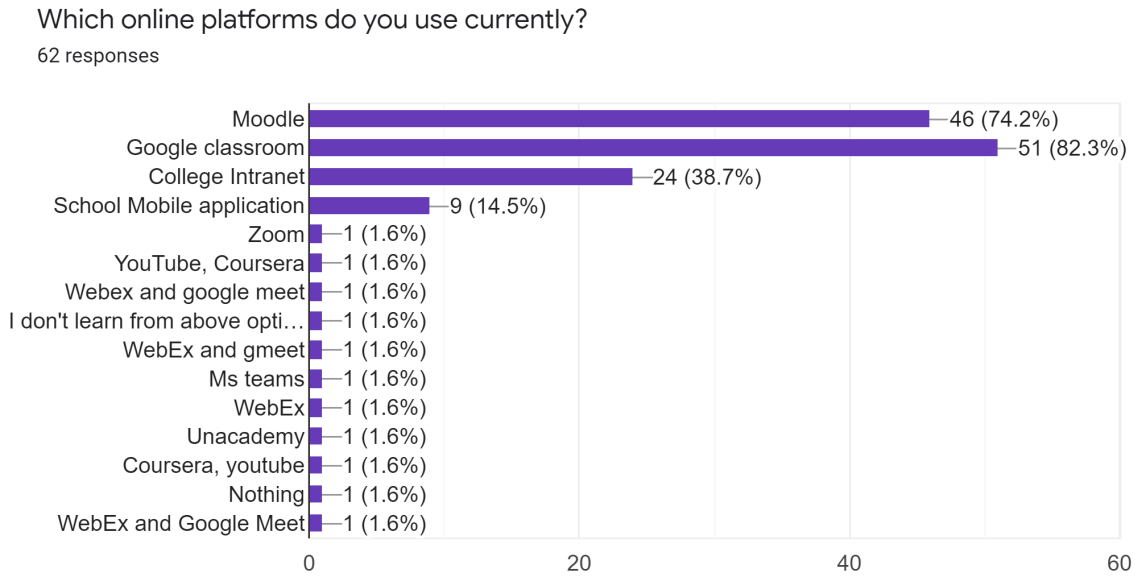
62 responses

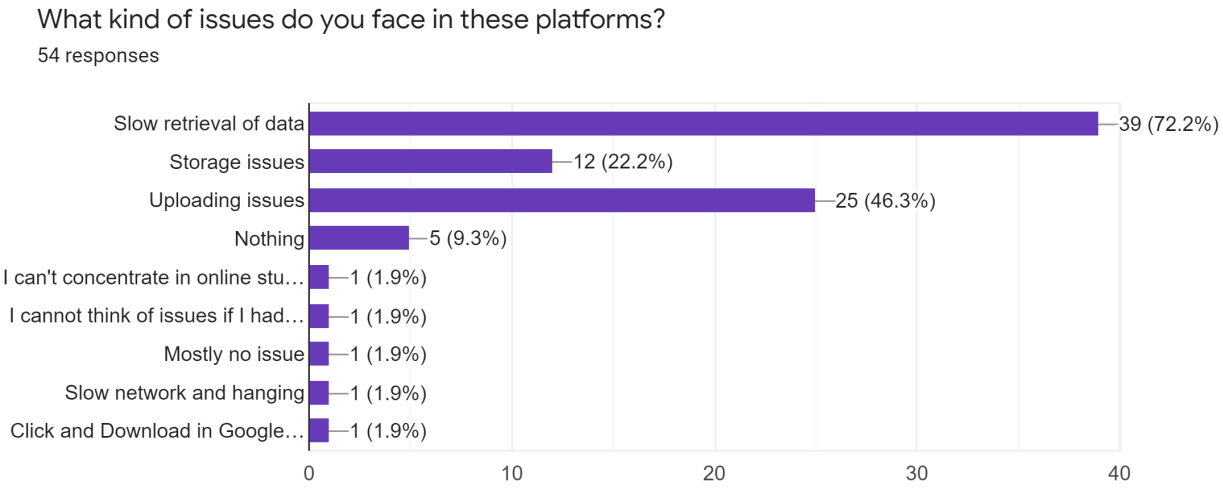


How many different online educational platforms do you use?

61 responses







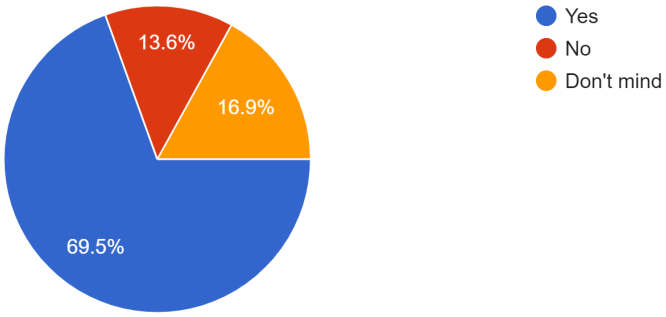
What do you like most about these platforms ?

- Reliability
- These platforms are user friendly.

- Google classroom is very good for managing files and assignments submissions.
- It’s a good way to find all material in one place and be able share the resources
- Informative
- They are quite helpful for students,which is useful to make analysis of students grades and performance
- Deadline Reminders
- User friendly and easy to use
- Easy and concentrated Access of resources
- Open source
- Accessible for all
- We get all the relevant data at one place
- These E-learning platforms save time and money.
- It reminds us via mail that we have a submission and also gives reminders 24 hours in advance.
- Presentation and Learning method

Would you like to see more security in the E-Learning management system?

59 responses



Please mention any suggestions for improving E-Learning management system.

9 responses

Please make the fast and smooth E-learning management system.
it should focus on more to make it more secure and its price should be decreased.
It would be better if uploading/retrieve process is smoother.
nothing
if E-learning management system would have allowed to make folder structures then students related topics could be managed together and it would have been more easy to find the resources of a chapter and inside that for a particular topic etc,...
Voice message feature.
it can improve by adding effective materials and make user friendly system.
Make database which can easily modify

Summary

- We can see that the majority of people (77.4%) use online educational platforms very frequently.
- 52.5% of the people use 2 to 4 numbers of different educational platforms, while 27.9% of the people use upto 2 different platforms.
- Approximately 50% of the people use Google classroom and Moodle as educational platforms.
- We can see that many users(72%) are facing issues of slow retrieval of data. It should be fixed by optimizing the management system.
- Users prefer platforms which are easily manageable and content-shareable.
- Users like the reminder system for deadline of assignment submission and task completion.

4) Observations

System : E-Learning Management System

Observations by: Gautam Ajugiya (Project Developer)

Date: 8/10/2021 **Time**: 14:30

Duration: 45 minutes

Observations:

1. Very little security at present
2. Lack of security on site appears to have allowed leaks about designs
3. Any new security measures must not offend Users
4. TAs often need to store Submissions. Downloading every submission individually is a big hindrance
5. Not Clear exactly how User uses the Interface.
6. No penalty for Late Submissions(Subject to Teacher’s policy)
7. Frequent Logins/Logouts
8. Busy Servers resulting in slowing down of software

SECTION C

Fact-Finding Chart

Objective	Technique	Subject(s)	Time Commitment
Preliminary meeting to identify problems faced by instructor and their requirements	Interview	School/College Principal	30 minutes
Preliminary meeting to identify problems faced by student and their requirements	Interview	1 Student Representative	30 minutes
Preliminary meeting to identify problems faced by TA(Teaching assistant) and their requirements	Interview	1 TA(Teaching Assistant)	30 minutes
Preliminary meeting with Database developer to understand user behaviour	Interview	1 Developer	45 minutes
Background on design of ELMS (E-Learning management system)	Background reading	Articles on the topic	About 1 day
Compact details regarding product	Observations	From readings, questionnaire, interview	About 1 day
General Functionality	Questionnaire	Responses	Half day

SECTION D

List Requirements

Requirements	Frequency
Fast Retrieval of the data	39
Storage	12
Fast Updation	25
Efficient Management of Registration Data, Lecture Materials, Exams and Grading Data	10
Reminder System	3
Efficient Assignment Submission management	7
Make Mobile and Desktop app available	1
Make lab and lecture boards available	6
Improve UI-UX	1
Provide better interface to all users	4
Easy to use	1
Security	1
Voice message feature	1

SECTION E

User Classes and Characteristics

(1) Student:

Description: Students are the users which will access the database interface most frequently. Also, they are the one who will acquire the largest part of the database. They can access the lecture materials and also lab assignments. They also can submit their assignments and will receive notifications or an email as a reminder before the deadline.

(2) Instructors :

Description: Instructors are the second largest users of the database interface. They are the ones who will maintain TA, labs and also courses. They can create courses and offer them to students who are eligible. They are the ones who also can see the assignments and grade the students.

(3) TA (Teaching Assistant) :

Description: Teaching assistants are the third largest users of the database interface. They also can be students. They are the ones who will maintain labs and assignments. They are the ones who also can evaluate assignments and provide grades to the students.

(4) Administrator :

Description: They can control the privileges of the users.

SECTION F

Operating Environment

1) Hardware, Software, or Connectivity Requirements

For all the user:

- Computer: Browser Support:
  - Google Chrome (recommended)
  - Firefox
  - Safari
  - Brave
  - Internet Explorer 11
  - Microsoft Edge
- Reliable internet
- 1 GB RAM
- Working Microphone
- Webcam Mobile:
  - Android 5.0+
  - iOS and iPad 9.0+

Server side:

- Linux/windows
- Hosting database
- Data storage capacity – 100TB
- Sufficient RAM
- MySQL database
- Cloud based services like AWS(Amazon Web Services), Azure can be used.
- Programming language: Java

2) External Interface Requirements

Third-party APIs list:

Google Classroom:

This API can be used by teachers to develop, coordinate, and rate assignments without the use of paper. The Google Classroom API enables users to incorporate data concerning classes, passwords, invites, students, instructors, and individual users. This API utilizes REST control and OAuth 2.0 access for Classroom network management of students, instructors, and student rosters.

REST API Link : https://classroom.googleapis.com

Quizlet Flashcards:

A study website that uses flashcards to teach, Quizlet Flashcards has over seven million flashcard sets and about two million registered users. The Quizlet API allows programmers to utilize Quizlet's more than two hundred million flashcards database which covers virtually every subject. The API allows users to download, scan, submit, and modify flashcard sets, scan for definitions, create, update, and enter groups, mark sets as favorites, and more.

REST API Link : https://api.quizlet.com/2.0/

WizIQ Virtual Classroom:

WizIQ provides interactive online learning resources like online classroom, pupil recruitment software, and processes for collecting payments. Using the WizIQ API, programmers can link WizIQ with their learning management system, CMS, or website. The API's accessible features include holding live classes for multiple users,

taking part, posting and handling content, and more. The API utilizes RESTful calls, and XML types replies.

REST API Link : http://classapi.wiziqxt.com/apimanager.ashx

Clever :

Clever's a tool for organizing files. It helps programmers in school and software management. Additionally, for information of students, it provides data analysis, organization, integration and security, as well as data recovery functionalities.

SECTION G

Product Functions

Sign up/in:

To sign up on the Interface students have to provide their First name, middle name,last name,college email address, and need to create a password to login. All the details will be stored in a table, and student id will be generated serially.

Searching and filtering:

Courses can be searched by course id or course name. When course id is provided, it will be matched to the courses table and students will be directly redirected to the course page.When searching by course name all the courses with similar names or similar categories

will be shown as results. This can be further categorized or ordered by their category using order by and group by function of Database.

Enrollment in the course:

Whenever a student enrolls in a new course student id will be added to that course table and course id will be added to the student table. Student scores for newly enrolled courses will be initialized by zero.

Accessing course Material :

Everyone can access the course home page which shows the course plan. If a currently signed in student is enrolled in that course there will be links for every chapter.

Lecture/Lab Leaderboard:

Every course/lab will have their dedicated board. Students can refer to it for Labs and course time related information and TA related information.

Adding new course:

Instructors can add new courses by providing course name, course type, category name, instructor id and other necessary details. New tuples will be added to the courses table and course id will be generated serially.

Adding new Assignment:

Instructors can assign new assignments by providing assignment name , instructor id and other necessary details. New tuples will be

added to the assignment table and assignment id will be generated serially.

Assignment Submission :

Students can submit assignments by providing students id and other necessary details. New tuples will be added to the submission table and submission id will be generated serially.After that submission status will be updated and TA have rights to grade those assignments.

SECTION H

Privileges

There are 3 main categories of users who can access the modules provided by the software.

1. **System Administrator**

   They are the highest level authority. They are granted all the available privileges. They can edit student, staff details and also insert/delete them.

2. **Instructors**

   Instructors can upload/delete material on the database. They can declare the results of students. Instructors can assign TAs to student groups. They can not add/update student details in the database.

3. Teaching Assistants

They can check the assignments submitted by students and can give marks for the same. They can access all answers submitted by students in exams and can review them.

4. Students

They can register themselves in a particular standard/stream. Students can also access materials/lecture recording provided by the instructor. Students can upload answer sheets in exams and can also upload reports of labs or assignments on the portal.

SECTION I

Assumptions

- Users have mobile phones of version 6.0 or above.
- User is running an updated operating system to use the Web application.
- User has an active internet connection of minimum bandwidth 512 kbps.
- System administrator will keep all data in its original form and will not tamper with data.

SECTION J

Business Constraints

- There is no any type of Marketing/Ad campaigns in the software.

- The software allies with all the Government of India (Digital India Campaign) Guidelines.
- The software keeps the user information safe by providing encryption keys and promises to never sell data to any third-party apps in future.
- All the content of this Software comes under copyright Act.
- The software will be available in an Annual plan and has to be renewed every year.
- The software is available in different categories depending on the number of students enrolled and Amount of storage capacity required.
- The software Updates automatically on Regular Intervals.
- In case of any system failure, User's complaint is resolved within 24hrs.