

ELEARNBD-AN ONLINE LEARNING PLATFORM

BY

**Md. Ahsan Habib
ID: 181-15-1907**

**Md Anisuzzaman Shayak
ID: 181-15-1988**

**Abdul Hadi Hemel
ID: 181-15-2080**

This Report Presented in Partial Fulfillment of the Requirements for the
Degree of Bachelor of Science in Computer Science and Engineering

Supervised By

Mohammad Jahangir Alam
Lecturer
Department of CSE
Daffodil International University

Co-Supervised By

Tajim Md. Niamat Ullah Akand
Lecturer
Department of CSE
Daffodil International University



DAFFODIL INTERNATIONAL UNIVERSITY

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APPROVAL

This Project titled “**ELearnBD-An Online Learning Platform**”, submitted by Md Ahsan Habib, Md Anisuzzaman Shayak and Abdul Hadi Hemel to the Department of Computer Science and Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfilment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on 18.09.2021.

BOARD OF EXAMINERS



Tania Khatun

Senior Lecturer

Department of Computer Science and Engineering
Daffodil International University

Internal Examiner



Mohammad Jahangir Alam

Lecturer

Department of Computer Science and Engineering
Faculty of Science & Information Technology
Daffodil International University

Internal Examiner



Dr. Dewan Md. Farid

Associate Professor

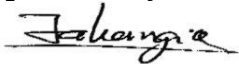
Department of Computer Science & Engineering
United International University, Bangladesh

External Examiner

DECLARATION

We hereby declare that this project has been done by us under the supervision of **Mohammad Jahangir Alam, Lecturer, Department of CSE, Daffodil International University**. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

Supervised by:



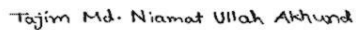
Mohammed Jahangir Alam

Lecturer

Department of CSE

Daffodil International University

Co-Supervised by:



Tajim Md. Niamat Ullah Akand

Lecturer

Department of CSE

Daffodil International University

Submitted by:



Md Ahsan Habib

ID: 181-15-1907

Department of CSE

Daffodil International University



Md Anisuzzaman Shayak

ID: 181-15-1988

Department of CSE

Daffodil International University



Abdul Hadi Hemel

ID: 181-15-2080

Department of CSE

Daffodil International University

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ABSTRACT

In this project, we have built an online learning management system (web application) with a database backend. Here we will be able to watch educational videos for free and premium (buying courses). There will be a huge collection of reading materials from very basic level to advanced level like question bank, pdf books, quizzes and more. A question bank will be available with a user-friendly MCQ system where any student or applicant can give an exam and can test their performance on any particular subject. There will be blogs in our project for all users who can post, comment or give suggestions for any particular topics. In our web application not only the students but also a teacher who is confident enough to teach a subject can apply to our admin and sell their online courses. This will generate a revenue system for application. In a short we tried to make an online educational platform where a user can find their desired study material such as previous years' questions (SSC to job level), regular quizzes for testing their capability, videos with the solved question, and also can find an instructor for a particular course based on their expertise.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

We all know that education is one of the five basic human rights of our life. Being a student at this time we are going through a hard time because of this pandemic COVID-19 where millions of students are having a long gap with their studies. But as per our government decision all of the schools, colleges and universities are taking the whole education system online.

We have chosen to make an online web platform where we can make our study easier than before, where we can get any study materials from our application like notes, pdf books, questions, and suggestions. We are intended to make a sector for our students where they can perform online exams on the basis of MCQ. There will be an access for teachers who can serve their students through different courses they may offer. It could be a free or premium course.

“Electronic Learning” is the elaboration of ‘E-Learning’ that refers to any type of technology-assisted learning. E-Learning is the application of technology to allow individuals to learn at any time and from any location. Our web application is an E-Learning platform for online based learning.

1.2 Motivation

Technology is becoming increasingly important in the subject of education around the world. The usefulness of just using e-learning technologies in the classroom has been extensively researched and proven. According to studies, learning is more effective when the senses are stimulated^[1]. Learning can be improved by activating the senses, particularly the visual sense.

Because of COVID-19 that has spread out throughout the world, Bangladesh has also faced the consequences of this pandemic. Since this pandemic our educational system has stepped into a new system and merged with the technology known as online learning. As all level of student performing their study via different online platform, we came up with an idea to make an online based web platform that can be helpful and useful to all aspects

of students in our country. One can gain knowledge, ask for queries and also can sell his/her course to our site.

1.3 Objective

Our main objective is to

- Make an environment suitable for our students to study online.
- Keep updated to all of our students with all sorts of information & study materials.
- Make an open platform for students and teachers where a teacher can share their knowledge with the students.

1.4 Expected Outcomes

- Educational videos, books, and notes based on topics ranging from class one to job preparation.
- Forums based on topics for discussing problems.
- Self-paced video and reading based course.
- Question Bank including questions for PSC, JSC, SSC, HSC, Admission, Medical exams, BCS, Govt. Jobs, etc.
- Short quiz for different subject.
- To publish course after verify through admin.
- Main admin can change or have the power to publish anything to site or can remove anything from our site.
- The user may be a free or a premium (paid) user.

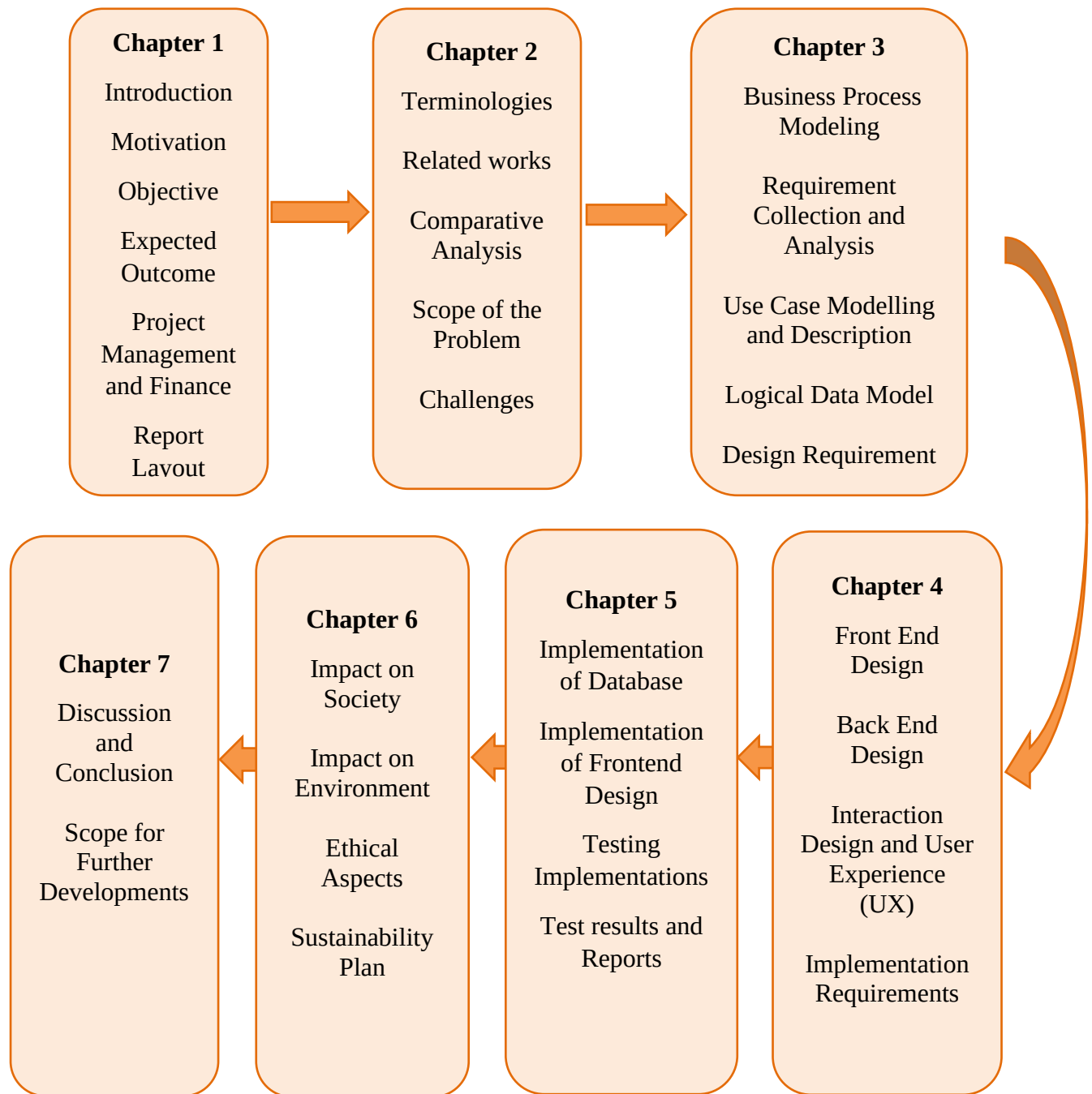
1.5 Project Management and Finance

Project control entails the making plans and organization of a company's assets to transport a particular task, event, or responsibility closer to completion. It can contain a one-time assignment or an ongoing activity, and assets controlled encompass personnel, finances, technology, and highbrow property ^[2]. Project control is regularly related to fields in engineering and production and, extra lately, healthcare and facts technology (IT), which

commonly have a complicated set of additives that ought to be finished and assembled in a fixed style to create a functioning product. No matter what the enterprise is, the assignment supervisor has a tendency to have kind of the equal job: to assist outline the dreams and goals of the assignment and decide while the diverse assignment additives are to be finished and through whom. They additionally create nice manipulate assessments to make certain finished additives meet a positive standard.

No matter what the organization is, the project manager has a bent to have type of the identical job: to help define the goals and desires of the project and determine whilst the numerous project components are to be completed and through whom. They moreover create excellent control tests to make sure completed components meet a fantastic standard.

1.6 Report Layout



CHAPTER 2

BACKGROUND STUDY

2.1 Terminologies

An online learning platform is a website or portal for academic content material and sources that gives a pupil the whole lot they want in a single place: lectures, sources, possibilities to fulfill and chat with different students, and more. It is likewise an exceptional manner for the pupil and the instructor to screen pupil progress. In this modern technology we should get used to learn online using these types of online learning platform where not only the students but also the teachers can expand their knowledge throughout the world.

2.2 Related Works

As we are making an online learning platform, there are a few online platforms that is related to our platform. But are making some extra features and e combination that will be very useful to all types of students and job holders also. Some of the related sites are:

10 Min School is a web-based educational platform based in Bangladesh where students can learn and practice. Now it's the biggest online platform in our country ^[8].

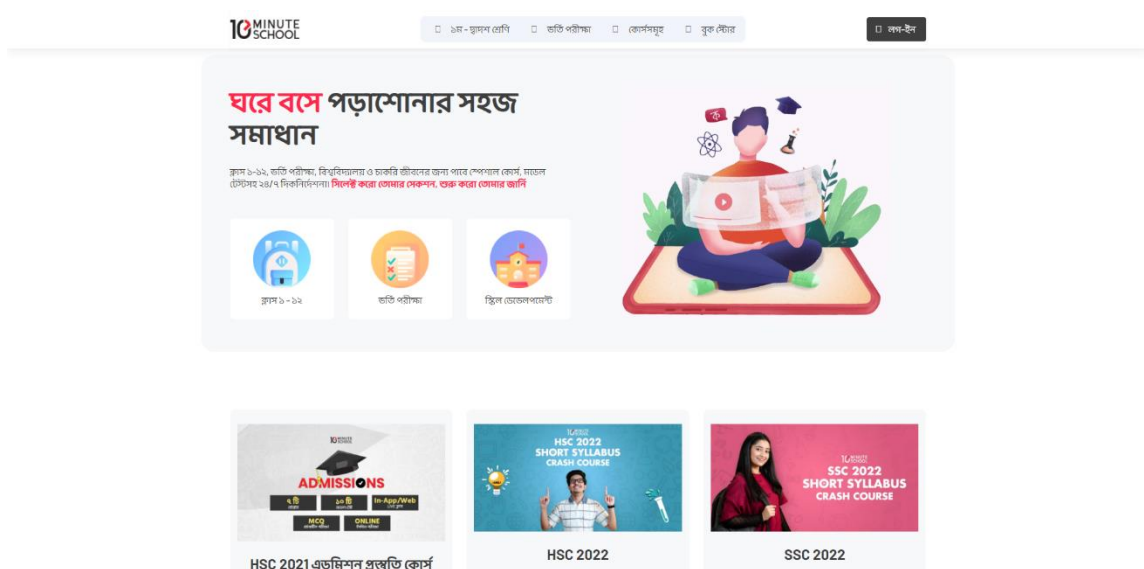


Figure 2.1.1: 10 Min School Website

Shikhhok.com is one of the oldest online academic web sites in Bangladesh created with the aid of Dr. Ragib Hasan, a laptop technological know-how professor at the University of Alabama at Birmingham. Shikhhok.com task desires to offer loose online schooling and terrific guides in Bengali language to rural and deprived college students in Bangladesh and India [7].

শিক্ষক
বাংলায় অনলাইনে মুক্ত জ্ঞানের মেলা

Home ~ কোর্স তালিকা আমাদের কথা শিক্ষক হতে চান? About Us Search

শিক্ষক হতে চান?
আপনি কি শিক্ষক.কম সাইটে কোনো একটি কোর্স পড়াতে চান? [Get a PDF version of this](#) [Print webpage](#) PDF

আপনাকেই খুঁজছি আমরা!

কী বিষয়ের উপরে কোর্স?
আসলে আমরা সব বিষয়ের উপরেই কোর্স এখানে পড়ানোর সুযোগ রাখছি। অর্থাৎ বিজ্ঞান, প্রকৌশল, কলা, বাণিজ্য, সমাজবিজ্ঞান, ইতিহাস, ভাষা, সবই কিছুই এখানে আপনি পড়াতে পারবেন।
(শিক্ষক.কম একটি অবাণিজ্যিক সাইট যেখানে পড়তে বা পড়াতে কারোরই কোনো বাধা নেই। এখানকার সব কোর্স সবার জন্য উন্মুক্ত ও বিনামূল্যের)।

কোন পর্যায়ের কোর্স?
বিশ্ববিদ্যালয়, কলেজ, এমনকি স্কুল পর্যায়ের কোর্স সবই এখানে পড়ানো যাবে। আর প্রথাগত শিক্ষা ছাড়াও অন্যান্য বিষয়, যেমন চাকুরিজীবীদের জন্য বা রান্নার জন্যও এখানে কোর্স পড়াতে পারবেন।
মোদা কথা আপনি নিজে যা জানেন, তা অন্যকে শেখাতে চাইলে সেটাই যথেষ্ট!!

কী করতে হবে?
এখানে কোর্স পড়াতে হলে চটপট নিচের জিনিষগুলো তৈরী করে ফেলুন, তার পর পাঠিয়ে দিন রাগিব হাসানের কাছে। (ইমেইল ঠিকানা ragibhasan অ্যাট gmail.com, ফেইসবুক আইডি http://www.facebook.com/ragibhasan)

- ১) কোর্সের শিরোনাম
- ২) কোর্সের সংক্ষিপ্ত বর্ণনা (১/২ প্যারাগ্রাফ)
- ৩) কাদের জন্য কোর্স? (স্কুল, কলেজ, বিশ্ববিদ্যালয়, সবার জন্য)

পুরস্কার
২০১৩ গুগল রাইজ এওয়ার্ড
২০১৩ ISIF Award
২০১৩ দ্য বেস ইন্ডিজার এওয়ার্ড
২০১৪ ইন্টারনেট সোসাইটি (ISOC) কমিউনিটি গ্রান্ট

গ্রাহক হন
নতুন লেখচার আসামাত্র ইমেইলে পেতে হলে এখানে আপনার ইমেইল ঠিকানাটি দিন।
Email Address

গ্রাহক হন

কোর্স তালিকা
ফ্রিল্যান্স কর্নার
CCNA পরিচিতি
ওয়ার্ডপ্রেস ফর বিগিনারস
ফ্রিল্যান্সিং
বেসিক ওয়েবসাইট ডিজাইন
ওয়ার্ডপ্রেস পরিচিতি
বেসিক অ্যাডবি ফটোশপ গ্রাফিক্স ডিজাইন
জাভাস্ক্রিপ্ট পরিচিতি
মোবাইল এপ্লিকেশন ডেভেলপমেন্ট
অ্যান্ড্রয়েড এপ্লিকেশন ডেভেলপমেন্ট
অ্যান্ড্রয়েড এপইনভেন্টর ডেভেলপমেন্ট
আইওএস এপ্লিকেশন ডেভেলপমেন্ট
আইফোন এপ্লিকেশন

Figure 2.1.2: Shikhhok Website

Study press.org is an internet primarily based totally specific website. Its massive series of frequently up to date questions enables the scholars to check himself. This web website online is centering the aggressive examination preparation. Students can locate any preceding questions of the nation's aggressive tests like BCS, Bank Job etc. [9]

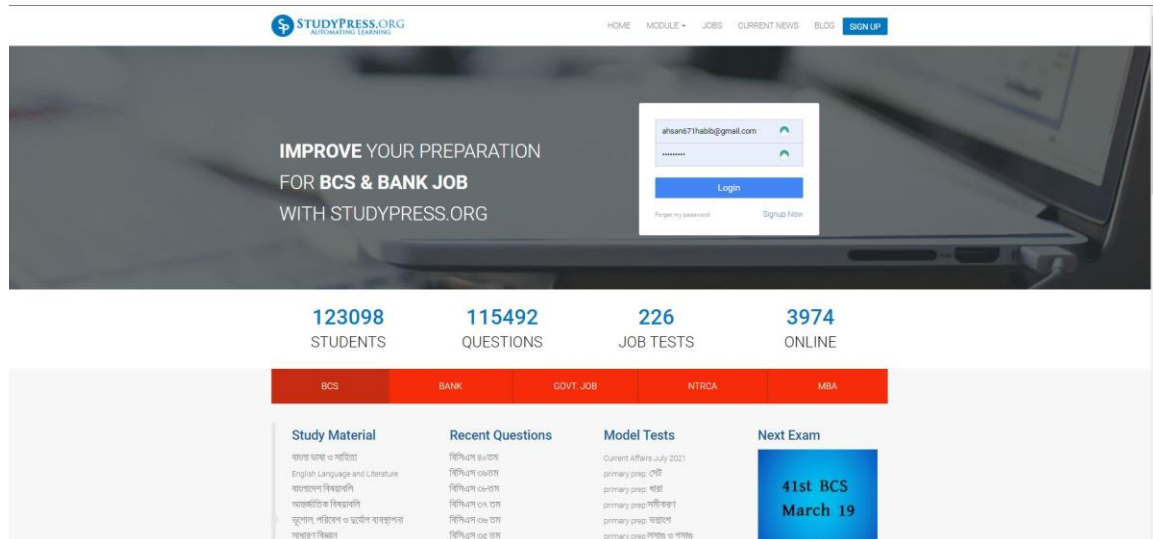


Figure 2.1.3: Studypress.org Website

Amarpathshala.com is a website with Over 12000+ videos covering all class 1-12 subjects, professional and skill development course from skilled trains, all one place, completely free of cost from any corner of the world [10].

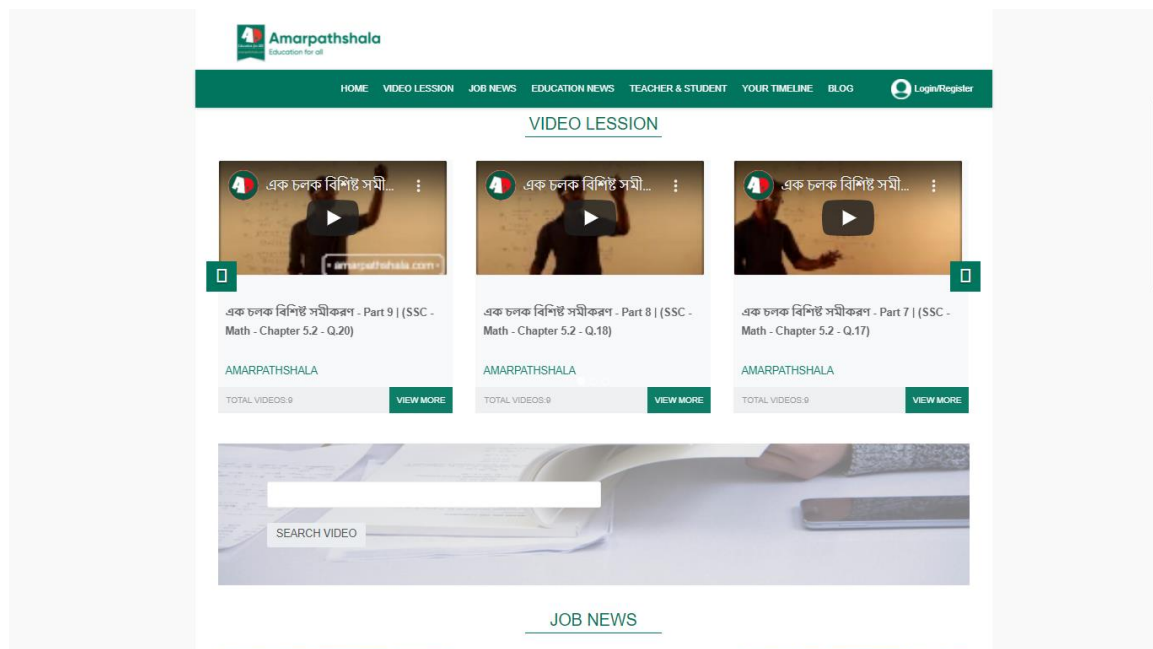


Figure 2.1.4: Amarpathshala.com Website

2.3 Comparative Analysis

In our previous topics we have shown 3 different online platform websites in our country. “shikkhok.com” is a blog type learning platform where they provide only blog post based on different subject. “10minschoool.com” is a video tutorial base learning website. And “stdupress.org” is a platform where it provides a question bank and e text exam for different subject. But in our “E-Learn Bd” we have many features including video tutorials, quizzes, job circular, blog post, huge collection of pdf books and pdf questions.

Table 2.3.1: Comparative Analysis

Feature	10 Minutes School	Shikkhok	Studypress	Amar pathshala	E-Learn Bd
Quiz	No	No	No	No	Yes
Course	Yes	Yes	No	Yes	Yes
Video Tutorial	Yes	No	No	Yes	Yes
Question Bank	No	No	Yes	No	Yes
Pdf Book	Yes	No	No	No	Yes
Job Circular	No	No	No	Yes	Yes
Blog Post	No	Yes	No	Yes	Yes

2.4 Scope of the Problem

Our main focus is that if any student or a job candidate search for a resource (pdf books, questions, course, circular) they can find out their desire resources through our website. As this will be an online learning platform, only people who are using mobile phones and computer can access and learn. Without internet no one can get access to our site as it is an online based learning platform. Being an online based platform, no one can get any hardcopy of any materials. Huge flow of traffic can be a problem to this site’s performance issue.

2.5 Challenges

To deliver the eLearning advantages to the human beings of growing nations like Bangladesh, a few essential troubles can be addressed and the important thing function that should be diagnosed as follows –

- To build a user-friendly smooth platform that anyone can understand easily and can find out the resources.
- Need to be up to date for some resources that will be update every day or month to add in our site.
- Maintaining the security is also important of our project.
- Admin and moderator need to monitor continuously to check out all over our site.
- Resource collection and data entry is needed regularly to enrich our project.
- Marketing and advertisement of our website is also a major part for the first time so that we can reach our targeted people.

CHAPTER 3

REQUIREMENTS SPECIFICATIONS

3.1 Business Process Modeling

BPM also known as Business Process Modeling can be defined as a graphical representation of any company or a website's business model or process and the workflows how it works.

In our BPM we have shown how a user can access our free resources along with paid resources after making a successfully payment via payment gateway. Here resource is consisting of courses, blog post, pdf books, online quizzes, job circular etc.

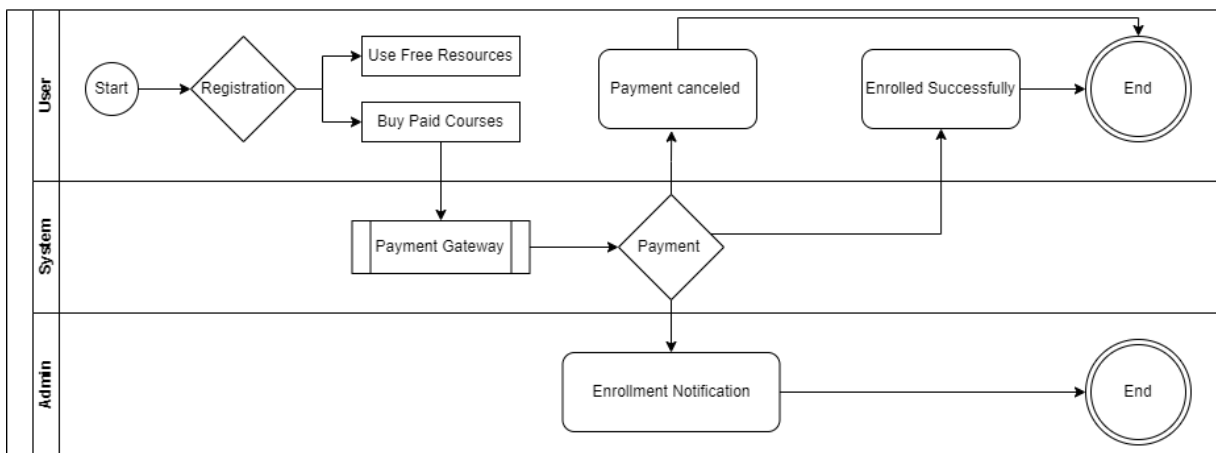


Figure 3.1.1: Business Process Modelling

3.2 Requirement Collection and Analysis

This task is concerned with the analysis, design, development, implementation and assessment of an e-gaining knowledge of control gadgets to offer a consumer pleasant surroundings for potential college students to gather information at any academic degree and to bridge the space among instructors and college students.

Some basic requirements and collections are needed to fulfill our website. These can be pointed as:

- Online Courses
- Blogs
- Quizzes
- Question Bank
- PDF Books
- Job Circular
- Payment gateway
- Seminar Videos
- Track student performance

3.3 Use Case Modeling and Description

A use case is defined as a technique that used in a system to organize and identify system requirements. From figure 3.3.1 we made a use case diagram that describes our actors and their functionalities.

Here our actors are user, moderator, instructor and admin.

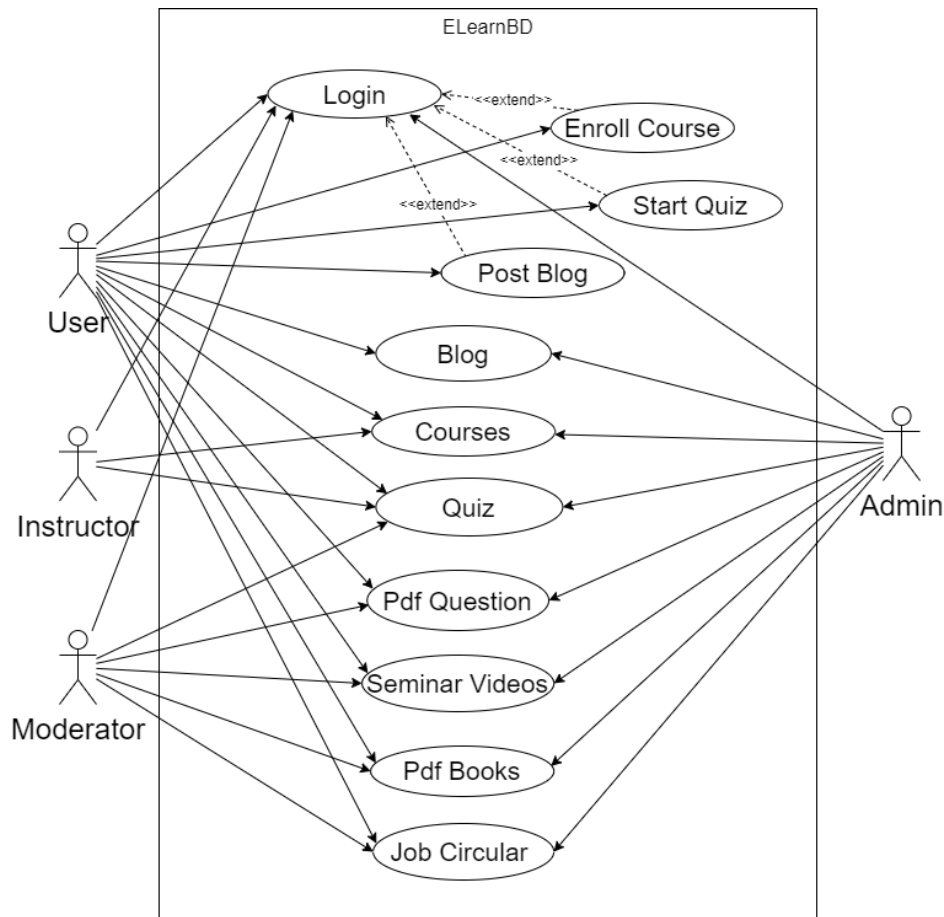


Figure 3.3.1: Use Case Modeling Description

3.3.1 Use Case Description

Here are some use case descriptions for our model:

Table 3.3.1.1: Use Case Description for User Sign up

Use Case	Sign in
Primary Actor	Student, Moderator, Admin
Secondary Actor	Null
Pre-condition	Null
Scenario	• Enter name • Enter username • Enter valid email • Enter password • Enter confirm password
Post-condition	• Signed up successfully or failed • Login

Table 3.3.1.2: Use Case Description for User Login

Use Case	Login
Primary Actor	Student, Moderator, Admin
Secondary Actor	Null
Pre-condition	Sign up
Scenario	• Enter valid email • Enter password
Post-condition	• Login successfully or failed • Dashboard

Table 3.3.1.3: Use Case Description for User Profile Setting

Use Case	Profile setting
Primary Actor	Student or user
Secondary Actor	Null
Pre-condition	Login
Scenario	• Update profile photo • Update full name • Update date of birth • Update email • Update Password

	• Delete account
Post-condition	• Update successful • View profile

Table 3.3.1.4: Use Case Description for Enroll Course

Use Case	Enroll Course
Primary Actor	Student or user
Secondary Actor	Null
Pre-condition	Login
Scenario	• Choose the course • Go to “Buy now” if paid course • Pay through payment gateway
Post-condition	• Payment successful • Course page

Table 3.3.1.5: Use Case Description for Quiz

Use Case	Give Quiz
Primary Actor	Student or user
Secondary Actor	Null
Pre-condition	Login, enrolled
Scenario	• Choose the subject • Start Quiz • Answer quiz within given time
Post-condition	• Quiz marks • Quiz page

Table 3.3.1.6: Use Case Description for Adding Resource

Use Case	Resource Add
Primary Actor	Moderator, Admin
Secondary Actor	Null
Pre-condition	Login
Scenario	• Enter resources (course, pdf, question, videos etc.) title • Enter resource price (if any) • Enter description (if any) • Enter link (pdf, videos etc.)
Post-condition	• Resources added successfully or failed

	• View resources • Download resources
--	--

3.4 Logical Data Model

Unified Modeling Language (UML) is a widespread motive modelling language. The primary intention of UML is to outline a widespread manner to visualize the manner a machine has been designed. Here in this 3.5.1 figure shows our entire project UML class diagram.

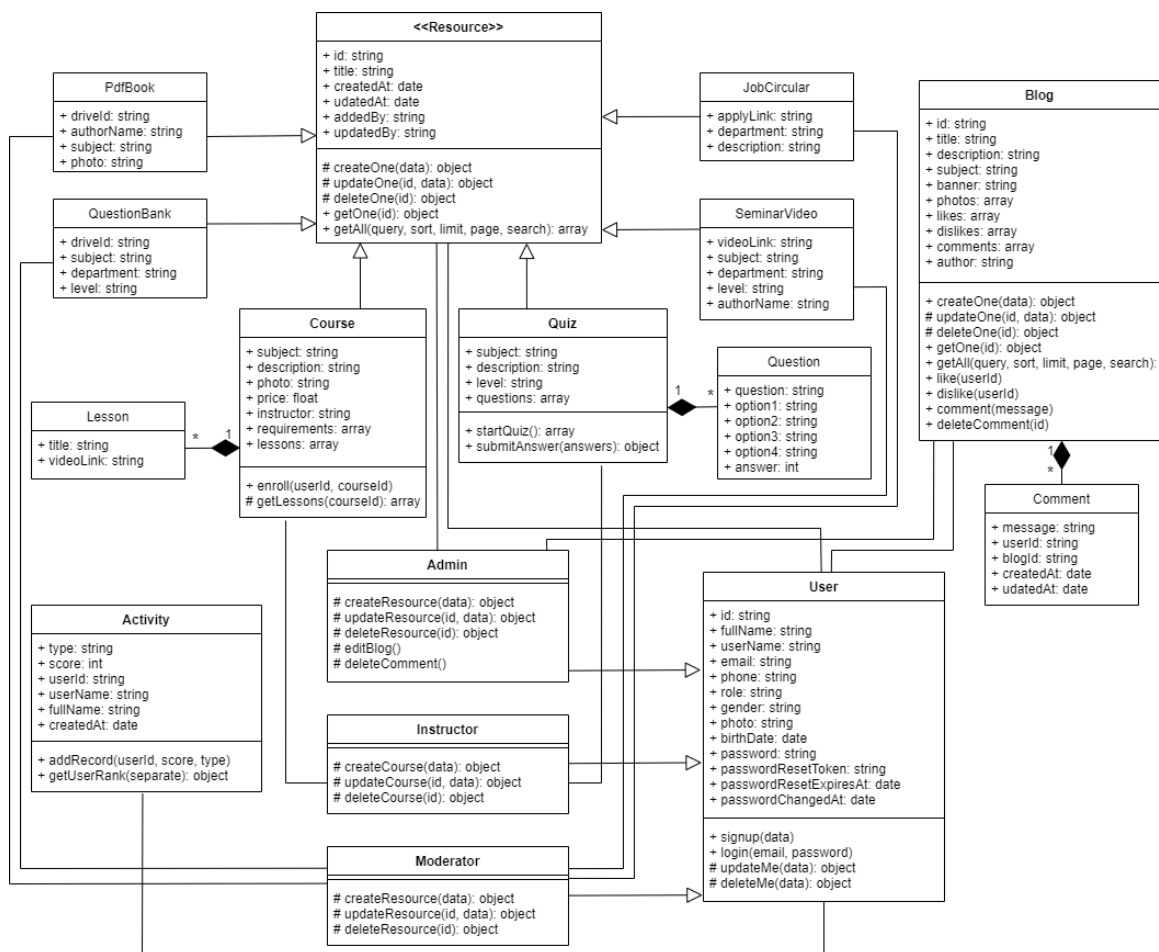


Figure 3.5.1: UML Class Diagram

3.5 Design Requirement

Table 3.5.1: Design Requirement Analysis Table

Module	Objective	Requirement Analysis
Admin	Admin Activities	• Admin can manage user role • Admin can edit/delete user role • Admin can see the list of available resources • Admin can modify and add resources, courses • Admin can approve instructor and their courses
Instructor	Instructor Activities	• Instructor can add courses from instructor dashboard • Instructor can add quizzes to their courses
Moderator	Moderator Activities	• Moderator can add pdf books • Moderator can add question bank • Moderator can add tutorials • Moderator can add job circular • Moderator can add quizzes
User	User Activities	• User can register & login with valid email • User can update their profile • User can post hand notes and blog • User can participate in quizzes • User can buy courses • User can get resources like pdf books, question bank • User can find job circular

CHAPTER 4

DESIGN SPECIFICATION

4.1 Front-end Design

Front end layout is the outer layout of an internet site. It makes an internet web page human readable and understandable. Front end layout is the whole thing that a person sees in an internet web page. Some languages like html, CSS are used to lay out the front end of an internet site. It offers a manner of interplay among the customers and the server. In growing an internet site, the frontend layout is the most important part ^[3]. A top searching and clean to apply person interface of an internet site now no longer best appeals to people however additionally enables them to engage effortlessly with the server. We have attempted to broaden an easy and clean way to apply the frontend result in our device. It enables the consumer to co-function with the device effortlessly.

In our project we have used some famous frameworks and libraries to make our front end much more user friendly. They are:

- **React Framework:** React is one of the most famous java script libraries that is used for building interactive user interfaces. It offers perspective and helps us to pick the relaxation of our frontend architecture.
- **Material UI Library:** Material UI is a library that allows us to import and use distinct components to create a user-friendly UI in our React applications.
- **Axios Library:** It is a JavaScript library which is used to make HTTP requests from NodeJS server from the browser which supports promise API. It also has the capacity to cancel requests.

Home page: Our user will see this 4.1.1 figure as our homepage of our web application E-Learn Bd. In this homepage all the features of our site are visible consisting of blogs, courses, pdf books, questions, seminar videos and job circular. Anyone can visit the other pages or can see the details information about any specific features.

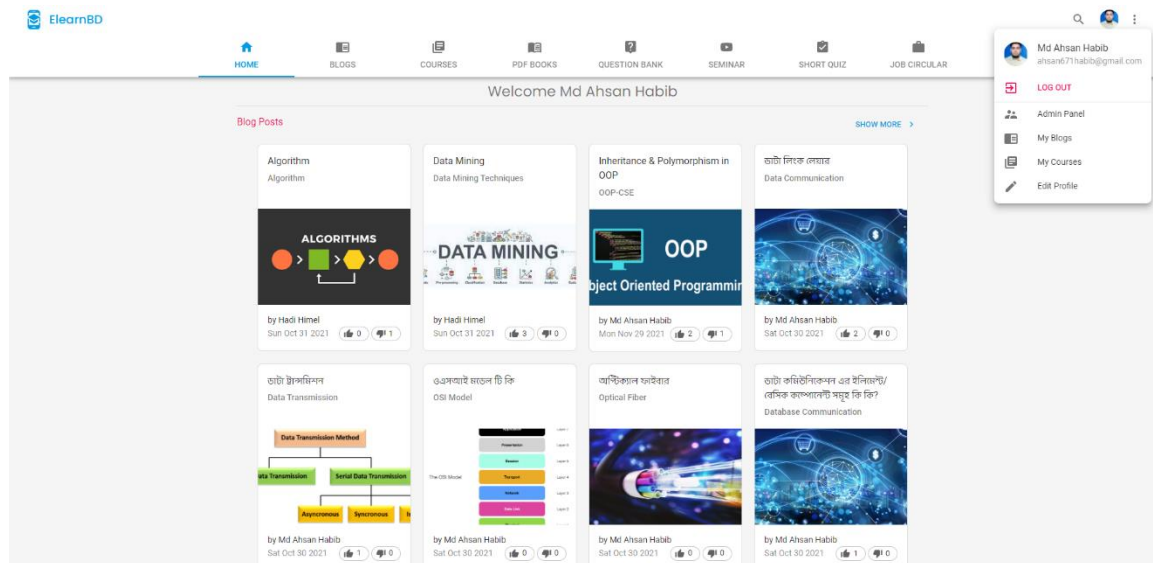


Figure 4.1.1: Home Page

Changing theme of our site: From selecting the profile icon from the upper left corner any user can change the theme which might be dark or light color as in this 4.1.2 figure.

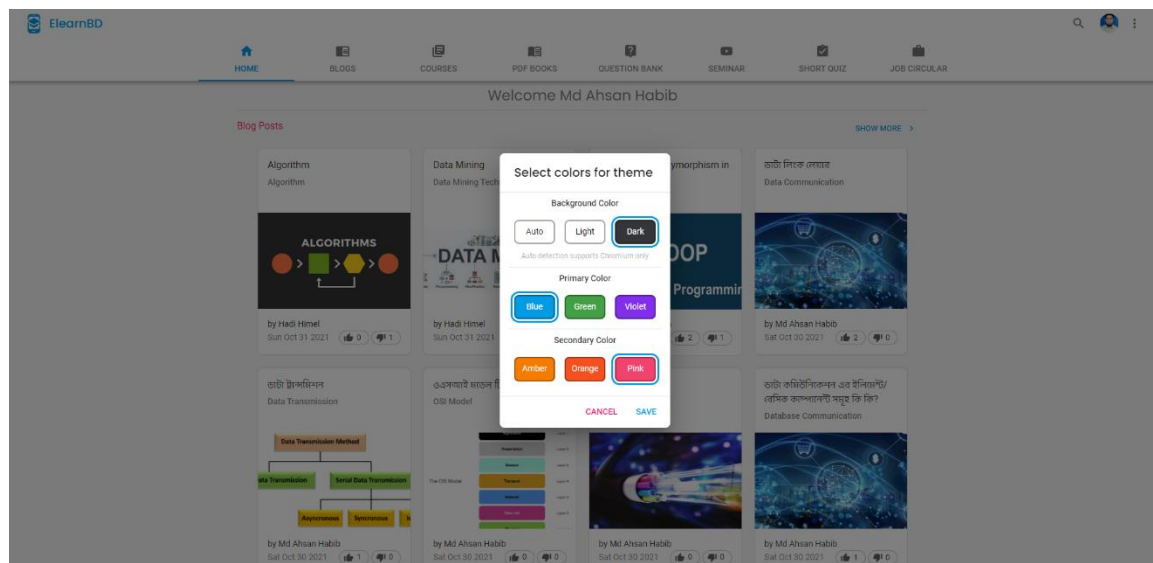


Figure 4.1.2: Changing theme of our site

Theme change: After changing the theme into dark our whole site will be look like this as 4.1.3.

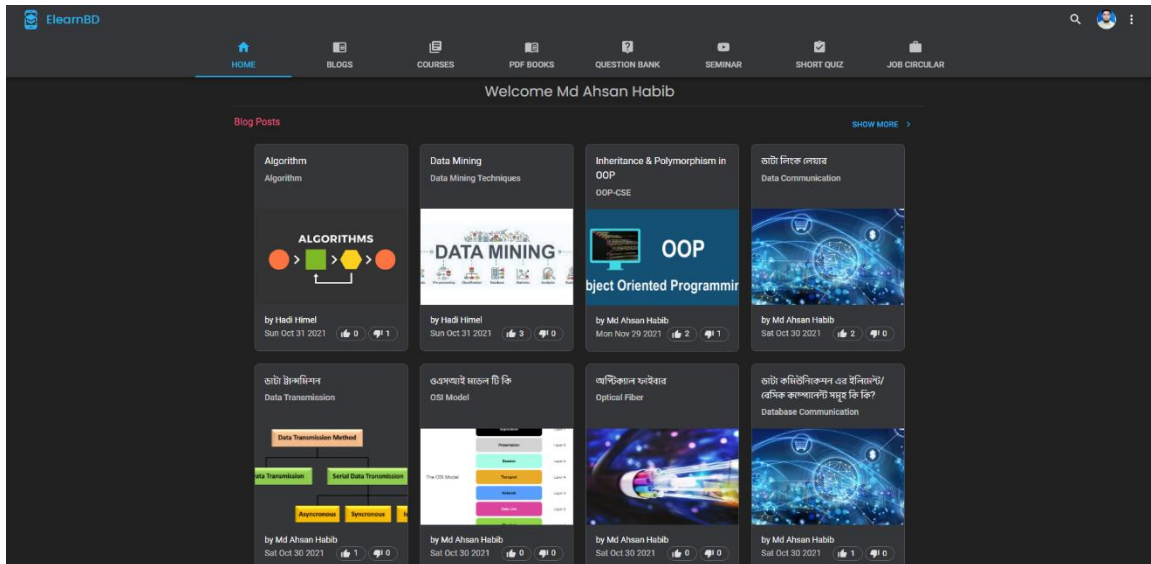


Figure 4.1.3: Theme change

Sign Up Page: This 4.1.4 figure shows our Sign-up page for our website E-Learn Bd.

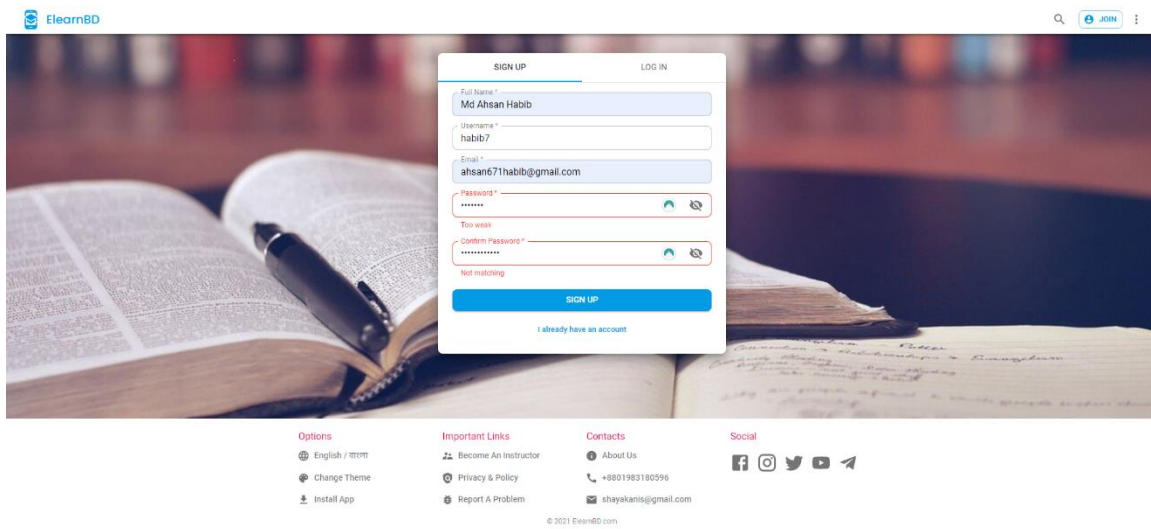


Figure 4.1.4: Sign Up Page

Log in Page: This 4.1.5 figure shows our Log in page for our website E-Learn Bd.

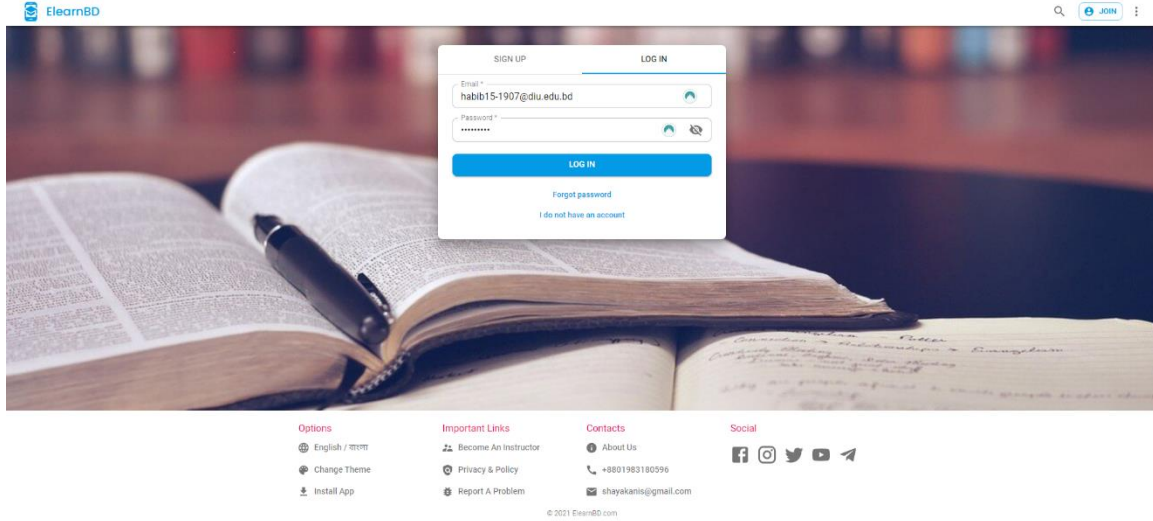


Figure 4.1.5: Log in page

Profile page: If we go to my profile page as this figure in 4.1.6, we can see there are some fields where I can change my profile picture, email, password and can add gender and birth date. Also, there is a feature where a user can delete his/her own account. Besides I can see my own blog post that I have been posted to site and the courses I have been enrolled.

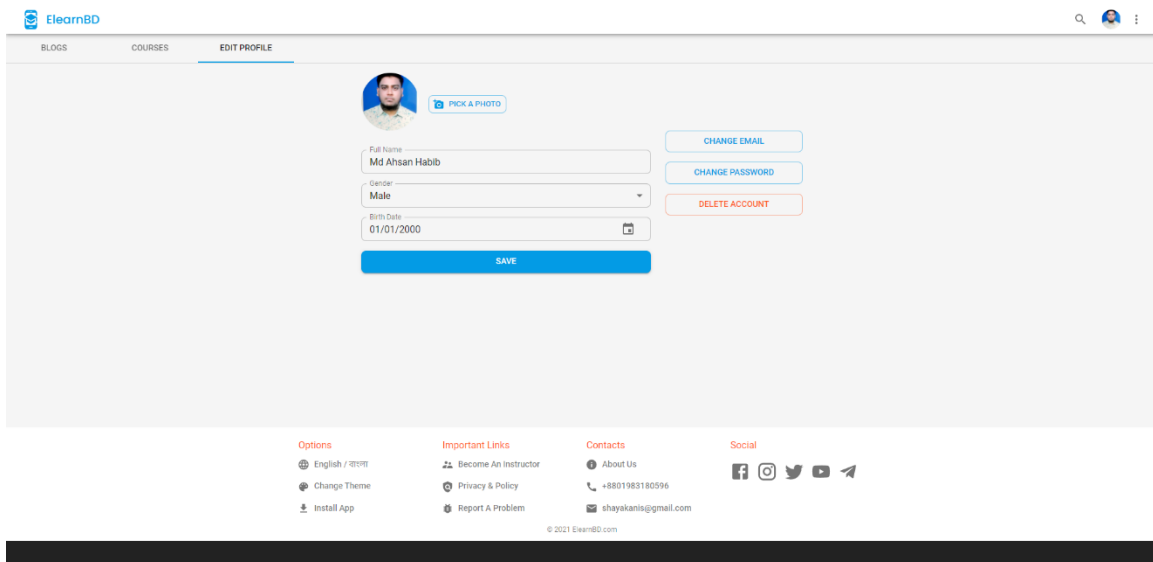


Figure 4.1.6: Profile page

Blogs page: In 4.1.7 figures it is our blog page, we can see different types or categories of blog post, which are posted by logged in user. We can also search any particular topic and if that topic has been posted, it will give us the result.

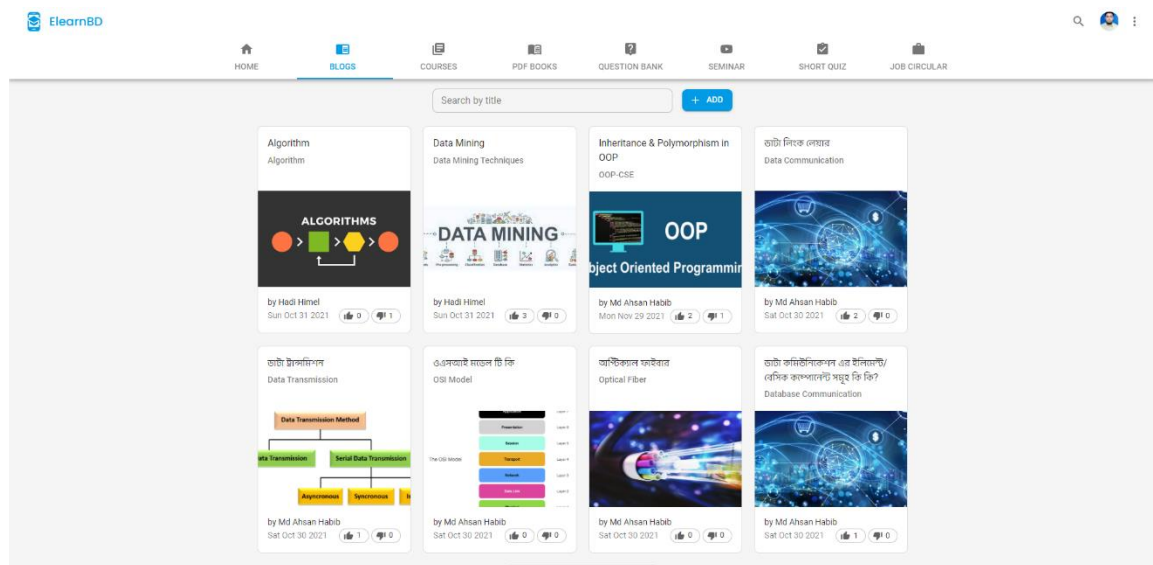


Figure 4.1.7: Blogs Page

Blog Description Page: A blog in consist of a banner image, title, subject, description and a user can add up to 10 images of any formats as a hand note of that topic. Anyone can see the post and only the user can comment and like or dislike the post.

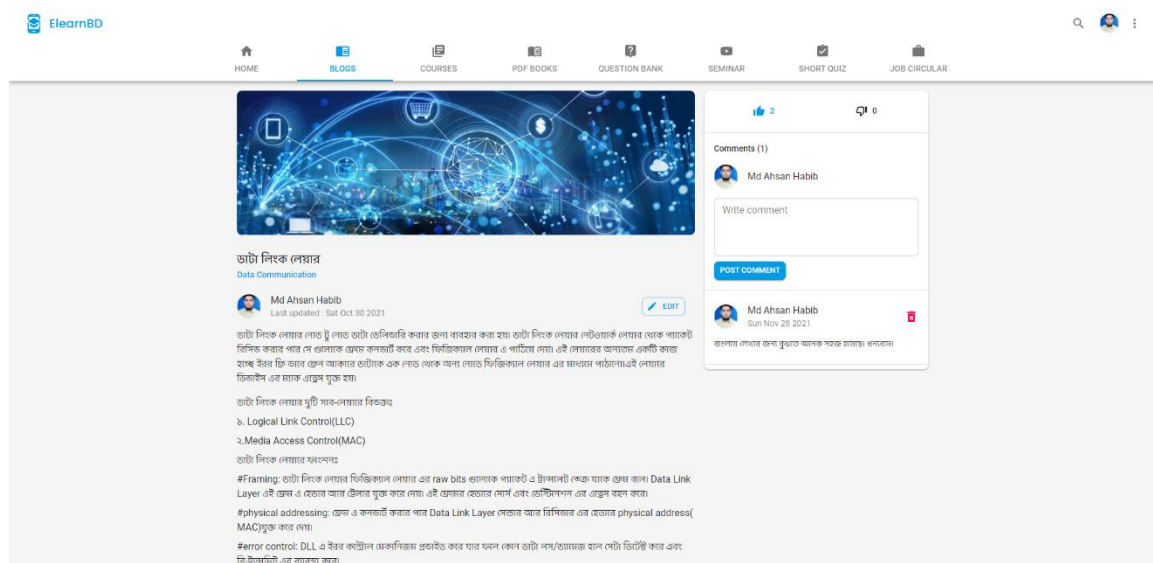


Figure 4.1.8: Blog Description Page

Blog Add Page: 4.1.9 figure shows how to add blog as a user or moderator or an admin.

Figure 4.1.9: Blog Add Page

Course Page: In this figure 4.1.10, different types of courses will be available for our users. Some courses will be provided free for all of our user and some will be paid course. Anyone can search and find any course if it is available in our site.

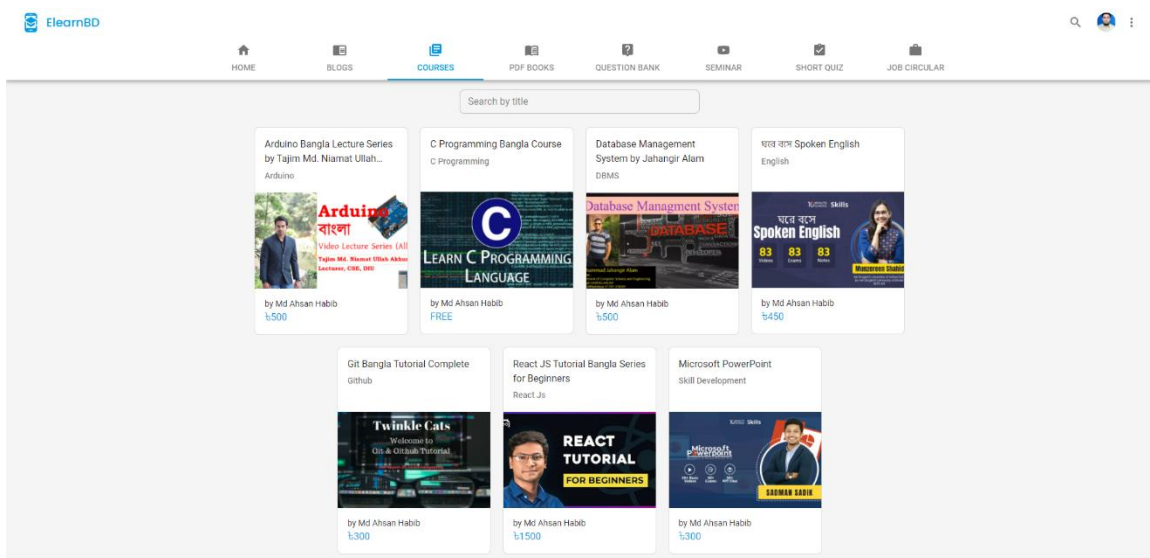


Figure 4.1.10: Course Page

Course Description Page: In this figure 4.1.11 a brief description of this course will be provided. If there are any prerequisites for this course it will also be added. To buy this course one must need to pay online through payment gateway which is sslcommerz.

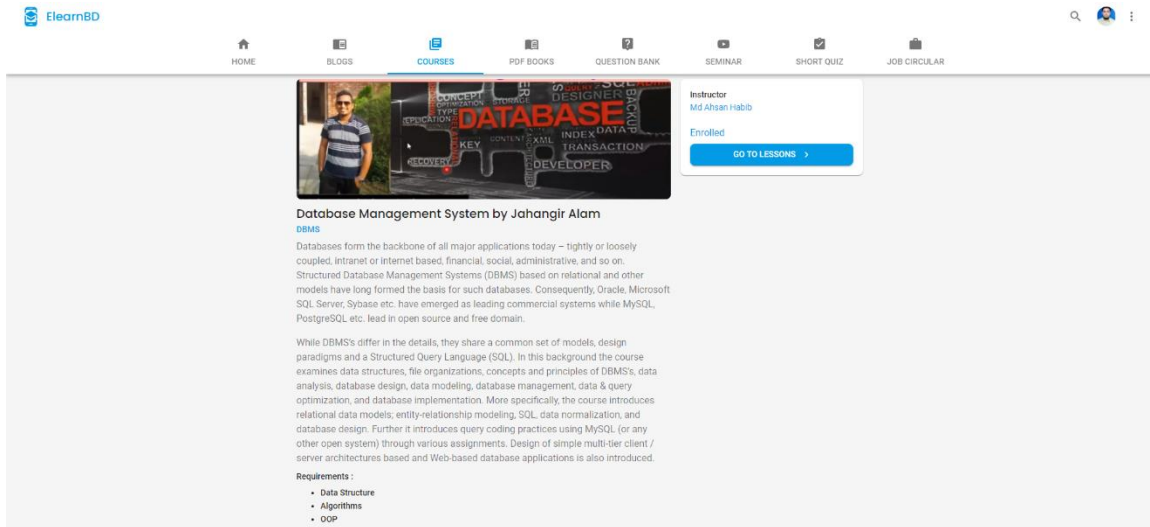


Figure 4.1.11: Course Description Page

Payment Gateway Page: If any user wants to buy a course from our site, they need to pay online through sslcommerze. They can use online banking or bkaash, Nagad, DDBL etc.

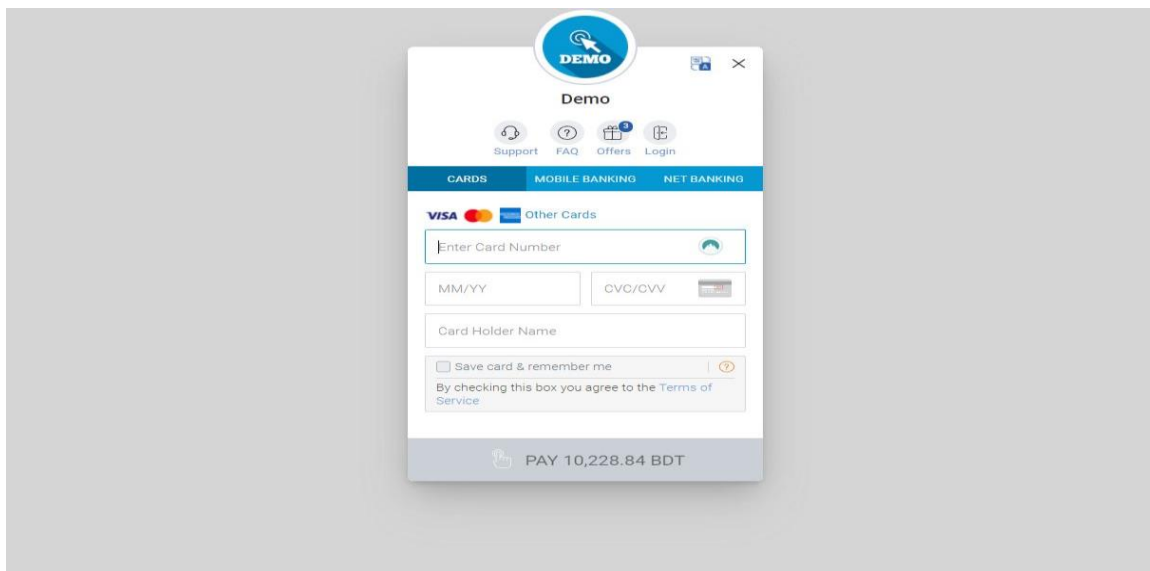


Figure 4.1.12: Payment Gateway page

Course Video Page: After buying any course or enrolling any free course a user can see this 4.1.13 figures as all the videos in a playlist and they can navigate one to another video anytime.

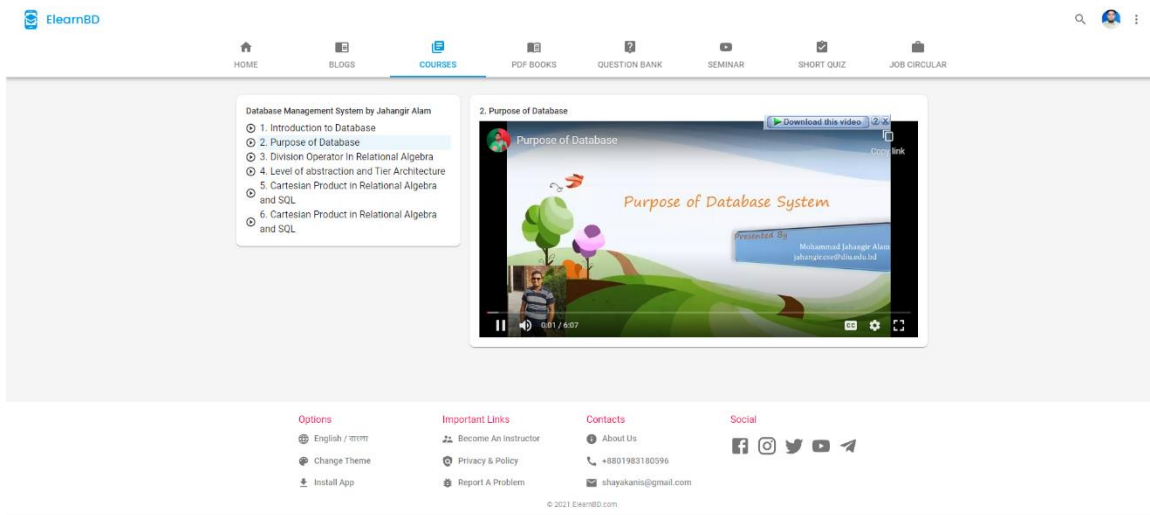


Figure 4.1.13: Course Video Page

Pdf Book Page: This pdf page as 4.1.14, has a huge collection of pdf books. Any user can search by title on any book in our site. Then he/she can download this pdf book or can read online through our site.

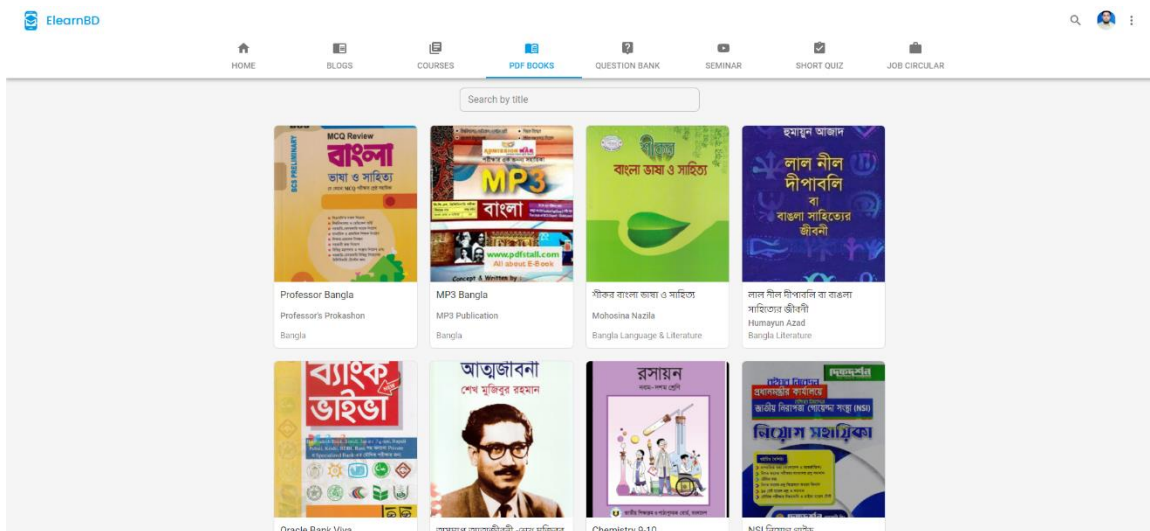


Figure 4.1.14: Pdf Book Page

Pdf Book Page: User can read any pdf book in that form or can easily download just by clicking “DOWNLOAD” button from the upper right side. Also, the pdf can be zoomed in and out by user if he/she wants shown in 4.1.15.

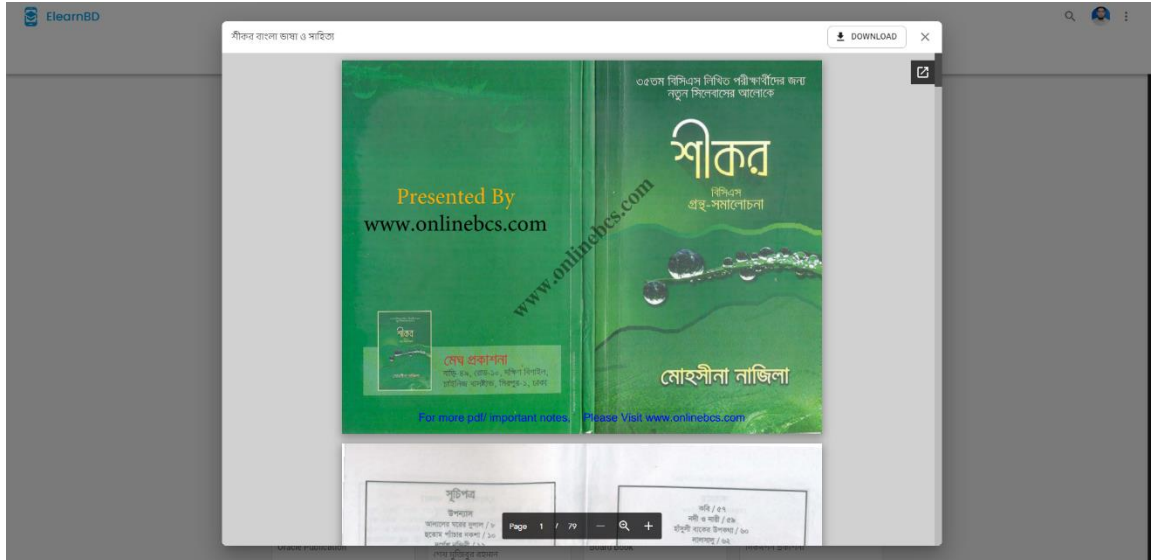


Figure 4.1.15: Pdf Book Page

Question Bank Page: In our question bank page, there will be a huge list of questions as in 4.1.16. We can search or find a specific question by two functions.

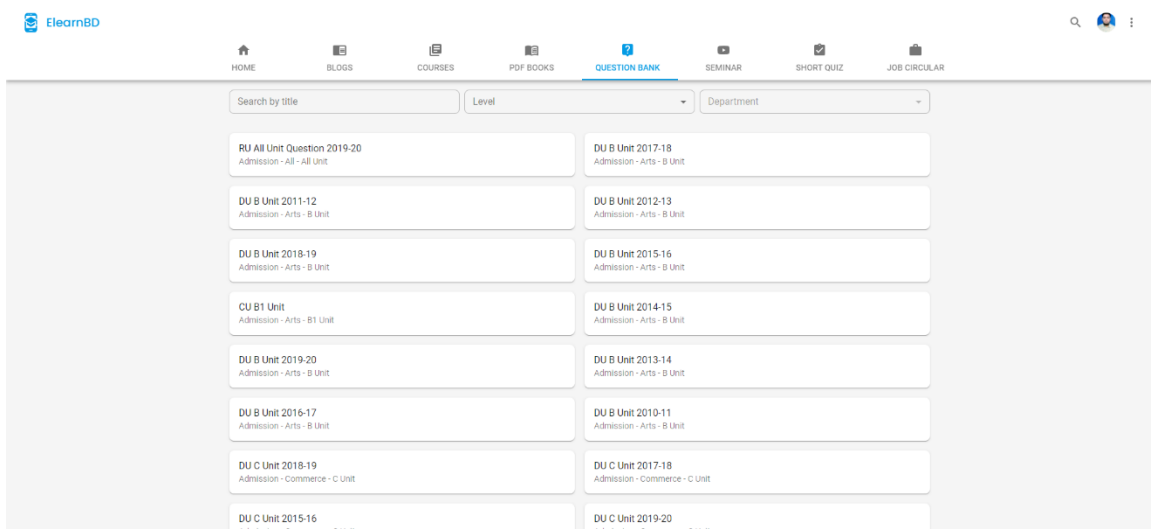


Figure 4.1.16: Question Bank Page

Read or Download Questions: User can read any pdf questions in that form or can easily download just by clicking “DOWNLOAD” button from the upper right side as shown in 4.1.17. Also, the pdf can be zoomed in and out by user if he/she wants.

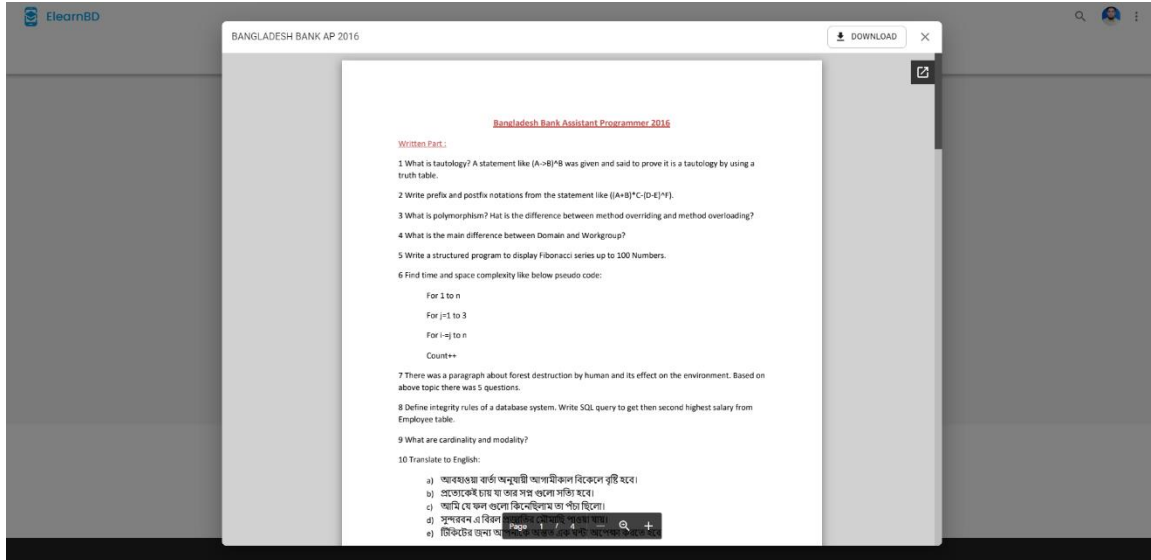


Figure 4.1.17: Read or Download Questions

Seminar Videos Page: In this section as shown in figure no 4.1.18 we have tried to add up some live seminar or webinar for our user that might be for a college admission program or a varsity webinar or a live workshop.

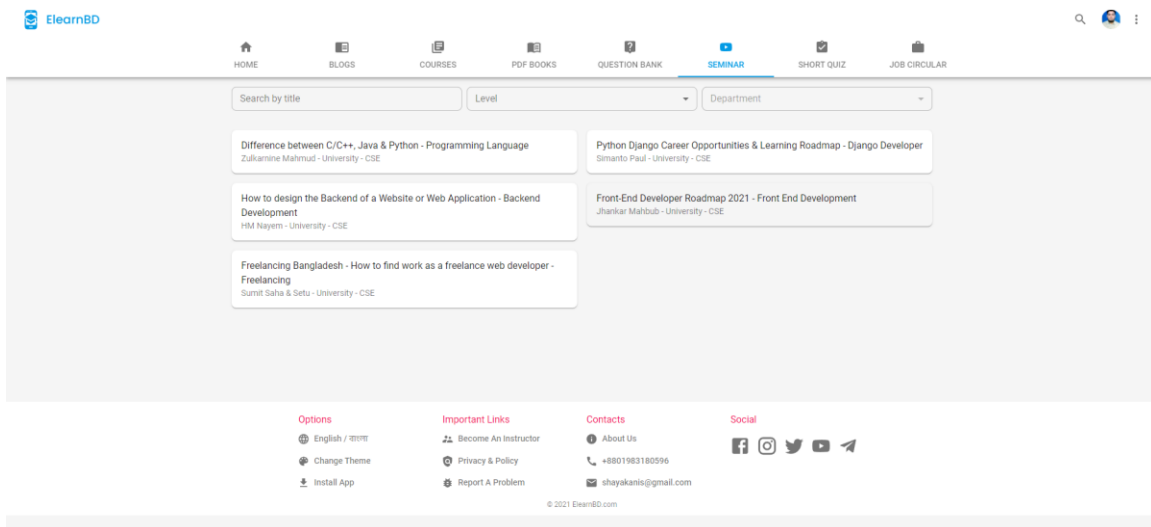


Figure 4.1.18: Seminar Videos Page

Online Quiz Selection Page: In this 4.1.19 figure we can see our quiz page where user can select level, department and subject for a particular quiz then want to participate.

Your score this week : 0

Start new quiz

Level: University

Department: CSE

Subject:

START

Options

English / বাংলা

Change Theme

Install App

Important Links

Become An Instructor

Privacy & Policy

Report A Problem

Contacts

About Us

+8801983180596

shaykani@gmail.com

Social

Facebook, Instagram, Twitter, YouTube, Telegram

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Figure 4.1.19: Online Quiz Selection Page

Online Quiz Answering Page: In this 4.1.20 figure we can see our quiz page where user can choose answer from 4 options.

General Math Quiz-01 (Time : 1 minutes)

Jobs - Govt. Job - General Math

$x+y=17$ এবং $xy=60$ হলে $(x-y)^2 =$ কত ?

☐ A. 7

☐ B. 8

☐ C. 9

☐ D. 10

কৃতের পরিধি ও ঘরের অনুপাত-

☐ A. ৩

☐ B. ৫

☐ C. $\frac{3}{2}$

☐ D. $\frac{5}{2}$

কোন চতুর্ভুজের বিপরীত কোণিক বিপরীত সংযোজন কেবলমাত্র দুটি প্রত্যেকটিতে বনে-

☐ A. বৃত্ত

☐ B. স্বর্গ

☐ C. চন্দ্রা

☐ D. উল্লস

ত্রিভুজের বৃত্তের বাহু সংলগ্ন কোণ -

Time remaining : 0h 0m 54s

Figure 4.1.20: Online Quiz Answering Page

Online Quiz Result Page: In this 4.1.21 figure we can see our quiz page where user can see the result of the quiz.

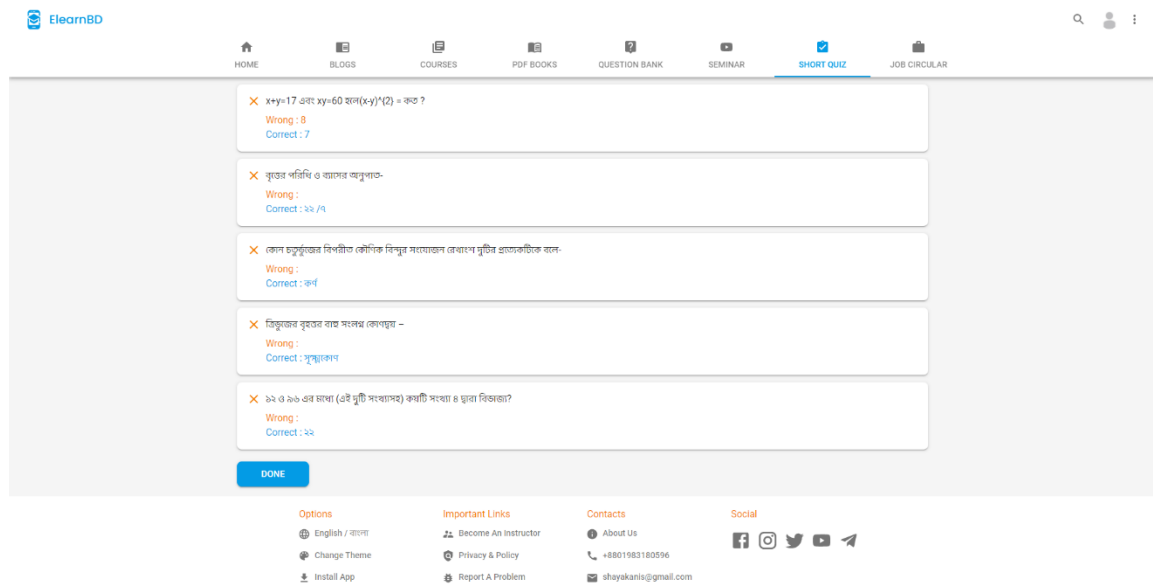


Figure 4.1.21: Online Quiz Result Page

Job Circular Page: User can find our any job searching by the title and also can find out by selecting the department section (like, EEE, CSE, Medical etc). It will show the title of the job circular that is shown in this 4.1.22 figure.

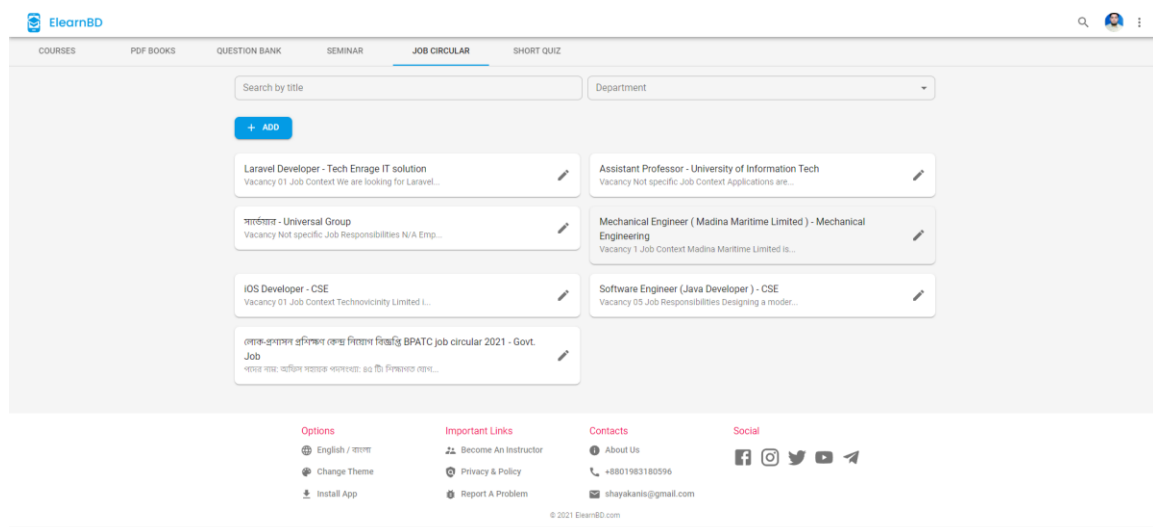


Figure 4.1.22: Job Circular Page

Job Circular Description Page: If any user wants to see any circular in details in this figure no 4.1.23, he/she can see the job vacancy, description, salary, last date of submission and finally the link for online application. It will redirect him/her to the actual job submission form for the further process.

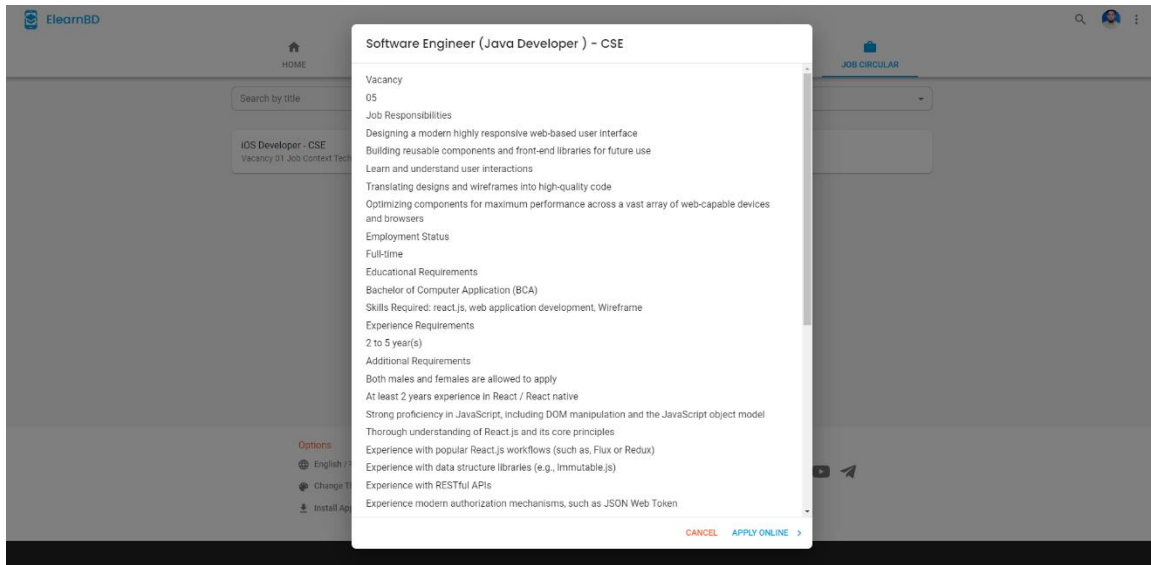


Figure 4.1.23: Job Circular Description Page

Admin Adding Course Page: This figure 4.1.24 shows that how an admin can add courses and course materials (title, description, price, video links etc).

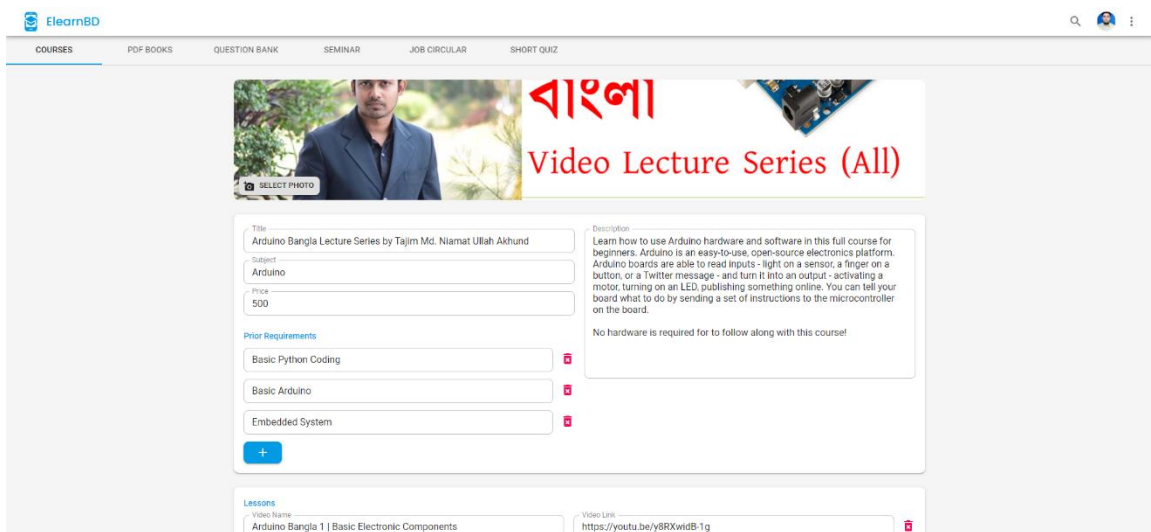


Figure 4.1.24: Admin Adding Course Page

Admin Adding Pdf Books Page: This figure 4.1.25 shows that how an admin can add pdf books of all category.

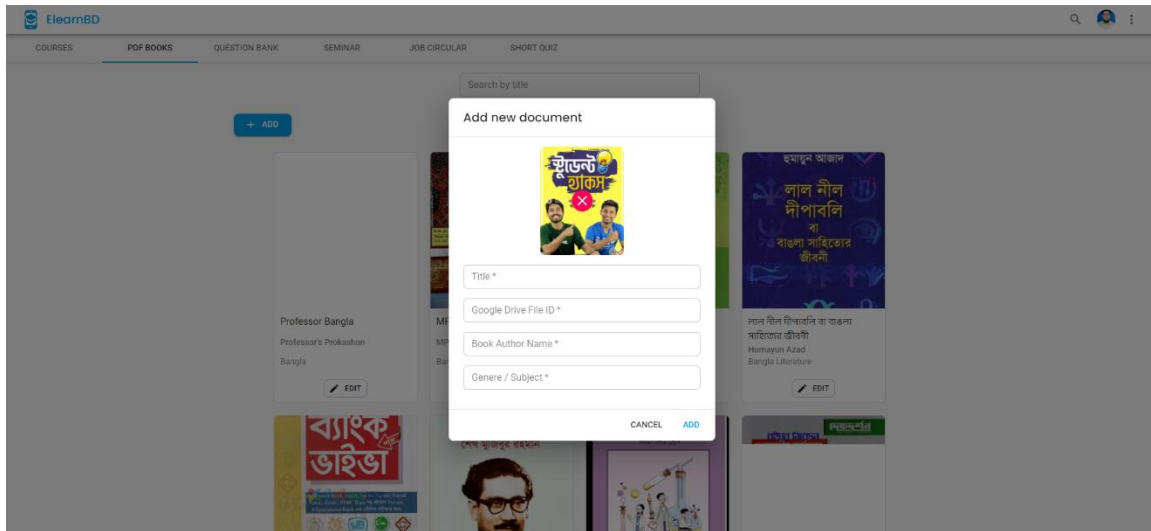


Figure 4.1.25: Admin Adding Pdf Books Page

Admin Adding Pdf Question Page: This figure 4.1.26 shows that how an admin can add pdf questions (title, drive link, level, department and subject).

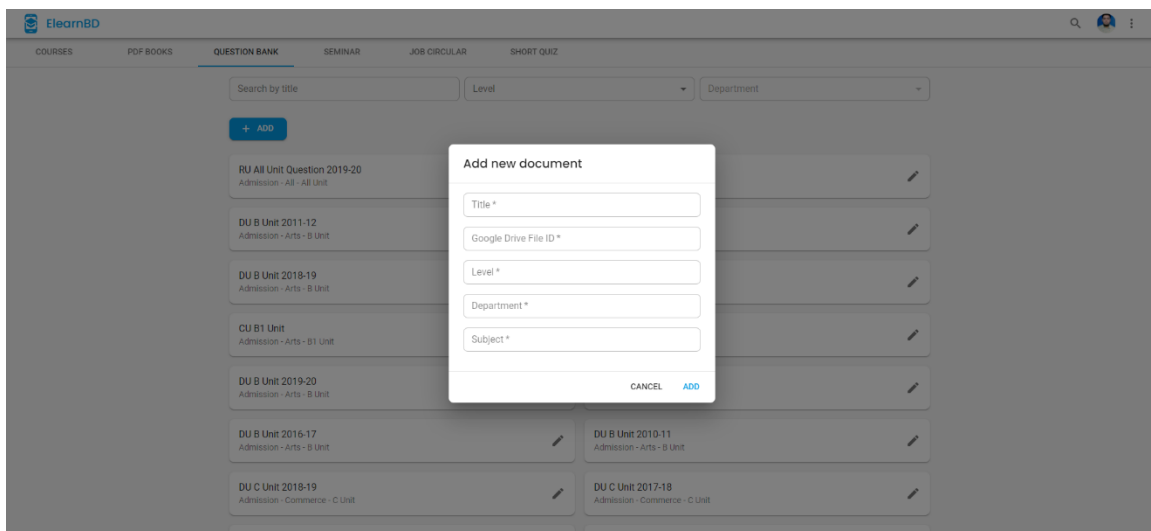
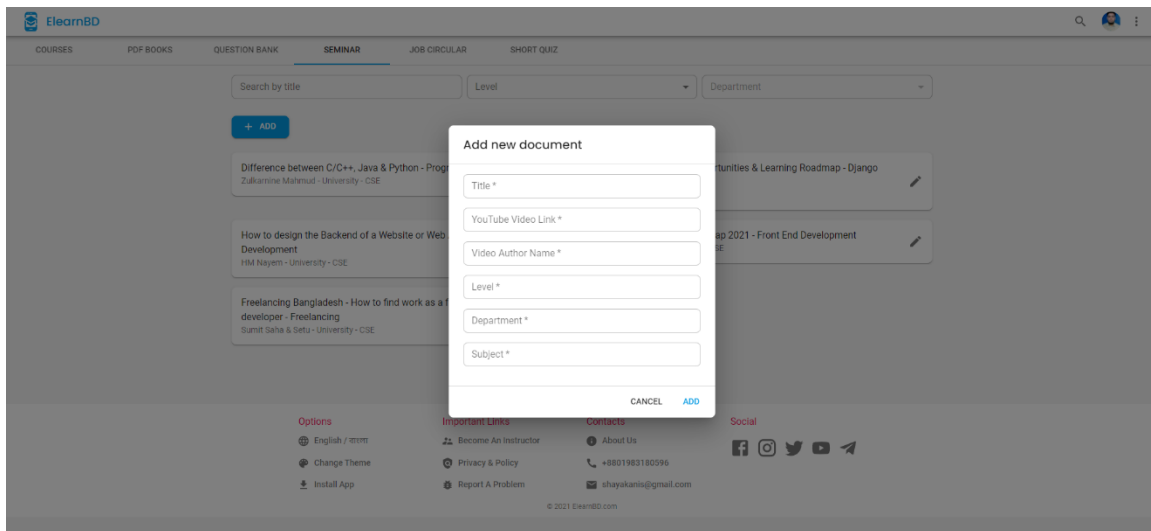


Figure 4.1.26: Admin Adding Pdf Question Page

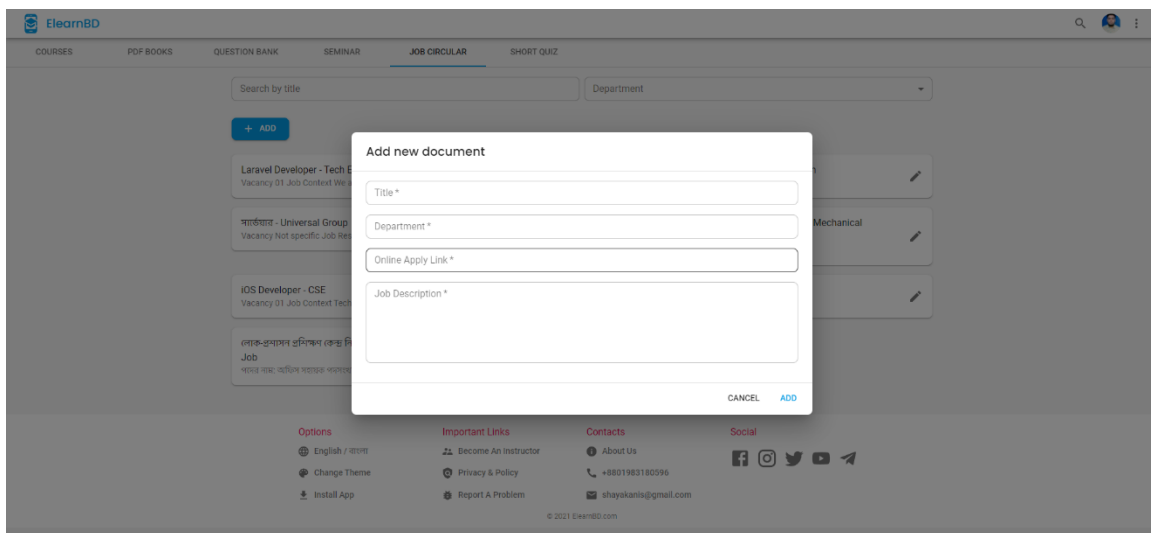
Admin Adding Seminar Video Page: This figure 4.1.27 shows that how an admin can add seminar video (title, YouTube video link, video author name, level and subject).



The screenshot displays the ElearnBD Admin Panel interface. The top navigation bar includes links for COURSES, PDF BOOKS, QUESTION BANK, SEMINAR, JOB CIRCULAR, and SHORT QUIZ. The SEMINAR tab is currently active. A modal window titled "Add new document" is open, featuring the following input fields: Title *, YouTube Video Link *, Video Author Name *, Level *, Department *, and Subject *. The modal also includes "CANCEL" and "ADD" buttons at the bottom. The background shows a list of seminar entries with details like title, author, and level.

Figure 4.1.27: Admin Adding Seminar Video Page

Admin Adding Job Circular Page: This figure 4.1.28 shows that how an admin can add courses and course materials (title, department, online apply link and job description).



The screenshot displays the ElearnBD Admin Panel interface. The top navigation bar includes links for COURSES, PDF BOOKS, QUESTION BANK, SEMINAR, JOB CIRCULAR, and SHORT QUIZ. The JOB CIRCULAR tab is currently active. A modal window titled "Add new document" is open, featuring the following input fields: Title *, Department *, Online Apply Link *, and Job Description *. The modal also includes "CANCEL" and "ADD" buttons at the bottom. The background shows a list of job circular entries with details like title, department, and online apply link.

Figure 4.1.28: Admin Adding Job Circular Page

Admin Adding Online Quiz Page: This figure 4.1.29 shows that how an admin can add online quiz questions (level, department, subject, quiz title, quiz time and questions).

Figure 4.1.29: Admin Adding Online Quiz Page

4.2 Back-end Design

The backend layout is the internal logical part of an internet site. It is likewise referred to as server aspect layout. Backend layout facilitates making an internet site dynamic. It defines how the web website online has to work. The backend designers are referred to as internet developers who offer the internet safety, shape and content material of the web website online. Backend is the most complex and critical part of internet site development. The complete internet primarily based totally device relies upon the backend or server aspect. A backend developer desires to cope with diverse complex phases like authentication, session, records validation, database management, records passing, safety and so on ^[4].

In our project our backend is made by this popular backend server named NodeJS. We know NodeJS is famous for its non-blocking, event-push servers because of its single-threaded nature. It is mainly used for its conventional web sites and for backend API services.

In our project we made a collaboration with MongoDB database which is a noSQL database with postman, which is an open-source platform for testing our request and

responses. We made an API for every section and the backend are shown in some pictures below.

Signup API: This 4.2.1 figure shows the request and responses for the sign up for a user.

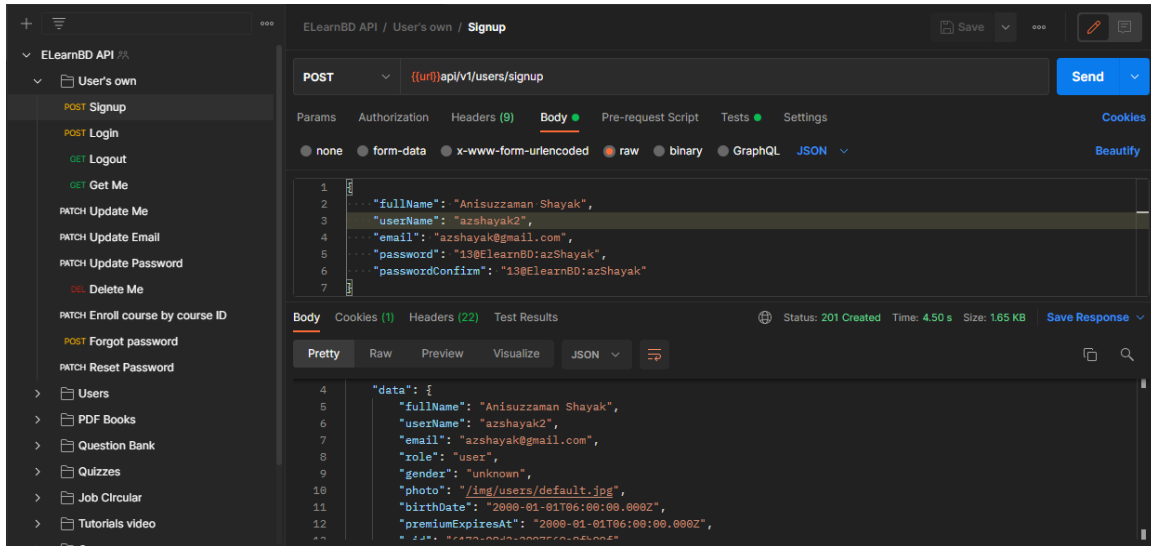


Figure 4.2.1: Signup API

Login API: This 4.2.2 figure shows the request and responses for the login for a user.

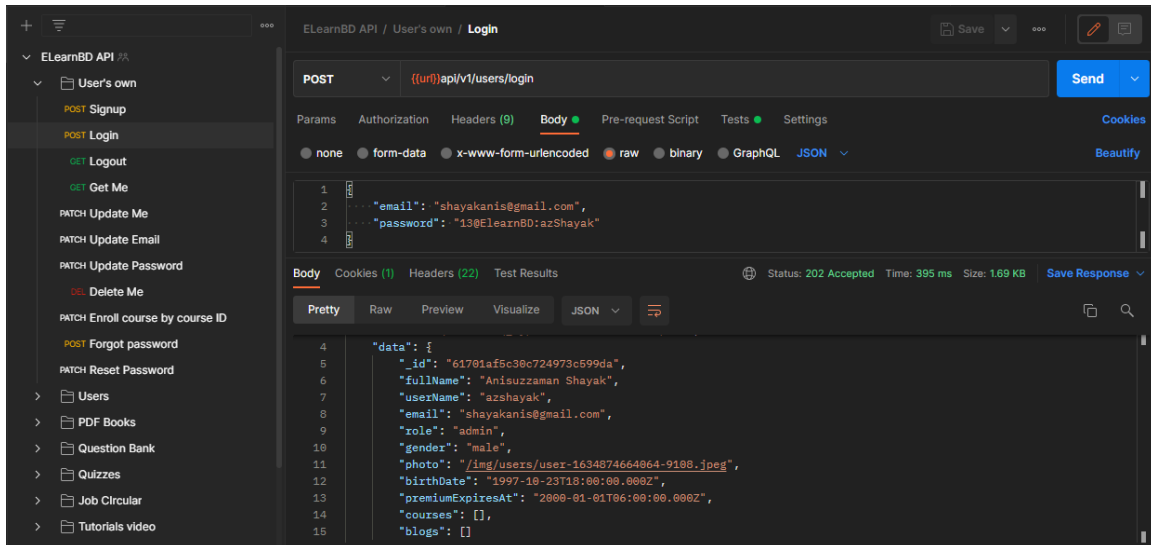


Figure 4.2.2: Login API

Forgot Password API: This 4.2.3 figure shows the reset password system. When a user forgets his/her password this is how they can recover their password.

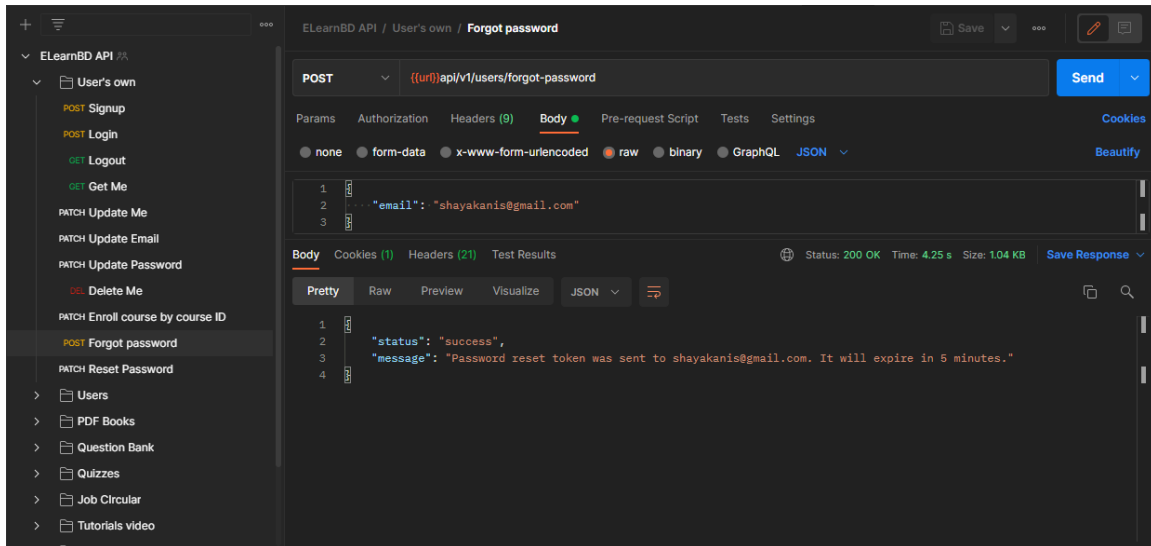


Figure 4.2.3: Reset Password

Forgot Password Mail: This 4.2.4 figure shows when user tries to reset their password, a mail will be provided like this to their specific email.

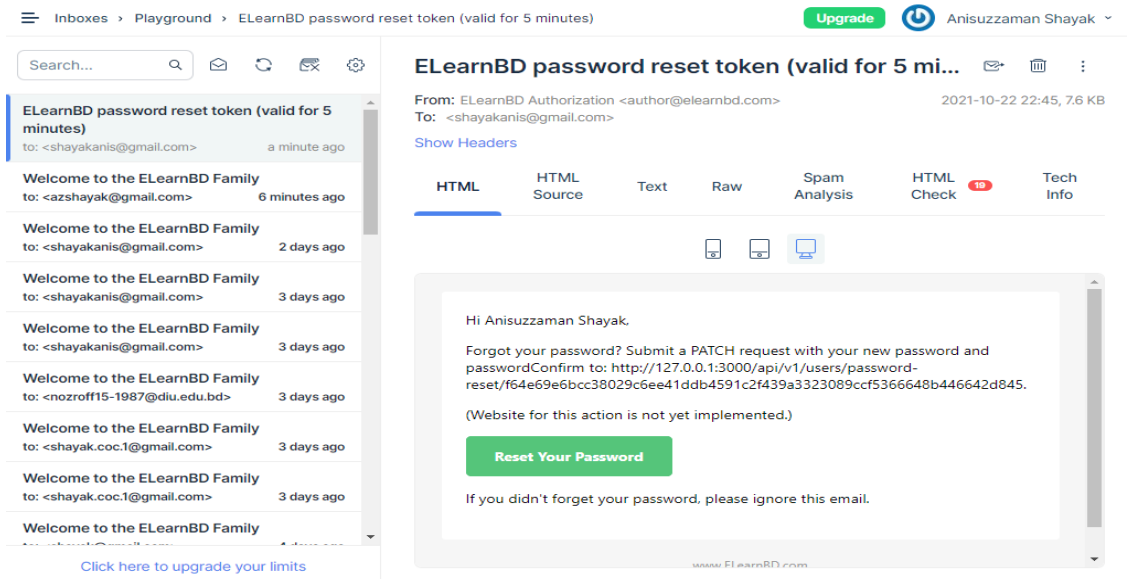


Figure 4.2.4: Forgot Password Mail

User Enroll API: This 4.2.5 figure shows the process when a user enrolls any of our courses in our site.

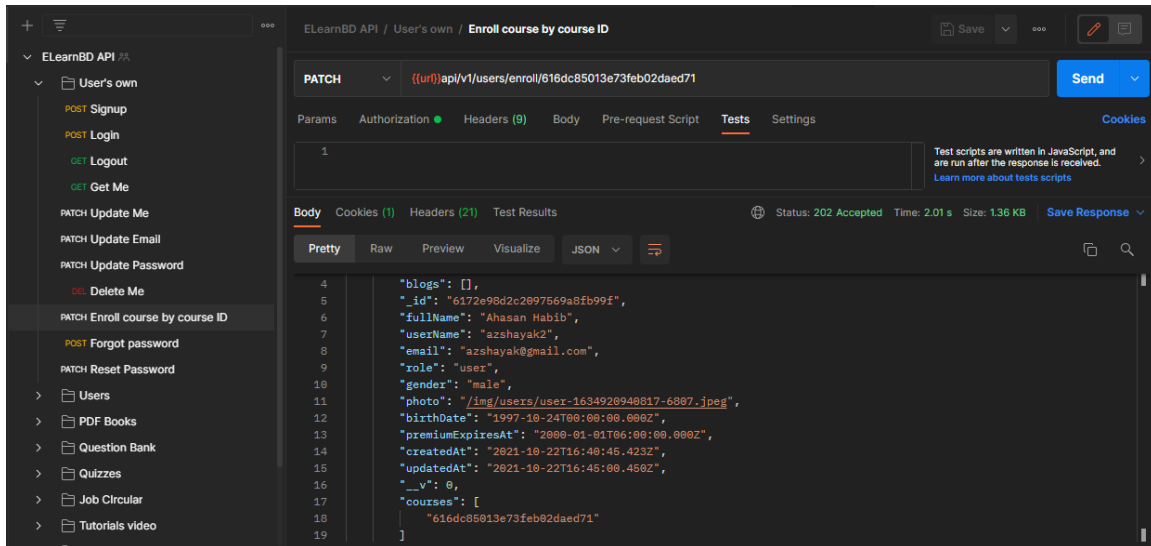


Figure 4.2.5: User Enroll Course

Quiz Add API: This 4.2.6 figure shows admin or moderator can add quiz questions.

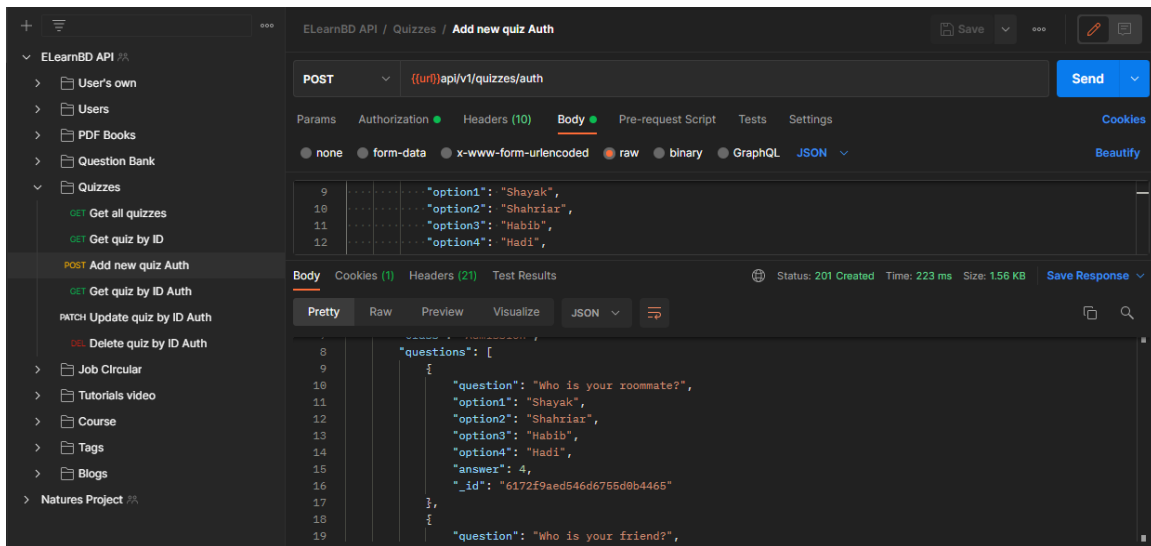


Figure 4.2.6: Quiz Add API

Question Bank API: This 4.2.7 figure shows the process how a user can get all the questions from our database.

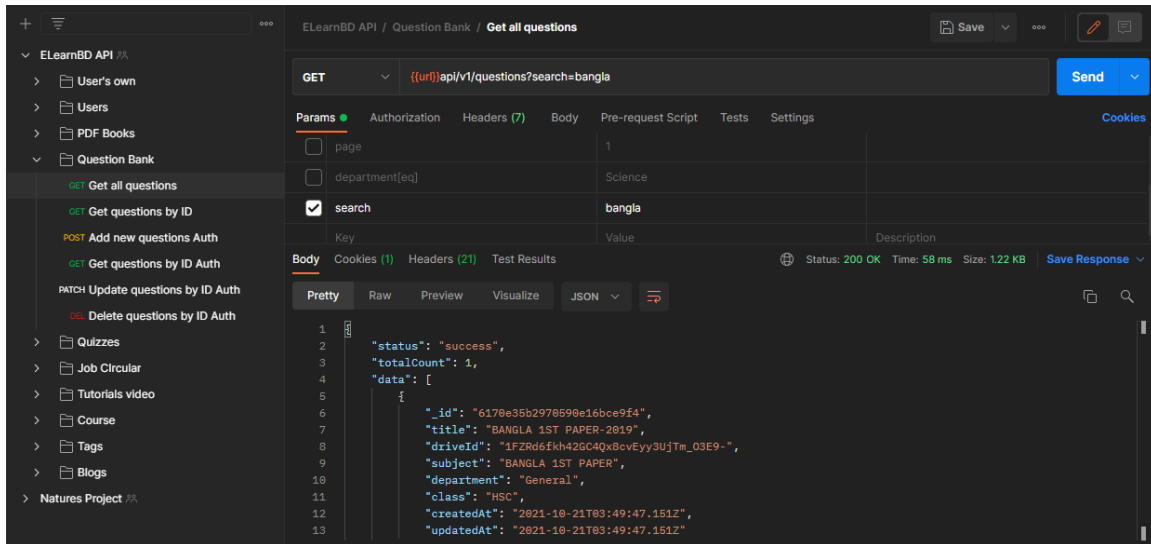


Figure 4.2.7: Question Bank API

Get All Books API: This 4.2.8 figure shows how a user can get all the pdf books from our site.

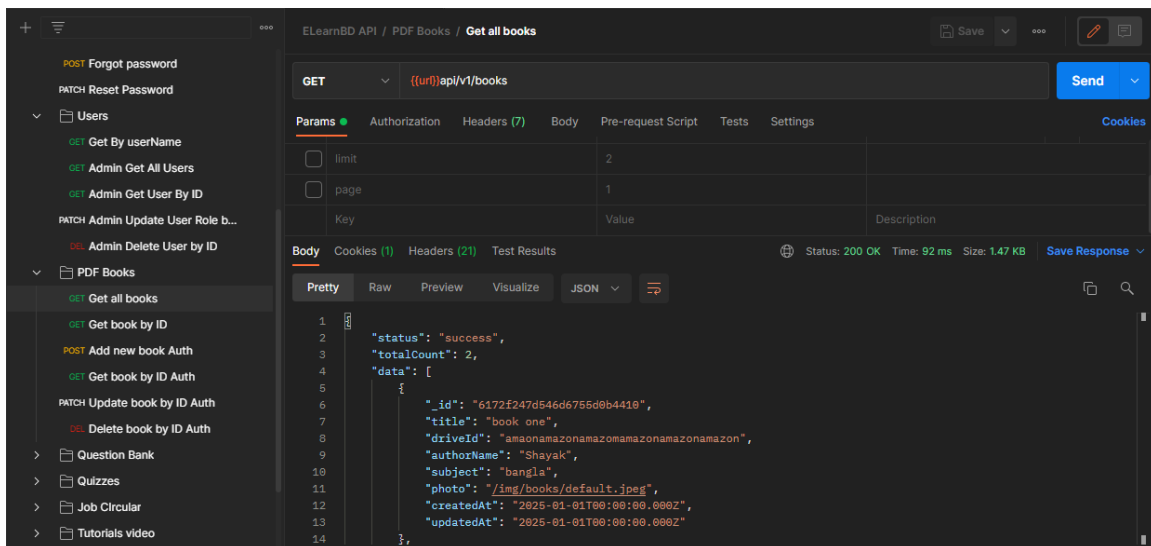


Figure 4.2.8: Get All Books API

Add Job Circular API: This 4.2.9 figure shows the process how add new job circular in our website.

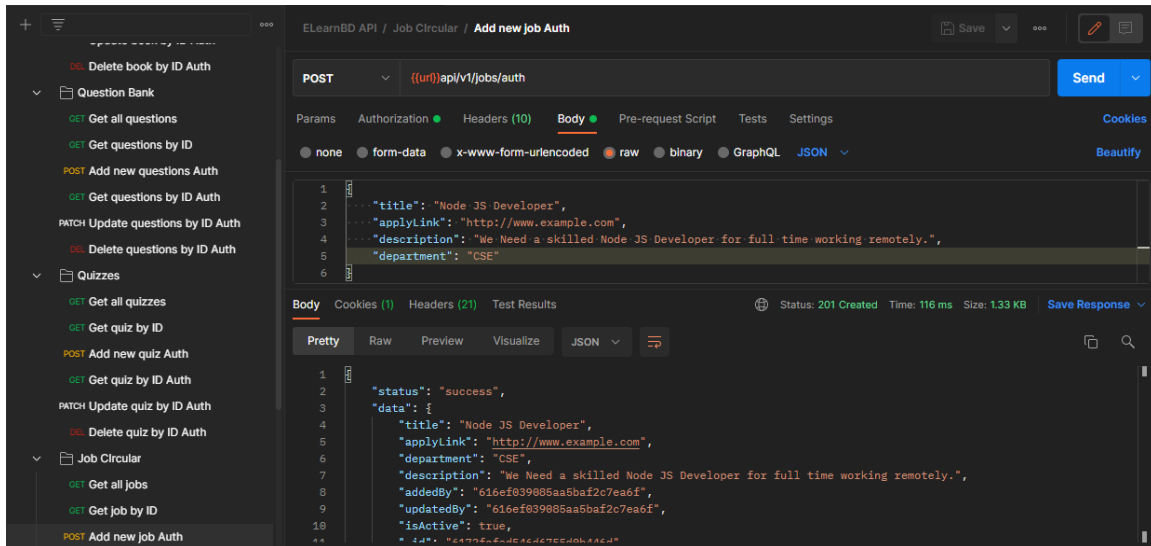


Figure 4.2.9: Job Circular API

Update Password API: This 4.2.10 figure shows how a user can update their password in our site.

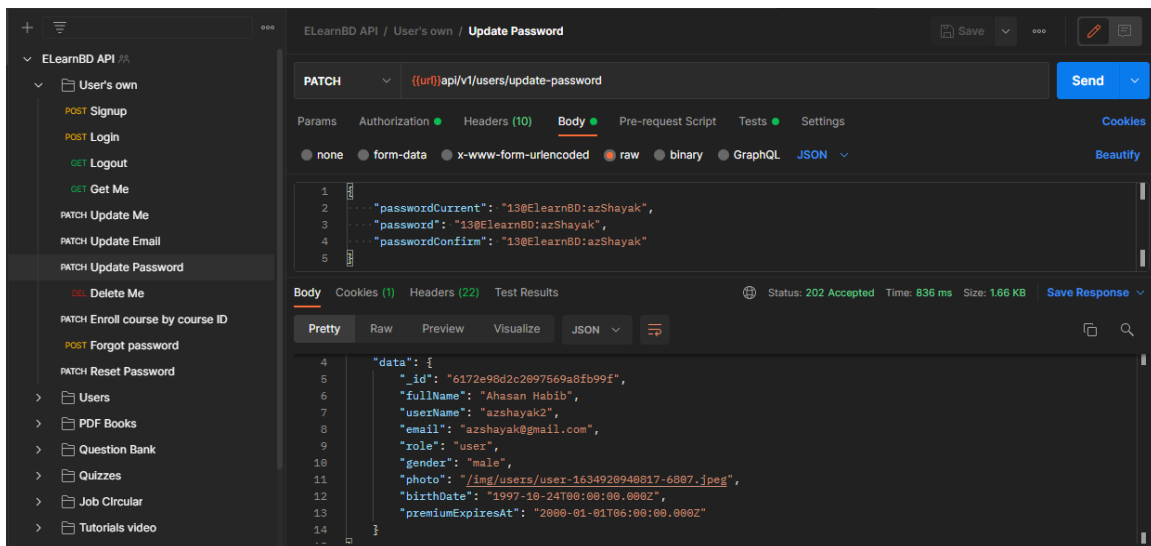
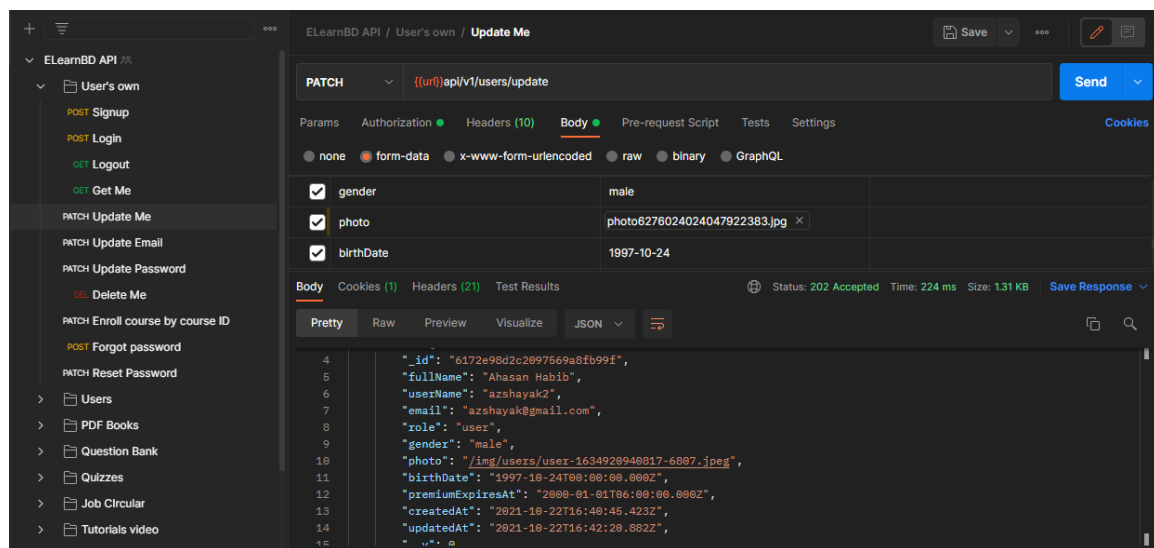


Figure 4.2.10: Update Password API

The screenshot displays the ElearnBD API interface. On the left, a sidebar lists various API endpoints under the 'User's own' category, including 'Update Email'. The main panel shows a PATCH request to the endpoint `((url))api/v1/users/update-email`. The request body is formatted as JSON, containing `"email": "azshayak@gmail.com,"` and `"password": "13@ElearnBD:azShayak"`. The response status is 202 Accepted. The response body is shown in JSON format, containing user details such as `"id": "6172e98d2c2897569a8f1b99f1", "fullName": "Ahasan Habib", "username": "azshayak2", "email": "azshayak@gmail.com", "role": "user", "gender": "male", "photo": "/img/users/user-1634920948817-6987.jpeg", "birthDate": "1997-10-24T00:00:00.000Z", and "premiumExpiresAt": "2000-01-01T06:00:00.000Z".`

Update Profile API: This 4.2.12 figure shows how a user can update their own profile in our site.



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4.3 Interaction Design and User Experience (UX)

As we are made an online learning platform, a web-based application for school level to job level students or users, we tried to make a very smooth user-friendly design where any user can smoothly go through all of our features from our website. Anyone can easily find out all the features or what is he/she looking for by simply searching the specific keyword in our sites. We don't use any dropdown menu; we made our site using tab view to change the view or features in a very easy way. We have made two themes; one is the normal white background and another is dark (black) than can be customized also. Overall, we tried to make an awesome UX design for our users where they can find and learn in a very convenient way.

4.4 Implementation Requirements

- The front-end website is made using React framework, Material-UI library and Axios library.
- The Back-end server is developed using NodeJS, Express library and MongoDB database.
- We have used Postman for the testing our API.
- Validation and verification on the client side is done with modern JavaScript.
- Any invalid data input in form should be warned by various error messages.
- We use no SQL database where query processing is much easier.

CHAPTER 5

IMPLEMENTATION AND TESTING

5.1 Implementation of Database

In our E-Learn Bd website we have implemented MongoDB as our database. MongoDB is known as a document-orientated database that helps to store any kind of data in JSON-like files with dynamic schema. It approaches that it may keep our data without stressing approximately the shape consisting of the number of fields or sorts of fields to keep values. MongoDB files are just like JSON objects.

Our design of the E-Learn Bd system consists of 8 entities, where the specific entities will be our database collection in our mongo dB atlas database and the implementation of E-Learn Bd database schema. Our entities are:

- User
- Course
- Blog
- Quiz
- Tutorials
- Question
- Pdf
- Job

After we've got our exact entities, it's time now to connect them as a relationship of the entities:

- Users (students) can enroll into any courses. (Many to Many)
- Users can take part in a quiz (M to M).
- Users can post any question or queries or any note in our blog (1 to Many).
- Users can watch free tutorial videos. (Many to Many)
- User searches for a job circular (1 to Many).
- User searcher for pdf books (1 to Many).
- User searcher for previous years question bank (1 to Many).

5.2 Implementation of Frontend Design

- Authenticated user profile: There will be a registration process and the capacity to log in as a registered user with a completely unique profile that may be edited.
- Dashboard: There will be a dashboard page that shows different features that we are providing to the users, instructors.
- Filtering: Must needed tool for choosing a convenient search method (manual, keywords, categories).
- Course page: When any user will go to the course page, course description, information about a teacher, a list of learning materials, videos, price, elements should be displayed there. And if the course is paid then the user needs to pay through online payment gateway sslcommerz. Then he/she will be redirected to the main video section.
- Editing page: Instructor has the access to edit their course materials (add, delete, update) from the admin dashboard.
- Notifications: There will be a system of reminders for users about new courses, updates on diverse activities.
- Admin panel: An admin dashboard tool for site administration, including interaction with courses, quizzes, books, tutorials etc.

5.3 Testing Implementations

Test results and reports are the vital part of an application to justify if the application is ready to launch or not. This can be obtained through evaluating all the features. We need to run various types of testing to check the functionally works exactly as we expected.

There are different types of testing including:

- Functionality testing
- Usability Testing
- Web UI Testing
- Compatibility Testing
- Performance Testing
- Security Testing

After passing through these tests successfully we can ensure our application to launch. We have tested these via different phones, tablets and pc. At the end, we carried out the results and the benefits of usability of testing:

- Best UI for interaction.
- Easy to use by the users.
- System is easy to use and search.
- Application is more readily accepted by users.
- Good quality of application throughout the market.

We have tested our web application several time from the time when we started to design our front-end. We tested our web application more than 30 times on different devices like mobile, tab, computers creating different user account to make sure that it will give us error free performance. Though we found some bug after every testing and worked on it to solve the problem and finally we have completed our project.

5.3.1 Login Test Case

Table 5.3.1: Login Test Case

Conditions	Email	F	T	F	T
	Password	F	F	T	T
Actions	Result	Error: Please enter valid email and password	Error: Please enter valid email and password	Error: Please enter valid email and password	Successfully Logged in
	Expected Result	Error: Please enter valid email and password	Error: Please enter valid email and password	Error: Please enter valid email and password	Successfully Logged in

5.3.2 Change Password Test Case

Table 5.3.2: Change Password Test Case

Conditions	Old Password	F	T	F	T
	New Password	F	F	T	T
Actions	Result	Error: Please enter valid password	Error: Please enter valid password	Error: Please enter valid password	Password Changed
	Expected Result	Error: Please enter valid password	Error: Please enter valid password	Error: Please enter valid password	Password Changed

5.3.3 Test Case Evaluation

Table 5.3.3: Test Case Evaluation

Test Case	Test Input	Expected Outcome	Obtained Outcome	Pass/Fail	Tested on
1.Registration	Valid email, username, password	Successfully registered	Successfully registered	Pass	25-10-2021
2.Login	Login via mobile, pc, tab	Successfully login	Successfully login	Pass	25-10-2021
3.Password	Incorrect password or empty field	Warn the incorrect password or field is empty	Show warning	Pass	25-10-2021
4.Profile settings	View profile, update profile information	Show and update profile information	Show and update information successfully	Pass	25-10-2021
5.Course enroll	Enroll free course, enroll after pay	Successfully Enrolled	Successfully Enrolled	Pass	25-10-2021
6. Blog post	Add title, description and image	Blog posted successfully	Blog posted successfully	Pass	25-10-2021
7.Comment, Like & Dislike	Comment to any post, like or dislike	Comment, like, dislike added	Comment, like, dislike added	Pass	25-10-2021
8.Give Quiz	Select subject and start quiz	Answer submitted	Show quiz marks	Pass	25-10-2021
9.Search	Search any keyword in search bar	Show the searched output	Show the searched output	Pass	25-10-2021
10.Logout	Click logout button	Logout from the user account	Logged out successfully	Pass	25-10-2021

5.4 Test Results and Reports

Test results and reports are the vital part of an application to justify if the application is ready to launch or not. This can be obtained through evaluating all the features. We need to run various types of testing to check the functionally works exactly as we expected.

There are different types of testing including:

- Functionality, Regression & Security
- Performance & Scalability
- Usability & System interoperability
- Localization & Disaster recovery
- Installation/ upgrade.

After passing through these tests successfully we can ensure our application to launch. We have tested these via different phones, tablets and pc. At the end, we carried out the results and the benefits of usability of testing:

- Best UI for interaction.
- Easy to use by the users.
- System is easy to use and search.
- Application is more readily accepted by users.
- Good quality of application throughout the market.

CHAPTER 6

Impact on Society, Environment and Sustainability

6.1 Impact on Society

In these days, online learning is recognized for the benefit and versatility of permitting all stage of students to finish their coursework or preparation on their very own schedule. Our learning platform will have some good impact on our society. If we make some points that could impact our society through this learning platform these can be as follows:

- Online learning platform are making courses or videos interactive in a various way like implementing virtual lab or projects for college or varsity to creating animated videos of the course material.
- Instead of having the class discussion loud in physical class on campus, now students are engaging in virtual class discussion through our learning platform.
- By online learning platform, one doesn't need to go outside for classes or for buying any books or searching any study materials. They just search their desire courses or pdf books or question bank through our websites and easily can buy or download it.
- One can easily test their level or knowledge on a particular subject by giving online quizzes honestly. Thus he/she will get used to face the online exam effect that might be useful for next time.
- Student might also additionally want to regulate to the different format of an online learning platform. The students can not only get success by the hard work & dedication but also, they can find out the social interaction they are looking for.

6.2 Impact on Environment

Since COVID-19 pandemic, the worlds started to think about the online learning and from then and now the term known as "Online Learning" has become the topics for the learners to continue study virtually. If we talk about the pros & cons to online learning platform,

there must be the environmental benefits along with well documented and should be considered as our educational landscape evolves.

Some important environmental benefits of online learning can be pointed as below:

- Online learning reduces pollution from the environment and emissions from transportation. A study has proven that online learning lessens up CO2 emission up to 148 pounds by an average each semester from our environment.
- It reduces energy consumption. We know educational institutions need a lot of electricity for using technology, lighting, cooling systems. So, reducing energy consumption can save an institution money while decreasing its carbon footprint.
- It decreases paper waste and save trees. As online learning mainly depends on digital contents like videos, pdfs, virtual exams and the textbooks and assignments are also completed electronically. Thus, less paper is being used and more trees are saved.
- Online learning platform saves natural resources such as water. Though a student will use water during learning virtually. But it is a lot less than a commercial building such as a college or varsity or a coaching spot.
- It reduces plastic and food waste. The extra use of plastic and food can be decrease if one stays at home rather than goes to school or college. This is how it can keep our environment clean as well.

6.3 Ethical Aspects

E-Learning environments require guidelines balancing one-of-a-kind expectancies of contributors and thinking about how the customers understand ethics at some stage in online studying. The emergence of the data age has modified the arena forever. The Internet and frantic increase in conversation technology have had one of the most profound and seen consequences of any invention in contemporary-day history ^[5]. Web technology has modified how we communicate, how we make purchases, and the way we research and teach ourselves. There is a sturdy perception within the schooling network that the conventional teaching-studying fashions do now no longer scale to satisfy the brand new demanding situations created with the aid of using rising technology. E-Learning presents

all of the essential gear to satisfy the ones demanding situations. E-Learning is to be had to anyone, everywhere withinside the world; all a learner desires is to get entry to a Web browser. E-Learning is defined as online shipping of data, conversation, schooling, and training. E-Learning is likewise an amazing instance of the different platform of studying over the Internet ^[6]. While the worldwide boom withinside the use of the Internet has furnished several advantages to our schools, colleges and universities, it has additionally prolonged conventional issues of cheating, plagiarism, and violation of privacy, and spying into cyberspace.

6.4 Sustainability Plan

Development of a regular and self-controlled e-learning platform: <http://elearnbd.com>. It is led with the aid of using our technical team. The platform is suitable for the scope and desires of this proposal. It is appropriate for exceptional styles of devices (mobile, tablet, laptop, and desktop). It can host more than 1000+ students at the same time. It operates 24/7. It is likewise designed and evolved in a manner that scholars can get admission to gear like videos, webinars, downloadable documents-booklets, exercises, and quizzes. Students can engage via a forum. It permits the improvement of a getting to know network of a few of the trainees.

CHAPTER 7

Conclusion & Future Scope

7.1 Discussion and Conclusion

The examiner exhibits that e-learning is powerful for college students without regard to their background. But studying effectiveness may also range from college students to college students. The examination highlights a few variables to don't forget the effectiveness of e-studying. The life of a few variables virtually seem that e-studying is useful to a few college students and simplest for the one variables e-studying may also now no longer be similarly useful to others. The examination considers a few restrained quantities of variables. Further studies can be persevered via means of overlaying an extensive variety of variables. The final results of the examination shows that scholars said e-studying is much less time consuming, clean to apply and fee friendly. It didn't show the volume to which e-studying is time and fee friendly ^[19]. Another essential trouble is that the self-efficacy of college students is likewise very essential to get privileges from e-studying. The college students having a true understanding of the era is able to seize the advantages than individuals who don't have. But this project now no longer doesn't forget this trouble. More studies may be performed to examine the effect of a student's cap potential and their notion of the effective use of e-studying.

7.2 Scope for Further Developments

We faced many challenges during the development process of this project. Thankfully we were able to overcome most of the challenges, but we still have some issues that we could not fix due to limited time constraints, technological difficulties, lack of funding and lack of experience in this field. Some of the limitations are listed below:

- We could not implement HTTPS cookies on our website since we did not purchase an SSL certificate.
- We decided not to show ads on our website because showing ads degrade the user experience. As a result, we lost a significant part of our revenue.

- We decided not to add a drop-down menu for filtering subjects as we had for levels and departments because it is hard to keep track of so many subjects for each department and managing the state for this proved to be very difficult.
- We found some problems with the MongoDB database's text indexing but we did not find any solution. This problem sometimes results in inaccurate search results.
- We had been working on this project for six months. Before this none of us had experience in working on such large projects. We failed to complete some features in time because of a lack of knowledge and planning.

There are many scopes for future in our project like we need to add several things to make this project more useful and handier, some of them are given below:

- We will a user ranking system based on user's monthly activities. We will assign some points to certain activities in this website. At the end of every month, we will add up all the points and release the scores in leaderboard. This feature will inspire the users to engage more in study activities. The users will also be able to compare their past month with their current month points, so, they will be able to improve themselves gradually.
- We have a plan to add some cool and good themes in our project so that our users get more satisfaction from using it.
- We will add some features like our users will collect any file or submitted paper from their previous courses they complete.
- We will add a regular attendance system so the users will make sure their concentration throughout the running courses.
- We will add some weekly tasks for users so that they can evaluate their capabilities.

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