

KATHMANDU UNIVERSITY
SCHOOL OF ENGINEERING
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

PROJECT PROPOSAL



“My Virtual Classroom”

A **Third year/ Second Semester** Combined Engineering Project [COMP 308]

Proposal submitted in partial fulfillment of the requirements
for the degree of Bachelor of Engineering.

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COVER LETTER

Dhulikhel, Kavre
July 08, 2020

The Project Coordinator and Supervisor,
Department of Computer Science and Engineering,
Kathmandu University.

SUBJECT: Cover Letter for Proposal Approval

Dear Sir,

Submitted for your review is our proposal entitled “My Virtual Classroom”. The proposal is submitted as requirement of course entitled Combined Engineering Project [COMP 308]. Within this document you will find the basic introductions, objectives, Methodology and expected outcome from the proposed work (Listed in detail in the table of content session). We hope for your keen review and future assistance in this work along with the approval.

Sincerely,
Prashant Bhatta (09)
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ABSTRACT

In this pandemic situation the education system is not same as always. Colleges and Universities are beginning to start the online classes. During this online classes' students face many problems from joining the classes to finding the assignments. So, to tackle this problem we intend to develop "My Virtual Classroom"- one application for all. "My Virtual Classroom" is an educational video conferencing web-based application for online study of various courses in colleges and Universities. It is not just a video conferencing tool but a virtual classroom for students. It will contain all the resources provided by teachers. It will keep record of students marks and finally award them a report card at the end of semester or terminal. Teachers can leave the assignments or tasks in the assignment portal allocating the due date where students will be able to submit their work. The Application will automatically keep attendance of the student based on their presence on the video conference. All the video conference will be recorded automatically by the application itself and will be available to the students as soon as the lecture ends which will be a great handy tool for them during revisions. The video conferencing process will be smooth. To make it more engaging we will add chat box in the video conference and drawing tool through which tutor can explain the various concepts to the students. And yes, we will not limit ourselves and will add some more handy features like hand raise to ask questions, presenting your presentation to others, and pinning another user to the screen. We intend to make this application as natural as it might seem to the students. So, we have also planned to design the user interface keeping a classroom in mind as we want to replicate the classroom, its teachings and learning but in virtual manner. Through this application students also won't have to go through the hassle of finding the video chat link which is changed every day. Our application will make them feel as they are visiting a classroom on daily basis through their home computers. The best thing about this application will be its flexibility. Students will be able to enroll in multiple courses as they desire, and Teachers will be able to create multiple courses and customize it according to their need.

Keywords: Video Conferencing, Virtual Classroom, Online Study, Classroom Management, Classroom Environment, Student Portal, Teacher Portal etc.

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ABBREVIATIONS USED

Abbreviations	Full Form
WebRTC	Web Real-Time Communication
SSPL	Server Side Public License
W3C	World Wide Web Consortium
IETF	Internet Engineering Task Force

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CHAPTER 1

INTRODUCTION

1.1 Background

While countries are at different points in their COVID-19 infection rates, worldwide there are currently more than 1.2 billion children in 186 countries affected by school closures due to the pandemic. With this sudden shift away from the classroom in many parts of the globe, some are wondering whether the adoption of online learning will continue to persist post-pandemic, and how such a shift would impact the worldwide education market.

Virtual classrooms and distance learning, as alternate technology-driven learning methods, have been growing at a reasonable pace. Virtual classrooms have been specifically in use by all sectors, including primary and higher education as well as corporate learning. The increasing popularity of social and microlearning strategies, fostered by general social media platforms like YouTube and Twitter, and major educational technology disruptions like edX, have added to the increasing acceptance of virtual modes of learning. It is expected that the predominant use of virtual classrooms would increase by a whopping 16.2% compounded annual growth rate by 2023.

The current pandemic situation has paved the way for a ground test of virtual classrooms as a prominent tool of learning in the current times. Schools, colleges, universities, corporates, and even world bodies and multilateral organizations like the UNO, WHO, and G20 have had to switch to the lesser-used virtual mode of learning and communications. These emergent circumstances stand as a conducive test for companies offering virtual classroom platforms and services like Blackboard, Desire2Learn, Cisco, Microsoft, etc. The test parameters are varied, some predominant ones being bandwidth management, network traffic, server response time, and several concurrent users. Some of the existing virtual classroom are skooly.com, U-LMS, VEDAMO.com, Braincert.com, tutorrrrom.net, newrow.com, etc.

“My Virtual Classroom” is an educational video conferencing web-based application for online study of various courses in colleges and Universities. It will contain all the resources provided by the teachers, assignments along with their due dates and will automatically take attendance of students. All the video conference will be recorded automatically by the application itself and will be available to the students as soon as the lecture ends. This web-app will also contain some additional features like chat-box during video conferencing and drawing tool for the tutor. Through this virtual classroom we aim to make them feel as they are visiting a classroom on daily basis through their home computers.

1.2 Objectives

The project has multiple purposes. Some of its key objectives are:

- i. To get personalized learning: Students can learn at their own time and phase
- ii. To have real-time teaching and learning
- iii. To have equal access to everyone from anywhere and at anytime
- iv. To encourages digital and smart classrooms
- v. To enhances collaboration and communication
- vi. To gives students and teacher a worldwide exposure

1.3 Motivation

Education may have several purposes, and online learning helps to fulfill it. In today's technical world, going online instead of the traditional approach of attending the class, has started to become a trend. Significant rise in use of online learning due to ongoing pandemic has caught the eye of the entire world. Universities, colleges and even schools are starting to adopt the online teaching learning activities. Many universities are considering going online for the full semester. Increasing number of online learning activities, welcomes the same amount of problems for students and teachers, as shifting from a long time followed habit takes some time to adopt.

Both teacher and student find it difficult to surf through poorly designed and structured online education platforms. Also, some platforms require payments to utilize its resource. All of these are the common situations we all face, and it inspires us to design a new e-learning platform where user interaction is made simple and efficient.

1.4 Significances

The Significances of our project are listed below:

1. One Application for all
2. User friendly interface
3. Easier student-teacher interaction
4. Efficient

CHAPTER 2

LITERATURE REVIEW

A virtual classroom is a learning environment in which students (customers, partners, or any third-party) engage with the lesson material online. Information is often conveyed through voice or video conferencing with several participants and instructors connected to the same chat interface. Virtual classrooms may come as an integrated part of a learning management system (LMS) or integrate with one. Some of the virtual classroom's platforms are Zoom, Google Meet, Adobe Connect, Top Hat, Tutor Room and so on.



Fig: Zoom

Zoom is an American communications technology company headquartered in San Jose, California. It provides videotelephony and online chat services through a cloud-based peer-to-peer software platform and is used for teleconferencing, telecommuting, distance education, and social relations. Zoom's business strategy focuses on providing an easier to use product than competitors, as well as cost savings, which include minimizing computational costs at the infrastructure level and having a high degree of employee efficiency. Zoom unifies cloud video conferencing, simple online meetings, and group messaging into one easy-to-use platform. It allows Screen and application sharing with dynamic voice detection and have features such as scheduling, recording, chat, annotation, whiteboarding, and breakout rooms.

Google Meet is a video-communication service developed by Google. It is one of two apps that constitute the replacement for Google Hangouts, the other being Google Chat. Google planned to begin retiring Google Hangouts in October 2019. After being invite-only and quietly releasing an iOS app in February 2017, Google formally launched Meet in March 2017.

The service was unveiled as a video conferencing app for up to 30 participants, described as an enterprise-friendly version of Hangouts.



Fig: Google Meet

At launch, it featured a web app, an Android app, and an iOS app. Google Meet allows unlimited number of meetings, audio and video preview screen, screen sharing and messaging with participants, compatible across devices and also integration with google and Microsoft office app.

Adobe Connect includes the Adobe Connect Webinars, Adobe Connect Learning and Adobe Connect Meetings. It has capabilities of Unlimited and customizable meeting rooms, Breakout sessions within a meeting and User management, administration, and reporting, Polling and Central content library.

These Virtual Classroom platforms holds real-time lessons remotely while offering the same collaborative tools and level of interaction possible in a physical classroom. But they do lack on some features, while some miss attendance sheet and others assignment portals. These may be the most popular video conferencing application, but they are very far from being perfect.

Our designed application “My Virtual Classroom” provides access to students who may not be able to attend in-person courses. Through the virtual classroom environment, teachers can interact with students and students can engage with lesson materials, view presentations and videos, and take tests, all in real time. The classroom or the meeting room staple – whiteboard – remains intact. Brainstorming, ideation, and discussions happen in real-time. Tests are given and taken pre and post the session. The reports are ready right after the session is over. Our application tries to solve all the problem these platforms have. Our application mainly targets the high school and colleges students and meets their demands.

CHAPTER 3

METHODOLOGY

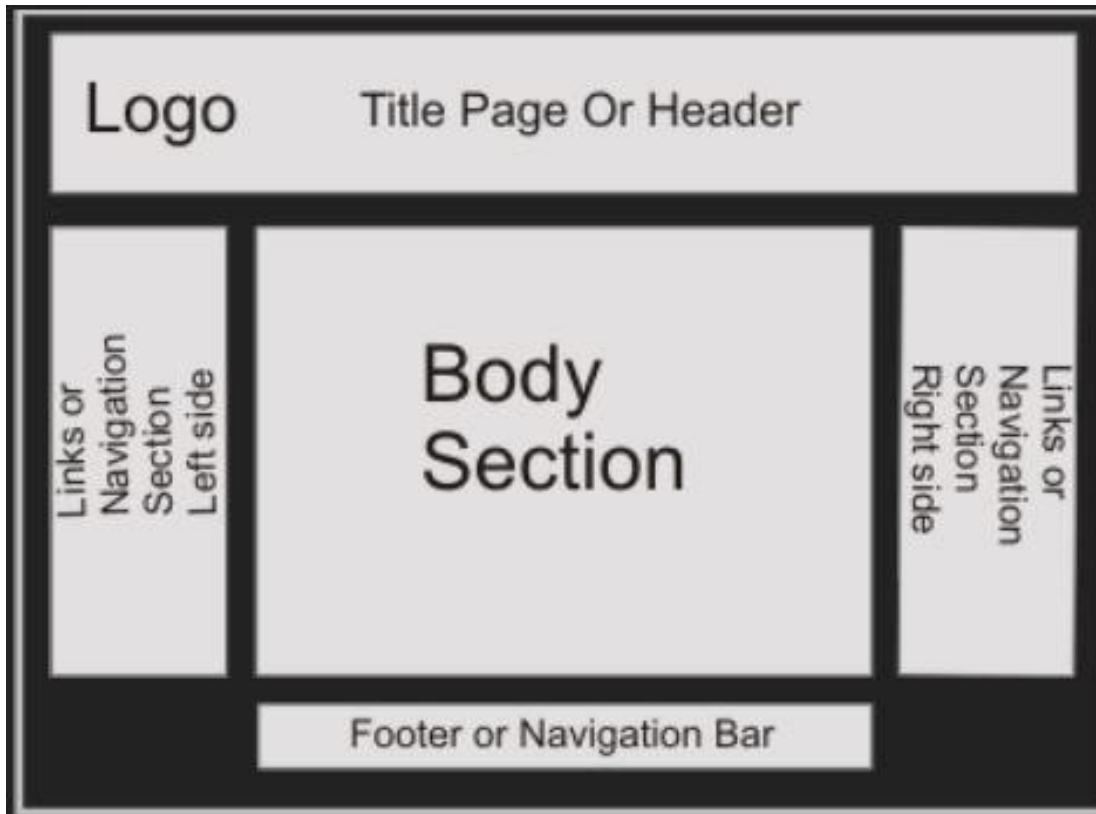


Figure 1. Web Layout

3.1 Creating Layout

Creating layout is one of the first step in Website Building. We will use HTML for the layout of website. It is used to design web pages using markup language. HTML is the combination of Hypertext and Markup language.

3.2 Designing Layout

A website layout is a pattern (or framework) that defines a website's structure. It has the role of structuring the information present on a site both for the website's owner and for users. It provides clear paths for navigation within webpages and puts the most important elements of a website front and center. We will use CSS and JS (specifically React.js) to give our website a perfect design and interaction. CSS and JS are the modern trends in webpage designing.

3.3 Backend (Server Side) Development

Back-end Development simply refers to server-side development. It is the term used for the behind-the-scenes activities that happen when performing any action on a website. Backend development focuses on databases, scripting, and the architecture of websites. Code written in the backend helps to communicate the database information to the browser. We use NodeJS to structure our backend.

3.4 Database Design and Management

Database Design is a collection of processes that facilitate the designing, development, implementation and maintenance of data management systems. Properly designed database is easy to maintain, improves data consistency and are cost effective in terms of disk storage space. The main objectives of database designing are to produce logical and physical designs models of the proposed database system. The details of the student, teacher, etc. will be stored in database.

3.5 Debugging

Debugging means detecting and removing existing and potential errors (also called ‘bugs’) in a website code that can cause it to behave unexpectedly or crash. To prevent incorrect operation of a website, debugging is used to find and resolve bugs or defects.

3.6 Testing

The website should be able to function properly. Its every function and feature must run properly so we test it with various scenarios so that our website might not fail when the user run it.

3.7 Deploy

After the successful completion of designing and debugging now the website will be uploaded in the hosting server and will be ready to use.

CHAPTER 4

SYSTEM REQUIREMENT SPECIFICATIONS

4.1 Software Requirements

4.1.1 Visual Studio Code

Visual Studio Code is a source code editor developed by Microsoft for Windows, Linux and MacOS. It includes support for debugging, embedded Git control, syntax highlighting, intelligent code completion, snippets, and code refactoring.

4.1.2 Google Chrome

Google Chrome is a web browser by Google. It is used to surfing internet. Here in this project we test our website in it.

4.1.3 Front End Tools

A. HTML

HTML stands for Hyper Text Markup Language. It is used to design web pages using markup language. HTML is the combination of Hypertext and Markup language. Hypertext defines the link between the web pages. Markup language is used to define the text document within tag which defines the structure of web pages. This language is used to annotate (make notes for the computer) text so that a machine can understand it and manipulate text accordingly. Most of markup (e.g. HTML) languages are human readable. Language uses tags to define what manipulation has to be done on the text.

B. CSS

Cascading Style Sheets, fondly referred to as CSS, is a simply designed language intended to simplify the process of making web pages presentable. CSS allows you to apply styles to web pages. More importantly, CSS enables you to do this independent of the HTML that makes up each web page. CSS is easy to learn and understood but it provides powerful control over the presentation of an HTML document.

C. JavaScript

JavaScript is a scripting language most often used for client-side web development.

Client-side refers to operations that are performed by the client (in our case the client is the browser) in a client-server relationship.

D. Bootstrap

Bootstrap is a free and open-source CSS framework directed at responsive, mobile-first front-end web development. It contains CSS- and (optionally) JavaScript-based design templates for typography, forms, buttons, navigation and other interface components. Bootstrap is the third-most-starred project on GitHub, with more than 135,000 stars, behind only freeCodeCamp (almost 305,000 stars) and marginally behind Vue.js framework. According to Alexa Rank, Bootstrap getbootstrap.com is in the top-2000 in US while vuejs.org is in top-7000 in US.

E. ReactJS

ReactJS is an open-source JavaScript library for building user interfaces. It is maintained by Facebook and a community of individual developers and companies. React can be used as a base in the development of single-page or mobile applications. However, React is only concerned with rendering data to the DOM, and so creating React applications usually requires the use of additional libraries for state management and routing. Redux and React Router are respective examples of such libraries.

4.1.5 Back End Tools

A. MongoDB

MongoDB is a cross-platform document-oriented database program. Classified as a NoSQL database program, MongoDB uses JSON-like documents with schema. MongoDB is developed by MongoDB Inc. and licensed under the Server Side Public License (SSPL). MongoDB supports field, range query, and regular expression searches. Queries can return specific fields of documents and also include user-defined JavaScript functions. Queries can also be configured to return a random sample of results of a given size.

B. Node.js

Node.js is an open-source and cross-platform JavaScript runtime environment. It is a popular tool for almost any kind of project! Node.js runs the V8 JavaScript engine, the core of Google Chrome, outside of the browser. Node.js can leverage the work of the engineers that made (and continue to make) the Chrome JavaScript runtime blazing fast, and this allows Node.js to benefit from the substantial performance improvements and the Just-In-Time compilation that V8 performs.

C. WebRTC

WebRTC (Web Real-Time Communication) is a free, open-source project that provides web browsers and mobile applications with real-time communication (RTC) via simple application programming interfaces (APIs). It allows audio and video communication to work inside web pages by allowing direct peer-to-peer communication, eliminating the need to install plugins or download native apps. Supported by Apple, Google, Microsoft, Mozilla, and Opera, WebRTC is being standardized through the World Wide Web Consortium (W3C) and the Internet Engineering Task Force (IETF).

Its mission is to "enable rich, high-quality RTC applications to be developed for the browser, mobile platforms, and IoT devices, and allow them all to communicate via a common set of protocols".

4.2 Hardware Requirements

Since our website is simple and lite, so we don't require much complex hardware components. Any modern PC with internet access will be able to run our website.

CHAPTER 5

CONCLUSION

5.1 Conclusion

So, our project is intended to help out all the students in this pandemic situation where education is carried out through online measures. Since our application is one platform for all, where video conferencing to attendance to assignments will be carried out, we strongly believe this will be a much easier, effective and reliable application for the students.

5.2 Time Allocation

We have aimed to finish this semester project of ours in this time frame:

Months	June			July				August				September	
Weeks	2	3	4	1	2	3	4	1	2	3	4	1	2
Planning/Proposal Submission													
Preparation													
Work Division													
Coding													
Debugging													
Documentation													
Beta Testing													

	Work Completed
	Work Remaining

Figure 2. Gantt Chart

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