
Software Requirements Specification

for

MindPrep E-Learning Management System

Version 1.0

Prepared by,

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Contents

REVISIONS	III
1 INTRODUCTION	1
1.1 DOCUMENT PURPOSE	1
1.2 PRODUCT SCOPE	1
1.3 INTENDED AUDIENCE AND DOCUMENT OVERVIEW	1
1.4 DEFINITIONS, ACRONYMS AND ABBREVIATIONS	1
1.5 DOCUMENT CONVENTIONS	1
1.6 REFERENCES AND ACKNOWLEDGMENTS	2
2 OVERALL DESCRIPTION	3
2.1 PRODUCT PERSPECTIVE	3
2.2 PRODUCT FUNCTIONALITY	3
2.3 USERS AND CHARACTERISTICS	3
2.4 OPERATING ENVIRONMENT	3
2.5 DESIGN AND IMPLEMENTATION CONSTRAINTS	4
2.6 USER DOCUMENTATION	4
2.7 ASSUMPTIONS AND DEPENDENCIES	4
3 SPECIFIC REQUIREMENTS	5
3.1 EXTERNAL INTERFACE REQUIREMENTS	5
3.2 FUNCTIONAL REQUIREMENTS	6
3.3 BEHAVIOUR REQUIREMENTS	6
4 OTHER NON-FUNCTIONAL REQUIREMENTS	7
4.1 PERFORMANCE REQUIREMENTS	7
4.2 SAFETY AND SECURITY REQUIREMENTS	7
4.3 SOFTWARE QUALITY ATTRIBUTES	7
5 OTHER REQUIREMENTS	8
APPENDIX A – DATA DICTIONARY	9
APPENDIX B - GROUP LOG	10

Revisions

Version	Primary Author(s)	Description of Version	Date Completed
1	Meith Navlakha Rishabh Bhargava Russel Lobo	The current version of SRS is a comprehensive description of the MindPrep application and the proposed design of the same.	07/04/22



1 Introduction

Online teaching has imposed great challenges for student engagement during the pandemic. Building a virtual classroom with active student participation is our approach to address some of the concerns and make online learning more effective. As technology creates remote and global teams, all users must be able to connect. Our E-learning management system application, MindPrep provides all that the modern education system requires, such as a unified conversation platform where team members can have an open chat, voice, and video calls with optimal call quality and collaboration through content sharing. MindPrep is a single product that also offers a complete meeting solution, supporting sharing materials, voice, and video conferencing, allowing users to meet from anywhere. Users can use this application for all types of meeting — spontaneous or scheduled; formal or informal with internal and external participants; along with sharing and submitting materials as per requirements.

MindPrep is introduced as a virtual study room with many virtual tables (channels), where each table (channel) serves as an integrated platform for group meetings. Within this application , Learner-learner interaction is boosted by virtual meetings, group poster boards, the “mention” function, and emojis. By integrating it with video conferencing, we can offer a zero blackout, fully interactive learning environment. The paper includes a detailed description of the required technologies for such a delivery, time requirements for the design and delivery of such an approach, and faculty assessment and perspective of the methodology.

1.1 Document Purpose

The purpose of this SRS document is to define the requirements and scope of our MindPrep application being created in full detail. On top of outlining all functional and nonfunctional requirements, it will also go into depth about different use cases. This SRS will also contain any models that were used in the making of the software, as well as a description of the prototype that was created.

1.2 Product Scope

MindPrep is a persistent chat-based collaboration platform with document sharing, online meetings, and many more extremely useful features for education and business communications. MindPrep's mission is to "empower every person and every organization on the planet to achieve more." MindPrep is a tool that helps make that mission statement a reality.



The key objectives of the MindPrep is to **Learn On The Go** that is the ability to take it anywhere. Secondly, providing user-friendly plugins housed in one location. Employees have one place to access important resources quickly. No more clicking between different applications, emails, or company resources in a web of SharePoint sites. LMS software provides employees with a blended learning experience for well-rounded, engaging training. Educational content is presented in a variety of forms: written, audio, videos, etc. to support learning objectives. Easy to track, assess, and report analysis making it easy for teachers and supervisors to track the progress. Streamlining and personalisation of the training process thereby, improving the efficiency and letting employees train at their own pace and ask questions as needed.

1.3 Intended Audience and Document Overview

Our intended audience are the corporate employees of MindPrep, testers , marketing staff, the documentation writers, developers and project managers.

The remaining sections of this document provide a general description, including characteristics of the users of this project, the product's hardware, and the functional and data requirements of the product. General description of the project is discussed in section 2 of this document. Section 3 gives the functional requirements, data requirements and constraints and assumptions made while designing the E-LMS (MindPrep). It also gives the user viewpoint of the product. Section 3 also gives the specific requirements of the product. Section 3 also discusses the external interface requirements and gives detailed description of functional requirements. Section 4 is for supporting, non functional information. Section 5 covers any other requirements.

The following SRS contains the detailed product perspective from different stakeholders. It provides the detailed product functions of E-LMS with user characteristics permitted constraints, assumptions and dependencies and requirements subsets.



1.4 Definitions, Acronyms and Abbreviations

API: Application Programming Interface

ASCII: American Standard Code for Information Interchange

CRUD: Create, Retrieve, Update, and Delete

CSV: Comma Separated Value

HHD: Hard Disk Drive

HTML: HyperText Markup Language

HTTP: HyperText Transfer Protocol

HTTPS: HTTP Secure

JSON: JavaScript Object Notation

MTBF: Mean Time between Failures

MVC: Model-View-Controller

NIST: National Institute of Standards and Technology

PDF: Portable Document Format

QIF: Quality Information Framework

REST: Representational State Transfer

SRS: Software Requirements Specification

SSD: Solid state drives

SSL: Secure Sockets Layer

TLS: Transport Layer Security

UI: User Interface

UUID: Universally Unique Identifier

VDS: Volatile Data Stream

XML: Extensible Markup Language

XSLT: Extensible Stylesheet Lanaguage Transformation

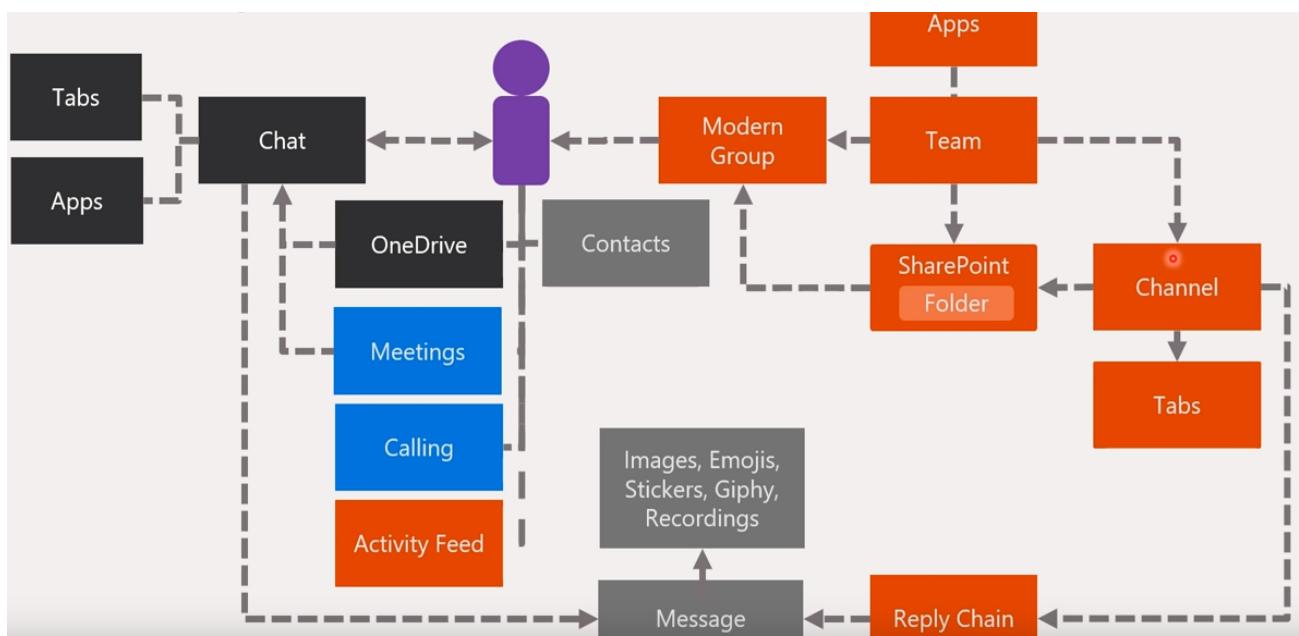


1.5 References and Acknowledgments

- 1) N. Partheeban and N. SankarRam, "e-Learning management system using web services," International Conference on Information Communication and Embedded Systems (ICICES2014), 2014, pp. 1-7, doi: 10.1109/ICICES.2014.7033900.
- 2) S. M. Jafari, S. F. Salem, M. S. Moaddab and S. O. Salem, "Learning Management System (LMS) success: An investigation among the university students," 2015 IEEE Conference on e-Learning, e-Management and e-Services (IC3e), 2015, pp. 64-69, doi: 10.1109/IC3e.2015.7403488.
- 3) A. Al-Ajlan and H. Zedan, "E-learning (MOODLE) based on service oriented architecture", Proceeding of the EADTU's 20th Anniversary Conference, pp. 62-70, Nov. 8-9.
- 4) E. Ambrosi, M. Bianchi and G. Felici, "When is it convenient to predict the web services completion time?", Proceedings of the 24th IASTED International Conference on Parallel and Distributed Computing and Networks, pp. 250-255, Feb. 14-16.
- 5) G. Naveh, D. Tubin and N. Pliskin, "Student LMS use and satisfaction in academic institutions: The organizational perspective", The Internet and Higher Education, vol. 13, no. 3, pp. 127-133, 2010.

2 Overall Description

2.1 Product Perspective





2.2 Product Functionality

MindPrep features make it stand out from other collaboration software:

- Teams and channels
- Chat features enabling conversations within channels and teams
- Document storage in OneDrive
- Online video calling and screen sharing
- Online meetings
- Audio conferencing
- Personalisation for user
- Online file sharing support
- Inbuilt apps (word, excel and ppt) support along additional plugins

2.3 Users and Characteristics

Users of MindPrep can be any person who is interested in having online presentations, meetings or even a conversation. Mainly this would be used for a classroom environment with the goal of conducting online lectures and tests.

Mainly we can categorize the users as Student, Faculty, Management, Admin:

Student: Each student can participate in lectures by joining the teams by using a team code provided by the lecturer. Once joined the meet they can view the white board and the presentations real-time while listening to the lecture. They can also interact with the lecturer and the other students without interrupting the lecture and also can participate in online exams the lecturer has given. The students can also store notes of the lectures in one drive.

Faculty: A software white board is provided to them in order to demonstrate the lectures. The documentations/presentations can be distributed prior to the lecture. Lecturers can interact with the students by asking and by answering their questions. Lecturers can also conduct an exam by storing a set of questions. Lecturers can also create a class notebook in order to maintain various lab submissions done by students.

Admin: As admin, they have the task of maintaining the system such as maintaining the database, performing regular backups, keeping the system running and handling any failure of the system.



2.4 Operating Environment

Microsoft Teams supports the following operating systems:

IOS,Android,Windows,Linux,Mac

Mobile devices such as iPhone, iPad, or Android devices must meet these software requirements: iPhones/iPads require iOS 11-14 or the future newest iOS version,Android smartphones/tablets require one of the four latest operating systems

MindPrep works in the following browsers:

Safari (no calls via Teams possible)

Google Chrome

Mozilla Firefox (no calls via Teams possible)

Opera

MS Edge

Minimum Hardware requirements and software requirements for MindPrep:

Hardware:

Computer and processor Minimum 1.1 GHz or faster, 4 core

4-core processor for video calls

4 GB RAM

HDD / SSD 3 GB free disk space

1024 x 768 pixels screen resolution

Software:

Graphics card supporting DirectX 9

.NET Framework 4.5 CLR

64-bit Windows for meetings

Windows 8.1 or 10

2.5 Design and Implementation Constraints

1. The browsers must have plug-ins in order to access word,presentations, meetings .
2. Team meetings on browsers are limited to a single stream; either incoming video feed of the current speaker or screen sharing..
3. Number of channels in a team is limited to 45 including deleted channels.
4. Onedrive has to be connected in order to share documents with sharepoints or to create class notebooks and in order to store the notebooks
5. Number of members which a team can have is limited to 500.



2.6 User Documentation

A readme file to help the user with the installation of the software will be provided . A well documented user manual will be provided where a proper demonstration of how to connect your video and audio,how to create teams,schedule meets,schedule tests,create class notebooks and various such topics would be covered . Online tutorials would also be made available on the MindPrep official website.

2.7 Assumptions and Dependencies

It is assumed that our application is compatible with the following dependencies:

1. OneDrive (Version 22.045)
2. Microsoft Office (Version 2021)
3. Agora Websockets (Android v3.6.2 , IOS v3.6.2)
4. Google Calendar API (v3)
5. Quiz Bot (1.2.8.39)

3 Specific Requirements

3.1 External Interface Requirements

3.1.1 User Interfaces

The user interface for the web application is compatible with any browser such as Google Chrome, Internet Explorer, Mozilla or Netscape Navigator. The desktop and mobile application is compatible with MacOs, Windows (versions greater than 7) and Linux OS (Ubuntu 18.04 LTS, 20.04 LTS, Fedora 30 Workstation, RHEL 8 Workstation, CentOS 8).

The MindPrep application window is completely responsive and works with all window sizes. On the top we have a menu bar having a search box in the middle and user profile and settings options on the right. The above mentioned menu bar is present globally on all the UI.



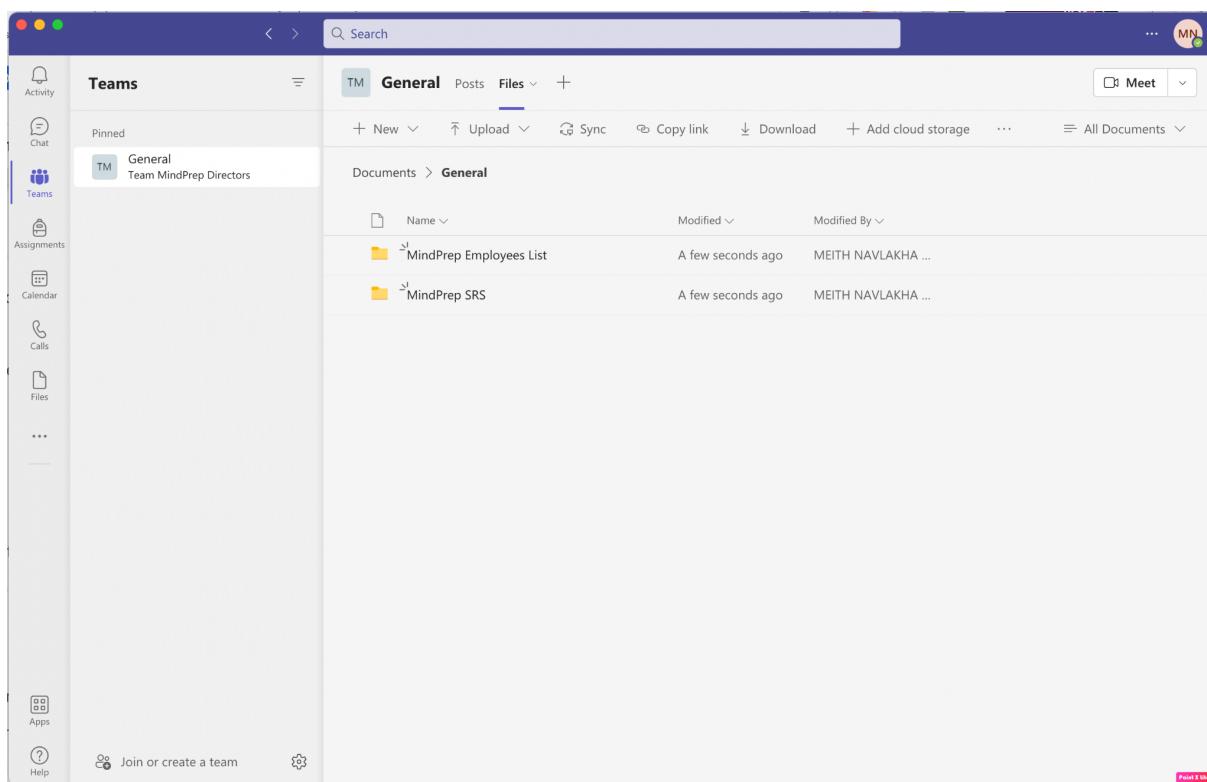


LoginUI

The login interface enables you to login into the MindPrep application by typing in the work email and password. Once successfully logged in, the user is integrated with the backend and the user can access the application. If the credentials mismatch then it is displayed with a toast message stating “Invalid credentials. Please try again”.

TeamUI

The Team interface is visible to all the members of the team. The interface has easy to access menu bar at the top which has options new, upload sync download and many more. The user can create new or upload existing documents which will be visible to the entire team. The user can download all or any specific document. Through the “Add cloud storage” the user can also link the page with a cloud platform. Below the menu bar we have navbar which helps with easy navigation between the pages.



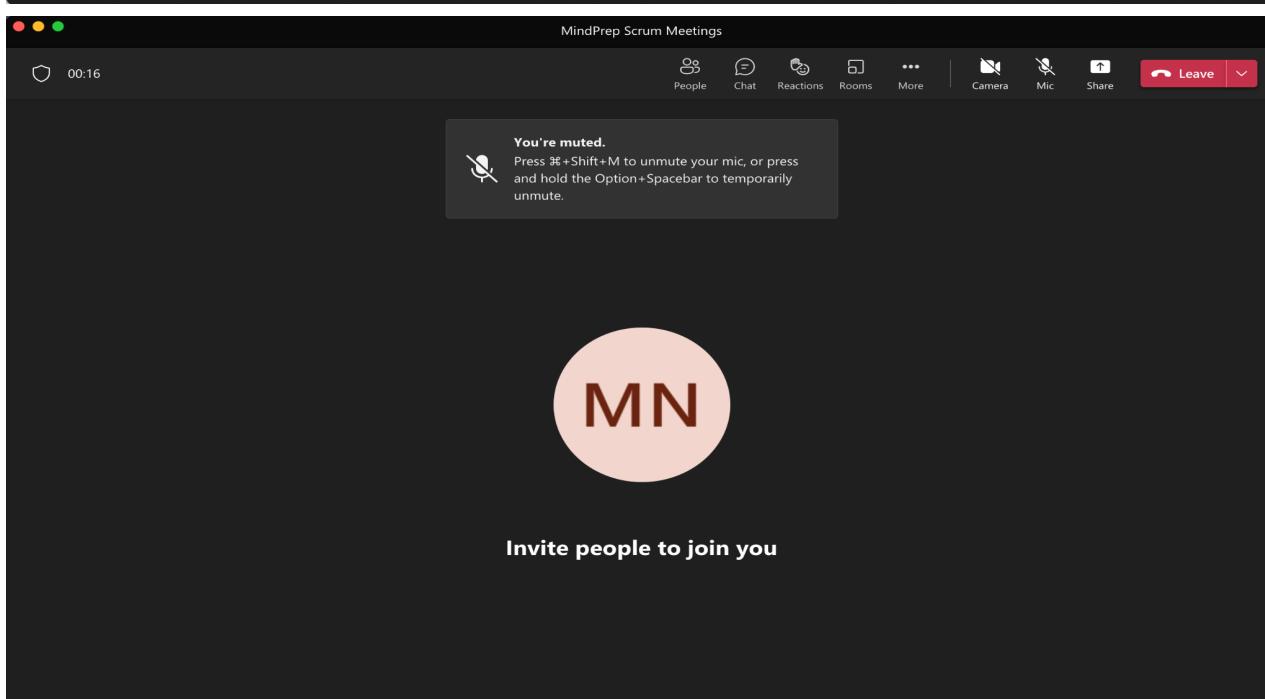
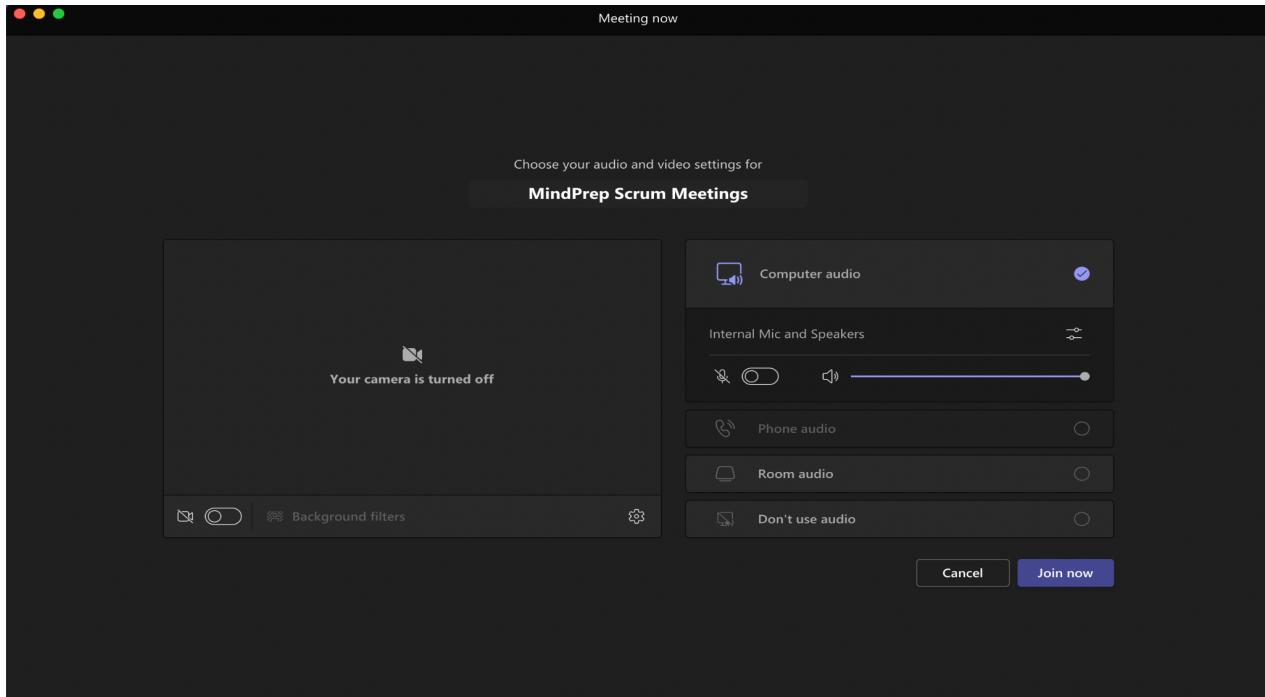
The screenshot shows the Microsoft Teams interface. On the left is a vertical sidebar with icons for Activity, Chat, Teams (selected), Assignments, Calendar, Calls, Files, Apps, and Help. The main area shows a 'Teams' tab with 'Pinned' content. Under 'General' (selected), there are two files listed:

Name	Modified	Modified By
MindPrep Employees List	A few seconds ago	MEITH NAVLAKHA ...
MindPrep SRS	A few seconds ago	MEITH NAVLAKHA ...



MeetUI

The meet UI enables the team owner to start a meet and add/invite other participants. Once the owner launches the meet, all the participants can on/off their camera, mute/unmute, , share screen, even access the chats as per the rights allocated to them.





FilesUI

The files interface enables the user to download learning materials or any resources pertinent to the current project. The file resources can also be linked to OneDrive cloud storage. The user also has the facility to upload documents, presentations.

The screenshot shows the Microsoft Teams Files interface. On the left, there's a sidebar with icons for Activity, Chat, Teams, Assignments, Calendar, Calls, and Files. The main area is titled 'Recent' under 'Cloud storage'. It lists two items from OneDrive: 'MindPrep SRS resources.xlsx' and 'MindPrep SRS requirements.pptx', both modified '1m ago'. A blue button at the bottom says '+ Add cloud storage'.

AssignmentUI

The assignment interface enables the team manager to set deadlines for projects and assignments. Once an assignment is created it notifies all team members. Also, the deadline and any instruction description or document can be added along. The members can upload their documents in the assignment and “turn in” for review.

The screenshot shows the Microsoft Teams Assignment UI. The sidebar includes icons for Activity, Chat, Teams, Assignments (which is selected), Calendar, Calls, and Files. The main content shows a submission for 'Submission of MindPrep Weekly report' due March 29, 2022, at 11:59 PM. It notes 'Turned in Tue Mar 29, 2022 at 11:08 PM' and '15 points possible'. Under 'Instructions', it says 'Aim: To identify a suitable life cycle model for your case study and justify your choice.' The 'Reference materials' section contains a link to 'Weekly_report_format.docx'. The 'My work' section contains a link to 'Meith_Navlakha_report.pdf'. A blue button at the top right says 'Undo turn in'.



Apps UI

The apps interface enables the user to view and download additional applications as required by the current project. The UI incorporates filters based on categories, industries, recent and many more.

The screenshot shows the Microsoft Teams 'Apps' interface. On the left, a sidebar lists various Microsoft services: Activity, Chat, Teams, Assignments, Calendar, Calls, Files, Apps (selected), and Help. The main area has a search bar at the top. A central panel displays a banner for 'Get learning resources for your class teams' featuring icons for 'go1', 'FLUID MATH', and 'Milestones'. Below this, sections for 'Popular in your org' and 'Popular across Teams' show cards for various Microsoft and third-party apps like Forms, YouTube, Polly, Whiteboard.chat for Edu, and Freehand by InVision.

ChatUI

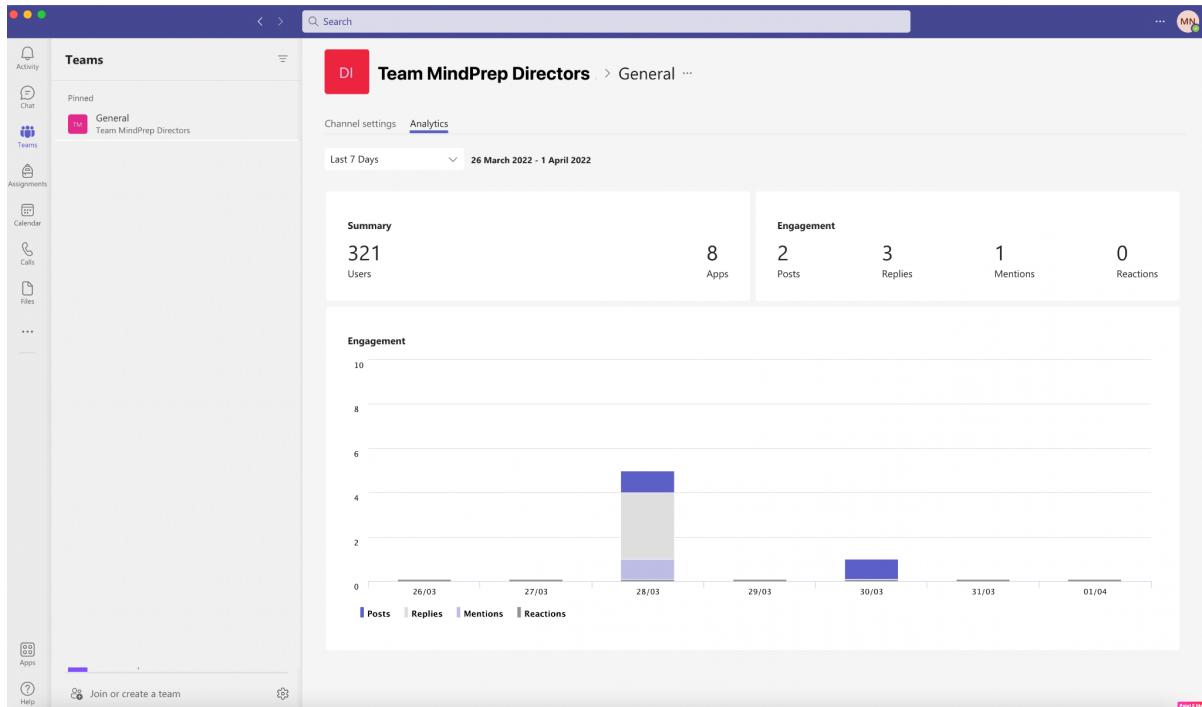
The chat interface enables the student to chat with other users of the MindPrep; personally or in a group.

The screenshot shows the Microsoft Teams 'Chat' interface. The sidebar on the left includes Activity, Chat (selected), Teams, Assignments, Calendar, Calls, Files, and Help. The main area shows a 'Recent' conversation with RISHABH and RUSSEL. The message history includes a welcome message from RISHABH at 8:40 am and a note from MEITH NAVLAKHA about adding users to the chat. A message input field at the bottom allows for typing new messages, and a toolbar below it provides various message formatting options.



ReportUI

The report interface displays various reports such as progress reports, ongoing course reports, the engagement of the team members, attendance of the members in meetings. The analysis is also elucidated with the helps of charts for better data visualisation.



3.1.2 Hardware Interfaces

All server-side components must execute on server-class computers. All client-side components must execute on workstation-class and personal-class computers. The hardware interfaces for a personal-class computer are computer headset (combination of headphones and a microphone), webcam (optional) and minimum 56Kbps of bandwidth internet connection.

3.1.3 Software Interfaces

The software interface should follow the Model-View-Controller (MVC) model for rendering and modeling data objects. The interface must be able to connect to a database to store XML schema defined using XSD and data streams, to store documents based schema defined dynamically as per the model mentioned. Source and destination formats for data must include XML and may also include: Extensible Stylesheet Lanaguage Transformation (XSLT), JavaScript Object Notation (JSON), Comma Separated Value (CSV), and American Standard Code for Information Interchange (ASCII).



3.1.4 Communications Interfaces

The application should be able to communicate with the database using the specific authentication communication method while performing user authentication queries before accessing the database. For the web server we use WebSphere HTTP server. It maintains the server side database handling and the client implementation to view the html and Flash content. SMTP protocols are used for mailing the users for reminders, inviting to meet and other activities. FTP protocol is required for transferring, sharing and downloading of files and documents to and from the applications. Web Sockets are needed for real time chatting and video sharing features. IP network protocols and the software drivers that activate the peripheral devices.

3.2 Functional Requirements

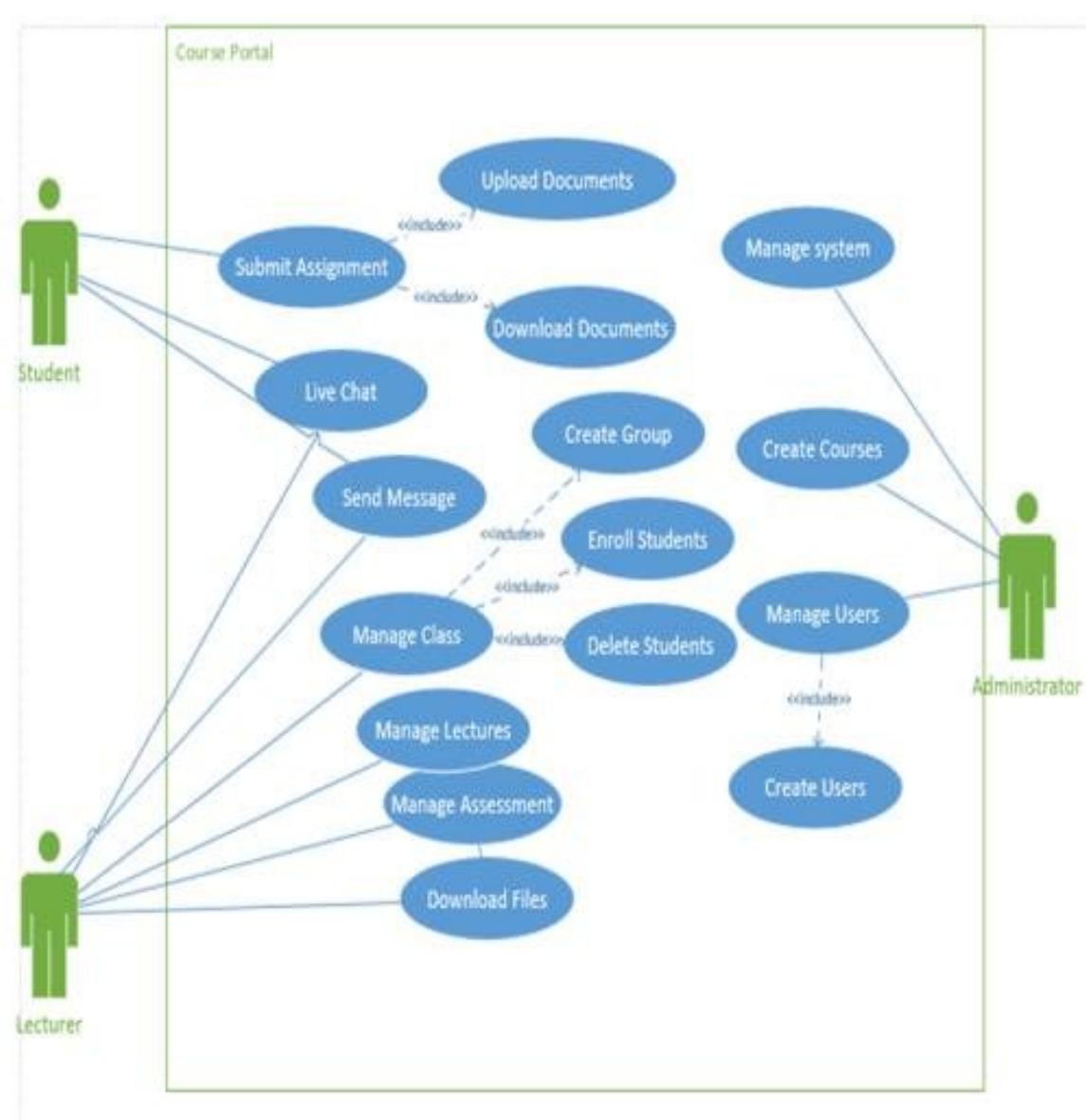
This section provides a requirement overview of the system.

- **Teams and channels:** Users can create different teams and channels to create groups and organize classes with the required members only. Only the members of the team or channels can access the information and post announcements.
- **Chat features enabling conversations within channels and teams:** Users can chat with others privately using our chat feature within channels and teams.
- **Document storage in OneDrive:** Teachers can upload notes and students can upload their assignments. All these documents are stored in OneDrive so as to prevent data loss and provide security of data.
- **Online video meetings and screen sharing:** This feature allows for flexible online video meetings. Meetings can be scheduled beforehand. Our app also supports screen sharing.
- **Personalisation for users:** Our app provides three different themes Light, Dark and High contrast. Users can create reminders for meetings and view recorded meets at any time.
- **Inbuilt apps and additional plugins:** MindPrep provides inbuilt apps like MS Word, Excel and PowerPoint. Additional plugins include OneNote where the user can add notes and save it for future reference. This helps in enhancing the learning and teaching experience for the user.



3.3 Behaviour Requirements

3.3.1 Use Case View





4 Other Non-functional Requirements

4.1 Performance Requirements

- **Response Time:** The loading time of each page/interface from the Product Module should be consistent. Each page/interface should load in less than 30 seconds. This requirement can be dependent on the user's computer or the server itself.
- **Reliability:** The video quality should be clear and good. The audio could be heard well. The video and audio of lectures should be synchronised well.
- **Workload:** The module should be able to handle a large amount of users at any given time. The increased load should not influence the response time.
- **Availability:** 24 X 7 availability should be there so that the users can use it at any time as per their convenience. Incase of server breakdown a temporary backed up server must be ready.
- **Scalability:** Scalability is the increase in the system's workload that the system should be able to process. The app should be able to handle traffic and not exceed the bandwidth limit.=

4.2 Safety and Security Requirements

- **User Authorization:** The application has different roles of users with different access and controlling rights. For example, the supervisor can see information of all the team members like personal information, attendance, work time entry and many more. This information must not be accessible to all the other team members. As a result user authorization needs to be regulated.
- **Loss of Data:** Incase of server crash or any other technical issue, resulting into loss of user's data uploaded on the cloud must be taken care of as per the Reparation for Data Loss provision in the company's privacy policy.
- **Expiring Inactive Sessions:** Inactive sessions should expire after a maximum time of 1 hour or when the user exits the app.
- **Multiple Fail Login Attempts:** Incase of successive fail login attempts within a short span must be flagged. The user must be warned about the failed attempts with a pop up message and a mail on the registered email if the user has 5 successive fail attempts within 1 min. More than 10 failed attempts in the next 3 minutes will result into soft banning of the account for the next 24 hours. This security feature is to make our application robust to brute force login attempts.



4.3 Software Quality Attributes

4.3.1. Maintainability: The module shall be designed with the view that bugs may need fixing, for future optimisations and for adding extra functionalities for other developers.

4.3.2. Portability: The module shall be designed such that it can be added to any system. It is also necessary for the module to be implemented in the same programming language to make it platform independent.

4.3.3. Extendability: The module shall be designed with the view that the "optional" functional requirements will be implemented at a later date. Also the module shall be designed with a view that other tasks may be added to the module.

5 Other Requirements

NONE

Appendix A – Data Dictionary

Element Name	Description	
Camera		A class to handle the camera's functionality.
Attributes		
Operations		
	TakePicture (): void	Takes a picture and adds it to the array of images used to identify a face.
UML Extensions		



Element Name	Description
Teams	A class to handle the members of a team and keep the channel activities in check.
Attributes	
Operations	
	createTeam (): void Used by the organiser to create a team .
	addMembers (): void Used by the organiser to add the required members to the team.
UML Extensions	

Element Name	Description
Documents	A data structure to store a document in oneDrive.
Attributes	
	documents The document can have different formats eg:- .pdf .doc .xlsx etc.
Operations	
	uploadDoc (): void Used by user to upload documents to OneDrive.
UML Extensions	



Appendix B - Group Log

SR. NO.	SUPERVISOR	TEAM NAME	DATE	WEEKLY PROGRESS
1	Meith Navlakha	–	16-02-2022	Project discussion with the Client.
2	Rishabh Bhargava	Team Heads	23-02-2022	Exploring issues related to the financial, technical, operational, and time management aspects of software development for the project and discussing it with the client
3	Russel Lobo	HR Team	28-02-2022	Designing the software architecture, Team Planning and allocation of resources and employees.
4	Meith Navlakha	Development Team	01-03-2022	Updates on the app development and reallocation of resources as per requirements.
4	Rishabh Bhargava	Testing Team	04-03-2022	Discuss about the bugs in phase 1 testing of the application
5	Russel Lobo	HR Team, Dev Team, Testing Team	07-03-2022	Short meeting to discuss about the bugs and changes.
6	Meith Navlakha	Development Team	14-03-2022	Resolve the bugs and deploy for beta testing.
7	Rishabh Bhargava	Testing Team	21-03-2022	Discuss about the bugs of the beta phase.
8	Russel Lobo	HR Team	28-03-2022	Short meeting to discuss the workflow and various issues faced by the employees



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9	Meith Navlakha, Russel Lobo, Rishabh Bhargava	Team Head	07-04-2022	Present the MindPrep application to the client along with the SRS.
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