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E-Tuition Class System

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E-Tuition Class System

A thesis submitted for the Degree of Master of Information Technology

Supun Wickramasekara

University of Colombo School of Computing

2021

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Declaration

The thesis is my original work and has not been submitted previously for a degree at this or any other university/institute. To the best of my knowledge, it does not contain any material published or written by another person, except as acknowledged in the text.

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This is to certify that this thesis is based on the work of Mr. Supun Wickramasekara. under my supervision. The thesis has been prepared according to the format stipulated and is of acceptable standards.

Certified by: Supervisor Name: M. G. N. A. S. Fernando

______________________ Signature: Date: 29-11-2021

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Abstract

COVID-19 pandemic has changed the way of learning in higher education. Teaching, and learning activities that are usually carried out with face-to-face meetings have turned into virtual meetings in various online learning applications. This project aims to analyze both student and tutor’s essays in the form of perspectives or responses about the challenges of online learning during the COVID-19 pandemic. This project collected fifteen students and tutors as samples in the Fundamentals of Education I course who were actively involved in online learning activities. Online learning provides various instructions led by the tutors. Instructions can be synchronous (communication where participants interact in the same time space as video conferencing, zoom, google meet, and WebEx) or asynchronous (time-separated communication such as e-mail, google form, streaming video content, posting lecture notes and social media platforms). This project used a qualitative approach. The researcher then collecting, reading and highlights each student's and tutor’s response that is considered relevant for analysis. This project has shown so many responses about the challenges experienced by the students while studying online,

The ultimate goal of the E tuition class system is to allow tutors to conduct their classes without having to pay a third-party authority and to pass this benefit on to the students. Tutors must pay more than 25% of their income to 3rd party business vendors in order to host their classes and provide and distribute lecture notes to students. Tutors are unable to host their classes at 3rd party vendors due to the pandemic, but they must still pay a large sum of money to host their classes within the 3rd party vendors Learning Management System.

The best way to solve that problem is to enroll in an e-tuition class. Tutors can host their classes, create timetables, receive third-party payments from students directly to their accounts instead of paying third-party vendors, and provide that benefit to students. Students can also attend multiple tutors' classes without clashing with each other, and they can subscribe to relevant tutors' online and offline classes. Web technologies such as JS, PHP, and HTML are used to create the application.

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Acknowledgment

First and foremost, I would like to thank the academic/non-academic staff of the University of Colombo School of Computing for the support and guidance provided throughout the Master's Program. And also the Lecture panel of the Master's program of UCSC for guidance and support.

Special thanks go to the supervisor Dr M. G. N. A. S. Fernando, for the advice and guidance given throughout the project. I am also really thankful for the help and guidance provided by project coordinator Miss. H. N. D. Thilini.

Last but not least, I would like to thank all my family members and friends who were with me throughout this project, giving me strength and never letting me go without advice and support whenever required.

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List of Acronym

UI - User Interface

FE - Front End

JS - JavaScript

CSS - Cascading Style Sheet

HTML - Hypertext Markup Language

iOS - iPhone Operating System (Apple)

PC - Personal Computer

SDLC - Software Development Life Cycle

HTTP - Hypertext Transfer Protocol

PHP - Hypertext Preprocessor

SQL - Structured Query Language

MIS - Management Information System

IDE - Integrated development environment

IPG: Internet Payment Gateway

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1. CHAPTER 1: INTRODUCTION

1.1 Chapter Overview

The objective of this chapter is to introduce the project topic. It commences with an overview of current trends in Distanced- Tuition Education

Since the introduction of COVID 19 in everyday human life, there has been a dramatic change in the way activities are performed. The educational sector has not escaped this phenomenon. Through the use of Internet and related technologies, a wide range of e-learning systems has been drastically developed. According to Alkhattabi, Neagu and Cullen (2010), trend of improved the teaching and learning activities in higher learning institutions, especially in developed countries were already had their processes and people had already adjusted to absorbed and the tutors adjusted to articulate the subject relevant knowledge through virtual environment. But with and after this pandemic occurs third world countries those who had very limited tele-communication facilities also had to adjusted. Researchers like Hansson et al. and Alexander, for example, have elucidated and implemented the role of information and communication technology (ICT) in improving educational quality. There are several factors that can contribute to successful implementation of computer-supported systems for teaching and learning, countries like Sri Lanka, Cambodia has necessary knowledge regarding the subject.

This study aims to clarify the concept of the e marketing plus e-learning system for tutors and provide some insight into a topic area which tutors in the field and students are likely to encounter, and maybe even must embrace, if their education potential is to remain successful and competitive in this new knowledge economy which has created after the COVID Pandemic.

1.2 Motivation and Project Background

The academic community is increasingly adopting an e-tutoring system due to the numerous advantages of learning anywhere, at any time. It appears to be most commonly used for web-based instruction, allowing students to access online courses via the internet. One possible reason for the failure is that simply posting lecture notes on the internet does not constitute training [1]. While countries' COVID-19 infection rates vary, more than 1.2 billion children in 186 countries are currently affected by school closures as a result of the pandemic.

With the dramatic shift away from the school in many parts of the globe, some are beginning to wonder if online learning adoption will continue post-pandemic, and how such a shift would affect the global e education marketplace.

It is not safe to conduct tuition classes in a prevailing country situation related to the covid-19 pandemic and because of that there is a huge market money rotation process has been blocked due to,

- Students cannot visit physically tuition classes since there are government protocols to be followed and hence tutors cannot conduct the classes.
- Students cannot have a consultation from a tutor since there are no classes to attend.
- Since most of the tutors are doing tuition as their full-time work, lack of wiliness to tutor on online platforms such as YouTube live, Facebook live, etc.
- Since there is a lack of money in hand with tutor social group more than in general society. it will affect the country’s economy in many ways.

Though out these prementioned topics the other major concerns are how to distribute the knowledge among the students and how to collect money as tuition fees. Since this is a pandemic situation, we cannot guarantee that weather is it possible to conduct tuition physically ever. Doing fund transfers to the tutor and take lessons is a very hectic way for both the parties

Due to this pandemic situation tutors are one of the most impacted group which were already in this eco system, especially the tutor those who were conducted their classes in places like Rotary, Sakya etc. Right now, those classes will give the tutors the privileges to conduct the classes by using their LMS system, but still they have granting so much money to conduct inside of their LMS system.

Small group class conducted tutors are suffering the most with this pandemic, because they use to conduct these classes at his or her places, now due to the pandemic situation they cannot do this according to the government restrictions, hence they are unable to conduct class properly, because even though they are conducting lectures through the google meetings, skype, etc, they cannot conduct a class properly. Conducting a class doesn’t mean that hosting a class virtually only, there are lots of back process there. Tutor has to distribute his or her lecture notes prior to the scheduled time, he /she need to arrange classes without clashing among which scheduled classes, student must have an ability to submit assignments and tutor must have an ability to received them, tutors need to collect their money at the right time and student can take other tutor’s classes without clashing them.

1.3 Problem Justification

Due to the pandemic situation tutors cannot visited to their classes or an individual home visits, Therefore the tutor related eco system and the tutor’s economy has devastated dropped. As effect of that tutor carrier was significantly dropped past couple of months, Hence the tuition market has slight rise of monopoly among the remaining tutors and the tutors those who can afford to have a e-learning system. Hence effect has directly swallowed the student’s economy and resource of knowledge. As an alternation tutor have started to do online classes by using many more freeware around the internet, but are unable to provide the proper solutions to the difficulties that they have faced when receiving payments, submitting assignments etc. Hence the proposed solution facilitates most of the encounter difficulties when conducting an online classis.

1.4 Aim and Objectives

1.4.1 Aim

The ***aim*** is to design, develop, an Online e-tuition system to facilitate tutors, where tutors can teach students for a fair price since there is zero cost encountered from the tutors’ side to enroll with the system. This is basically built as a community service.

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1.4.2 Objectivities

- Identify the current drawbacks in online system
- Facilitate an open environment to tutors in order to promote their self and conduct the classes without handover commission to any 3rd party vendor
- Maintain a better way to coordinate classes without clashes
- Facilitate to provide the link of host live and video-based classes (tutors)
- Introduce an online payment mechanism for students
- Introduce attendance, Assignment, and home governance to the tutors
- Maintain a user-friendly simple UI/UX for both students and tutors
- Easy report generation for both tutor and students (payments, attendance)
- Easy upload of assignments and revert back with the corrected paper and marks

1.4.3 Procedure

Number of tutors and students are selected from different areas and consideration is to collect data through questionnaires and online verbal interviews, entire subject mattered- population is not to be studied, only a sample representing the population is to be studied. Collected data are analyzed based on the majority of the responses gathered. The data collected from the questionnaires are computed to get the final output of responses.

Individual tutors were selected for this project by evaluating their student capacities and feasibility of implementing new system and usefulness of this kind of system to the society. Web based e- tutoring system helps tutors to promote and conduct classes without clashes and paying extra money to the 3rd element and as result of that they can reduce payments from students end, both students and tutors can have simple user-friendly E-tutoring system proposed as a solution of many and more difficulties faced in students and tutors in these pandemic days . The idea behind this project is eliminating difficulties of using most of the e - tutoring system offered by tuition classes these days by providing 3rd party-less e tutoring system as a community service.

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1.4.4 Proposed Solution

The proposed solution is an online tutoring system that greatly simplifies the distributing tutor's notes, conducting live classes, and process payments transparently for both the student and the tutor. When the student to the site, enrolled classes were presented interactively, and students can check all pre- visited or non-visited lectures depend on their subscription type. If a student wants to have a separate session with a separate tutor-student can select a lecture based on their subject-wise. Students can rate their lectures and their tutors, and those rates will be affected the tutors' credibility within the system. From there students can rate their tutors depends on satisfaction. This system also reduces the tutor's workload significantly as well as the student's end, because the entire tuition payment process is automated. If a student enrolls in an online or offline class, and makes a payment on the website, the information is entered into a database and retrieved in real time by a web-based application on the Tutors' end. All tutors and tutoring lessons will be listed in this web-based solution, along with their corresponding options and details, in a concise and easy-to-read manner. Students can be visited the lecture and attendance can be checked by tutors if needed. Tutors can list down homework or assignments depends their subject and students can submit them prior to the deadlines which were set up by the tutors. On the same note, tutors can check the completed assignments and mark them online, and reveled marks to the students

The system allows cashless by using the pay here internet payment gateway which will helps students to perform their card transaction many Students can set up a credit limit on a monthly basis. Student can do the payments via online transaction and once proceeded they can upload the payment slip into the system. If students want to check out the payment history student can do it via the payment history. The same concept is made out to the tutors where they can check their received payments from the students as well.

Throughout this, it will ensure both student and tutors health within this pandemic situation and increases the cost-effectiveness and productivity of the students and tutors.

Note that due to the online payment mechanism there will be single admin module was developed it will be only accessible to the admin only, at the end of the month the admin can split the transaction among the tutors by cross checking with payment receipts. Note that this was not in the original plan but once understanding the how actually payment gateway works, direct card transfers from student to tutor is unable to performed

As per the agreed scope project is provided functional web-based site which is full fill expected requirement and this project involves following items.

- Frontend and backend development on E tuition system with following items
- Login page and signup page for both tutors and students
- User profile page where user can fill necessary criteria in order to proceed with the system
- Dashboard to tutor to check the tutor already created and published models
- Module Management system: where tutor can create modules and sub modules for both online and offline classes without clashing them
- Subscribe management: Where tutor can accept payments
- Class Dashboard: Where students can check modules published by tutors and subscribed those modules and procced with either manual or online transactions. And check subscribed classes inside a scheduler

1.5 Content of the Report

The analysis and background study of the application are explained in Chapter 2. The application's Design architecture is explained in the third chapter. The specifics of implementation will be discussed in Chapter 4. Chapter 5 explains how the application will be tested and evaluated, as well as the results of the tests and evaluations. Chapter 6 concludes with a discussion of the application's future work and improvements.

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2. CHAPTER 2: BACKGROUND

2.1 Introduction

It is expected to evaluate the background of given scenario, how existing system performs with relevant features of system, drawbacks of existing system and how proposed system overcome the scenario with newly embedded features. Furthermore, requirement analysis according to the stakeholder feedbacks, how similar systems overcome the requirements, comparison of features of similar systems and what improvements can bring to your proposed system by following similar systems are discussed within this chapter accordingly. Under the comparison of alternative design strategies, different competing design strategies, development strategies, hardware environment and choice of system software are discussed.

2.2 Requirement Analysis

The system requirements and design analysis phase could be premised on the already established standards and specifications that were developed to structure content and information on e-tutoring systems to promote interoperability between systems such as Online payments gateway and to improve teaching quality by providing access to live video publishers like zoom, teams, google meeting etc.

The most technological educational standards and specifications are more focused on the course design and structuring all the processes of teaching/learning.

Interviews, Questionnaires, Observations are methods that use to gather requirements. Considering of proposed system which uses by different level of stakeholders. Because of that requirement gathering methods should be depending on how user interaction with the system and user expectations of the system

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Interviews

Online Interviews will be conducted with selected number of tutors (with different student capacities), students in different ages who are directly involved with the e-tutoring system, to identify the current system drawbacks especially affected to the students and to identify what are the resources that should be available for them. The data gathering was conducted under questionnaire form. After this, the second stage of the online- interview process was conducted with the relevant parties. Please refer appendix section's figure

2.2.1 Functional Requirements

Following are the main concerns in the when creating the e- tutor applications

Course Work Management

System facilitates tutors to schedule classes, run promotion campaigns by advertising their classes inside the system as well as outside. This module will help tutors to manage the course work easily, such as uploading videos, streaming live classes, scheduling live classes, upload contents which relevant to the subject, upload assignments, Publishing marking schemes to the students and parents.

Course Subscription

This module will help students to check the subject related tutors and their briefings and subscribe multiple courses under single subject.

Timetable Management

Helps students to manage their subscribed module's live classes without a hassle. This module will help students to identity live class clashes prior to the module subscription

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Report Management

Both tutor and student will be able to download reports throughout this module. Tutor will be able to download payment related, Attendance related, subscription related, student progress reports and student will be able to download course payment related, their own progress related under a subject report

Payment Management

This module enables tutor to collect money from students by using an Internet payment gateway, and manual way

When considering the functional requirement of the proposed application it is required to focus on each user role that will be interacted with the application. Detailed functionalities of each user role are listed out below.

A student must be provided the following functionalities in E-tutoring class:

- Create an account.
- Log in to the system.
- View subject related tutors and subscribed to their subject related classes.
- Can give feedback related to a lecture in which they have participates.
- Subscribed multiple classes under one subject live and telecasted basis
- If a student is going to subscribe to two live classes within the same timeslot system will be notified
- Can view/ submit assignments,
- View subscription details and history.
- View payments monthly basis.
- View attendance.

`

- Set up a card as a wallet and can configure maximum payment amount monthly basis.

On the same note system will be unable to schedule zoom or teams meetings through itself due to the unavailability of such an open APIs, but the system has provided facility to publish the zoom, teams, google meetings links via sub modules functionality

Tutors should have the following functionalities:

- Log into the system.
- Schedule lecture times and broadcast them to subscribed Students
- Live streaming facility
- Check payments and income
- Check Student attendance
- Upload videos
- Add briefings
- Upload assignment and home works and schedule time
- Review online answer sheets and mark them
- Generate student-related reports

2.2.1 Non-Functional Requirements

E-tutoring should also have the below Nonfunctional characteristics:

The system should be easy to maintain, expand, and enhance.

- The system should be more user friendly. The user interface should be kept simple.
- The system should be made responsive and should be able to use on both tablet screens and monitors.
- System supports for latest 2 versions in Chrome and Firefox.

2.3 Review Similar Systems

Below are some related systems currently available and considered as a base for the proposed E-tutoring systems.

`

Online Tutoring System [2] was created to allow tutors to take subscriptions and serve their students through a mechanism. e-Learning / Online Education tutors can provide private lessons via the internet using the tutor's own tutoring system from any geographical location.

Lynda.com [3] Each lynda.com course consists of a series of short tutorial-style videos. Screencasts, live action, and even smart boards are used in the videos. A typical course consists of around 40 videos organized into chapters. Each video is designed to stand alone, Hence it is not obligated to complete the entire course if the user doesn’t want to. Each course includes a number of free videos that you can watch before deciding whether or not to enroll. Courses also include free sample files to get you started and a transcript in case you need to refer back to a course later.

Domestika.com [4] is a paid online learning platform for creatives that offers courses in software, crafts, illustration, and other subjects. It began more than a decade ago in Spain with a completely different focus, but it has since relocated to San Francisco. Domestika is distinguished by its unwavering focus on creatives

Thinkific.com [5] is one of the most widely used online course platforms for creating and selling courses and membership sites. You can create a course with videos, rich text and images, and downloadable files using it. To collect payments and grant access to the course, you can create a sales page with your own branding

Table 1 compromises a comparison of the main functionalities in the above-mentioned systems and with the proposed E-Tutoring system.

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	E-Tutoring System	Online Tutoring System [2]	Lynda.com [3]	Domestika.com [4]	Thinkific.com [5]
Student/ Tutor Login	√	√	√	√	√
Free for tutors	√	x	x	x	x
Tutor Live Stream	√	√	x	x	√
Tutor Can upload videos	√	√	√	√	√
Tutor can check assignments	√	√	√	√	√
Payment gateway integration for students	√	x	√	√	√
Student can check previously purchased items	√	x	√	√	√
Tutor can generate payment related reports	√	√	x	√	√
Mobile and Web accessibility	√	√	√	√	√
Can rate tutor and students can check ratings and comments prior to the subscription	√	x	√	√	x

Table 1: Chapter 2: Functionality Comparison

Current system gap is that users are unable to locate the above-mentioned all-in-one system for their needs. As a result, the e tutoring system will be the obvious first choice among the group.

`

2.4 Related Design Strategies

2.4.1 Alternate Design Solutions

Several potential design concepts were investigated in order to discover the optimal solution that best met all the requirements.

Web Applications

To perform tasks over the Internet, web applications use web browsers and web technology. The Internet is used by millions of businesses around the world as a powerful and cost-effective communication tool. It enables them to share information and data with their target market while also facilitating quick and secure transactions. Effective engagement is possible, however, when the company can collect and store all necessary data, process it, and present the results to the user. Web applications use client-side scripts to present information to users and server-side scripts to store and retrieve information.

Users can interact with the company through online forms, tutors and students can use the apps regardless of where they are or what device they are using.

Mobile Applications

Mobile applications differ from the integrated software systems that are commonly found on desktop computers. Instead, each application has a limited and isolated set of capabilities. Mobile apps are programs that run on mobile devices such as smartphones and tablets. Native and hybrid applications are the two types of mobile apps available. Native mobile apps are designed for specific mobile operating systems like Android and iOS. Native mobile apps have better performance and a finer-tuned user interface (UI), and they typically go through a much more rigorous development and quality assurance process before being released.

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2.4.2 Proposed Design solution

According the studies, web based solution was selected since there is a less time to be involved with the development and the expertise more into the web development, from there, would be able to save much more time to think about the solution rather than be anxious over to understand the development language basically output result is morally focus as a community work.

2.5 Process Model

A well-defined scenario is included with the proposed system. Hence As a result, the project scope remains relatively constant, allowing effort and timelines to be determined early on. By completing a full design early in the project, changes to systems are kept to a minimum, lowering the cost of fixing and changing designs. When you take a structured approach to a project, everyone knows what needs to be done and when it needs to be done. Because the documentation describes in reasonable detail how any skills required to complete the work, a project can lose pressure without too much hassle if it has detailed documentation and designs. As a result, the Waterfall method is preferred.

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3 CHAPTER 3: DESIGN ARCHITECTURE

3.1 Introduction

The chapter elaborates the design architecture of the project and the most appropriate design and development solution based on the gathered requirements and resource for the system. It is expected to exhibit high-level diagrams and design structures to implement the best design for the system. Furthermore, UML diagrams of the “E Tuition Class” will elaborate the structural design of the system.

3.2 System Architecture

The proposed system will be developed using a two-tier architecture, which is also known as a client-server architecture. The client is on the first tier, while the database server and web application server are on the second tier's same server machine. The data is served by the second tier, which also handles the web application's business logic. This enables the application and database server capabilities to be combined on a single tier. The proposed system's availability, scalability, and performance characteristics are provided by the second tier, as shown in the diagram below.

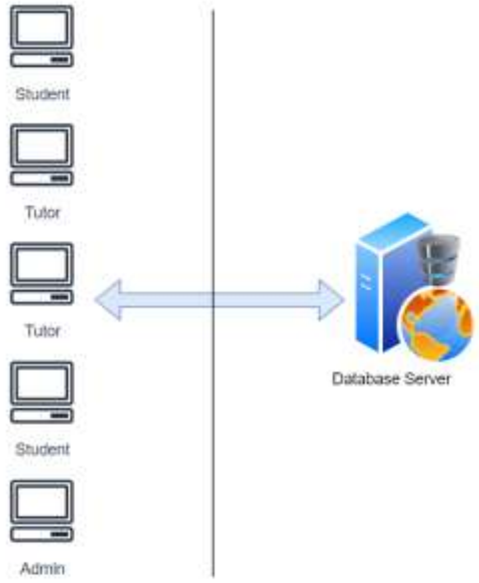

Figure 1:Chapter 3: Two- Tier connectivity between the client and server

In this way the E Tuition system facilitates student to subscribe to lectures content by settling down the payment as a pre- payment and once after the payment student will grant the full access to the relevant module.

System Facilitates an open environment to tutors in order to promote their self and conduct the classes without handover commission to any 3rd party vendor, means the system helps tutors to integrate their payment accounts with the system provided IPG. If a student subscribed to module tutor will be received payment instantly.

According to this architecture of system, course module management service will maintain a better way to coordinate classes without clashes. It will validate in each Live- Class Module subscription of student, and it will notify student if there is any clash between both.

Assignment and Homework governance is another feature of this Course Management Service. It helps tutors to publish online Assignments and homework via the system and it helps to extract reports related to grading both student and tutor

Admin should be able to check the relevant payhere IPG related payments and distributed those payments among the tutors

This content will be further described using the following architecture diagram.

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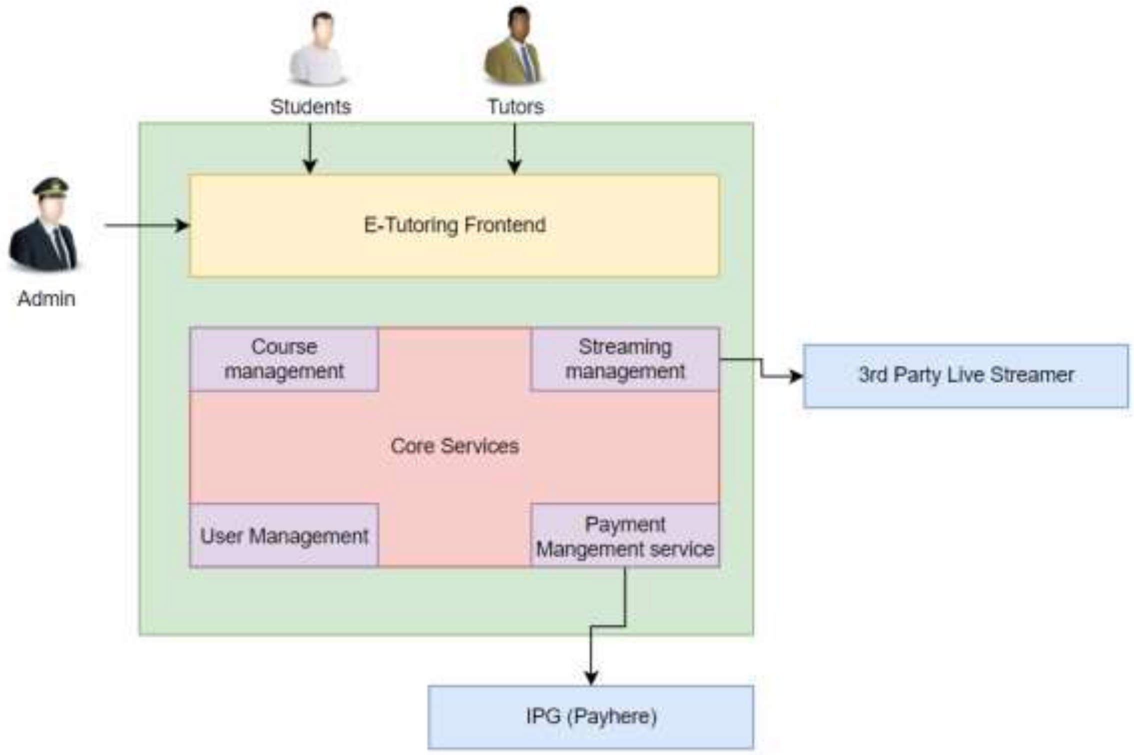

Figure 2: Chapter 3: Higher Level Architecture

3.2.1 Use Case Diagram

As per above mentioned, there will be two actors inside the system. Student and the Tutor. Following points will elaborate the functional activities of each of them.

- Students and Tutors can sign up to the system via using their email credentials and they can login by using the same credentials.
- Students can view subject related tutors and subscribed to their subject related classes.
- Students can give feedback related to a lecture in which they have participates
- Students can Subscribed to multiple classes under one subject live and telecasted basis

- If a student is going to subscribe to two live classes with in the same timeslot system will be notified
- Students can view/ submit assignments or HomeWorks online
- Students can check subscription details and history.
- Students can check payments monthly basis.
- Students can check their own attendance.
- Students can set up a card as a wallet and can configure maximum payment amount monthly basis
- Tutors can schedule lecture times and broadcast them to subscribed Students
- Tutors can Live stream (Planned to use zoom or teams) their classes or upload already captured videos for student references
- Tutors can check payments and income
- Tutors can check Student attendance
- Tutors can add briefings about their work
- Tutors can upload assignment and homework and schedule time for students to complete them
- Tutors can review online answer sheets and mark them.
- Tutors can generate student-related reports

Below uses case diagram in Figure 2 explains the features of the E-Tuition application and the user roles of the system in more detail.

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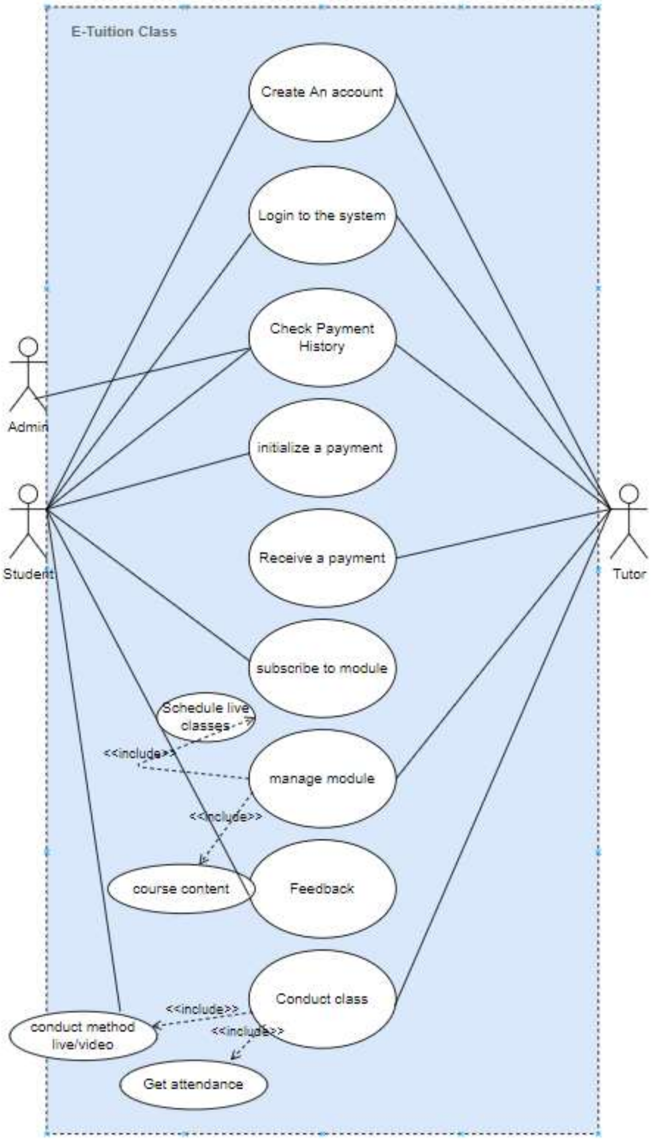

Figure 3: Chapter 3: Use case Diagram

3.2.2 Database Design

Structured query language will be used as the database management system which is the most widely implemented database language. E tuition Class database will contain tables illustrated in Figure 4.

Regardless of the user role, users are defined under a single table, there is a unique key which is generated by the system and depends on the user type (whether the user role, Tutor or Student) Category column will be managed, not only that but also it will save the email and the password by changing into a hash value. Tutors can make modules to for each subject or topic wise, each topic can be created by accompanying Tutor's user_ID, this module available grade can be taken by grade_id and the relevant subject can be taken by the subject_id, note that the data base has separate tables for grades and subjects.

Each Module can have multiple sub modules and these modules will be identified with its own primary key and each module will have one foreign key which is taken from the module table (It’ s primary key)

Reports table will content the report related details and there will be a system generated unique key for each generated report.

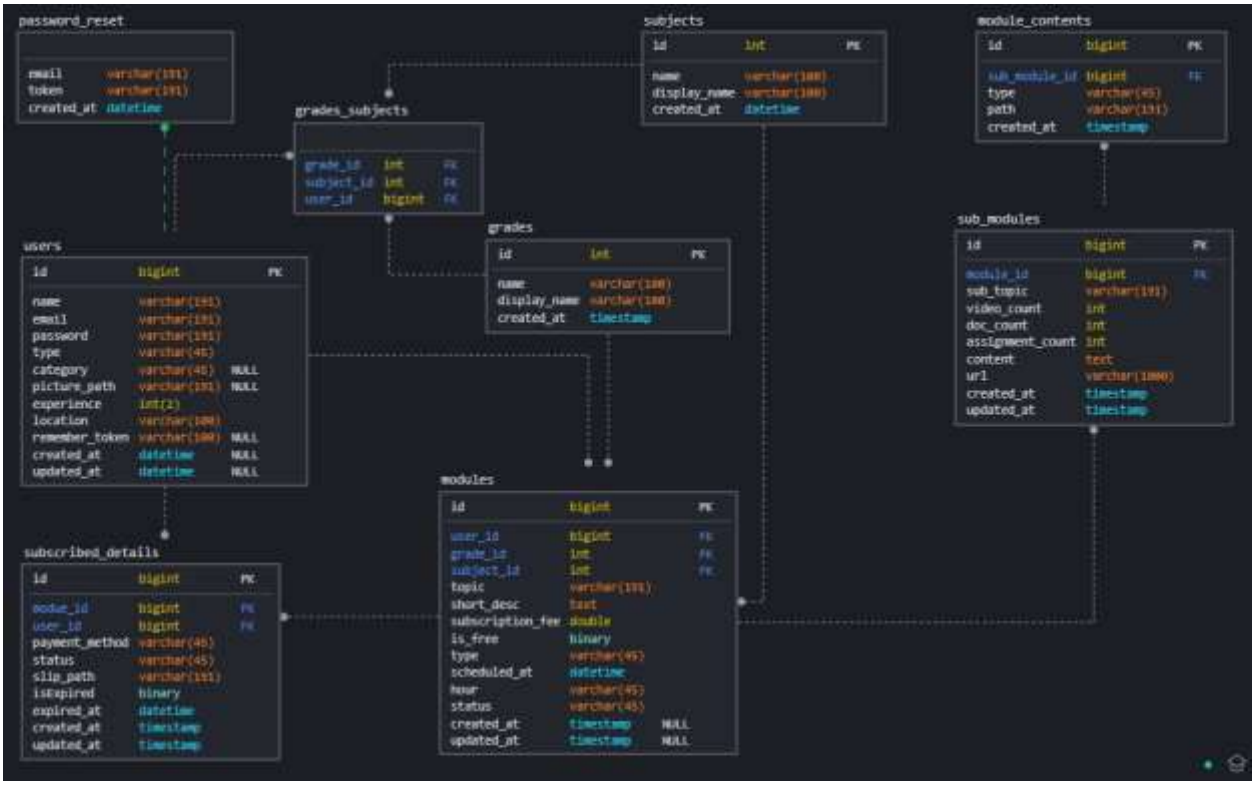

Figure 4: Chapter 3: Database Diagram

3.2.3 Wireframe Designs

As earlier described, below interfaces illustrate the some of the mandatory screens of the application.

Underneath screenshot will show you the Login functionality related screenshot, both tutor and student can login to application by using the same login functionality

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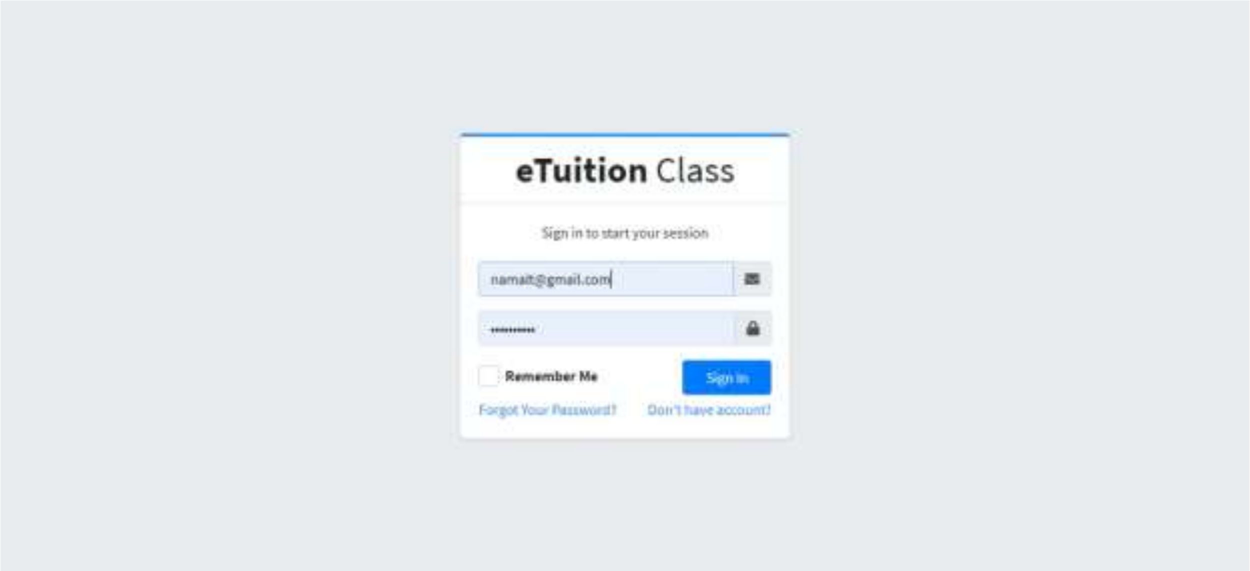


eTuition Class

Sign in to start your session

namalt@gmail.com

••••••••••

□ Remember Me

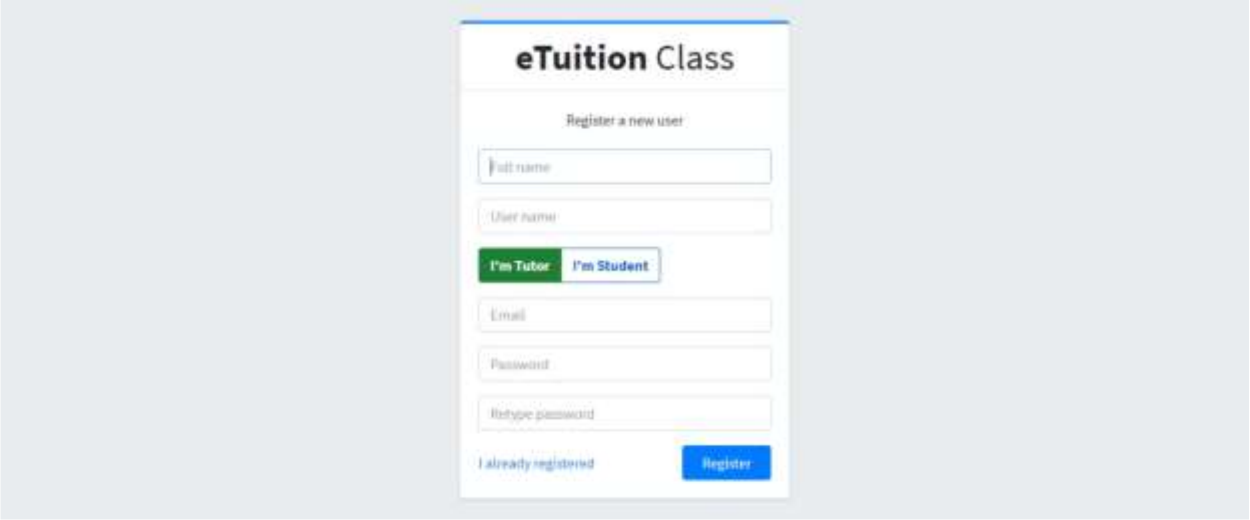
Sign In

Forgot Your Password?

Don't have account?

Figure 5: Chapter 3: Login Screen of the e tutor application

This screenshot will show you how a user should create a relevant user profile you are selecting either tutor or student from toggle button, here user has to provide full name, user name a valid email address, password and reconfirming the same password



eTuition Class

Register a new user

Full name

User name

I'm Tutor | I'm Student

Email

Password

Retype password

I already registered

Register

Figure 6: Chapter 3:Signup Screen of the e tutor application

Once any user type (student or tutor) logged into the system as an initial login, the relevant user will be navigated to the "User Profile" page. From there user will be able to provide mandatory details, if user type is tutor: user has to provide, his/her working experience (in years) and the subjects that he/ she is willing to teach and the tutor's profile picture.

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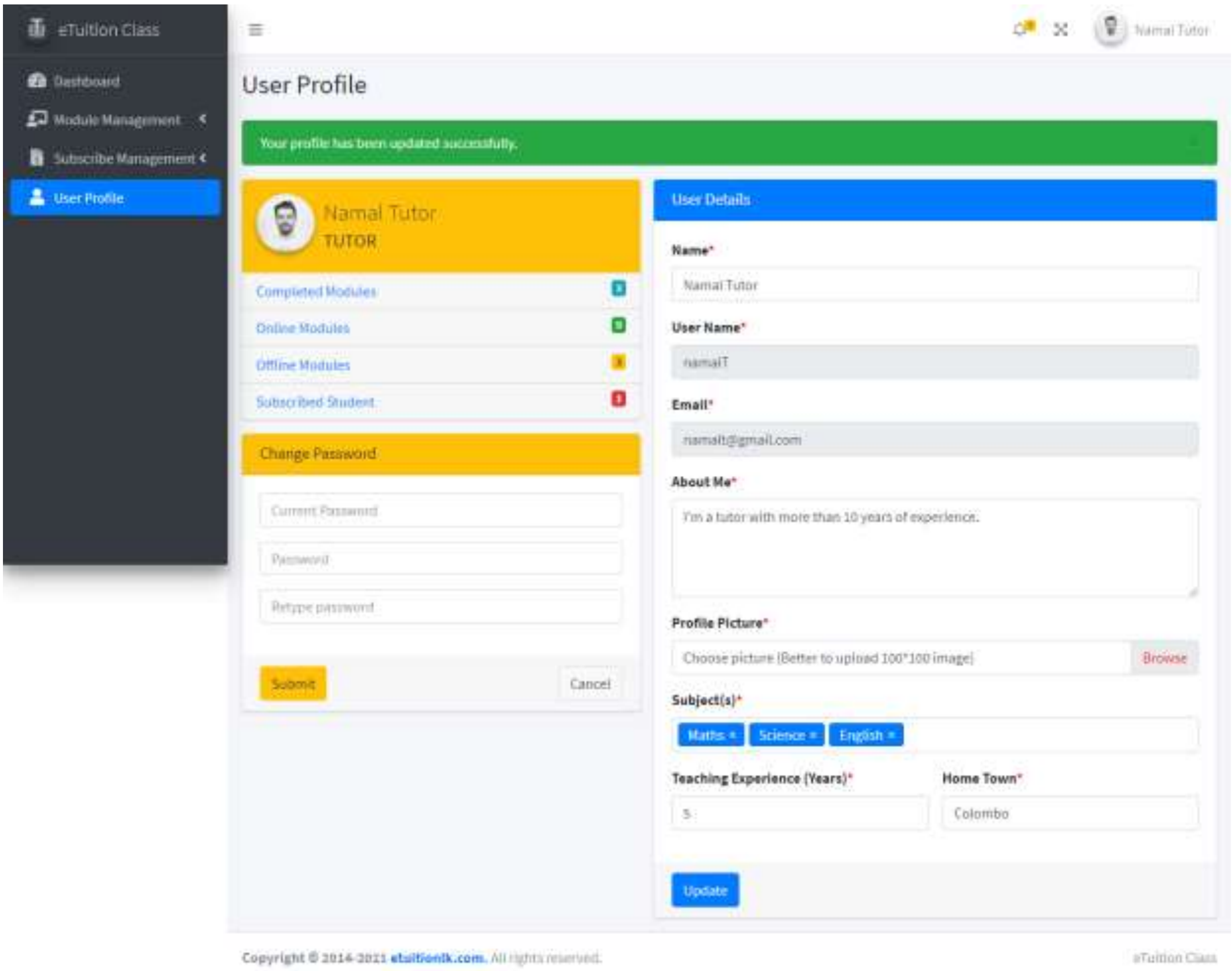

User Profile

Your profile has been updated successfully.

Namal Tutor
TUTOR

Completed Modules
Online Modules
Offline Modules
Subscribed Student

Change Password

Current Password
Password
Retype password

User Details

Name*: Namal Tutor

User Name*: namalT

Email*: namalt@gmail.com

About Me*: I'm a tutor with more than 10 years of experience.

Profile Picture*: Choose picture (Better to upload 100*100 image)

Subject(s)*: Maths × Science × English ×

Teaching Experience (Years)*: 5

Home Town*: Colombo

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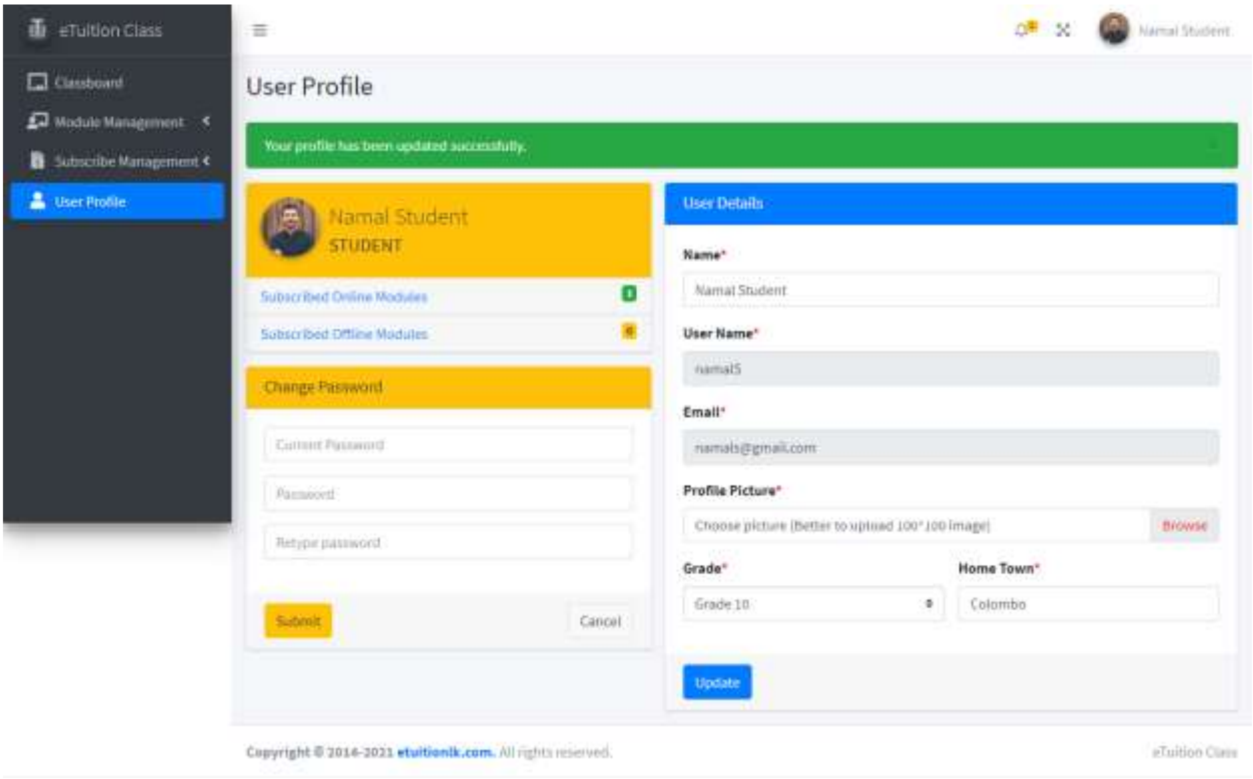
Figure 7: Chapter 3: User profile: tutor Screen of the e tutor application

Same concept will be applicable to the student as well. Once the student's login to the page as well. Once navigated a student can provide his/her current schooling year (Grade 1,2 etc). This will be incremented at each year end. This selection is very important to a student. Because the "Class board" will show subject related modules by cross checking with the relevant student's grade. Student can change this selection at any time

`



User Profile

Your profile has been updated successfully.

Namal Student
STUDENT

Current Password
Password
Retype password

Name*: Namal Student

User Name*: namal5

Email*: namals@gmail.com

Profile Picture*: Choose picture (Better to upload 100*100 image)

Grade*: Grade 10

Home Town*: Colombo

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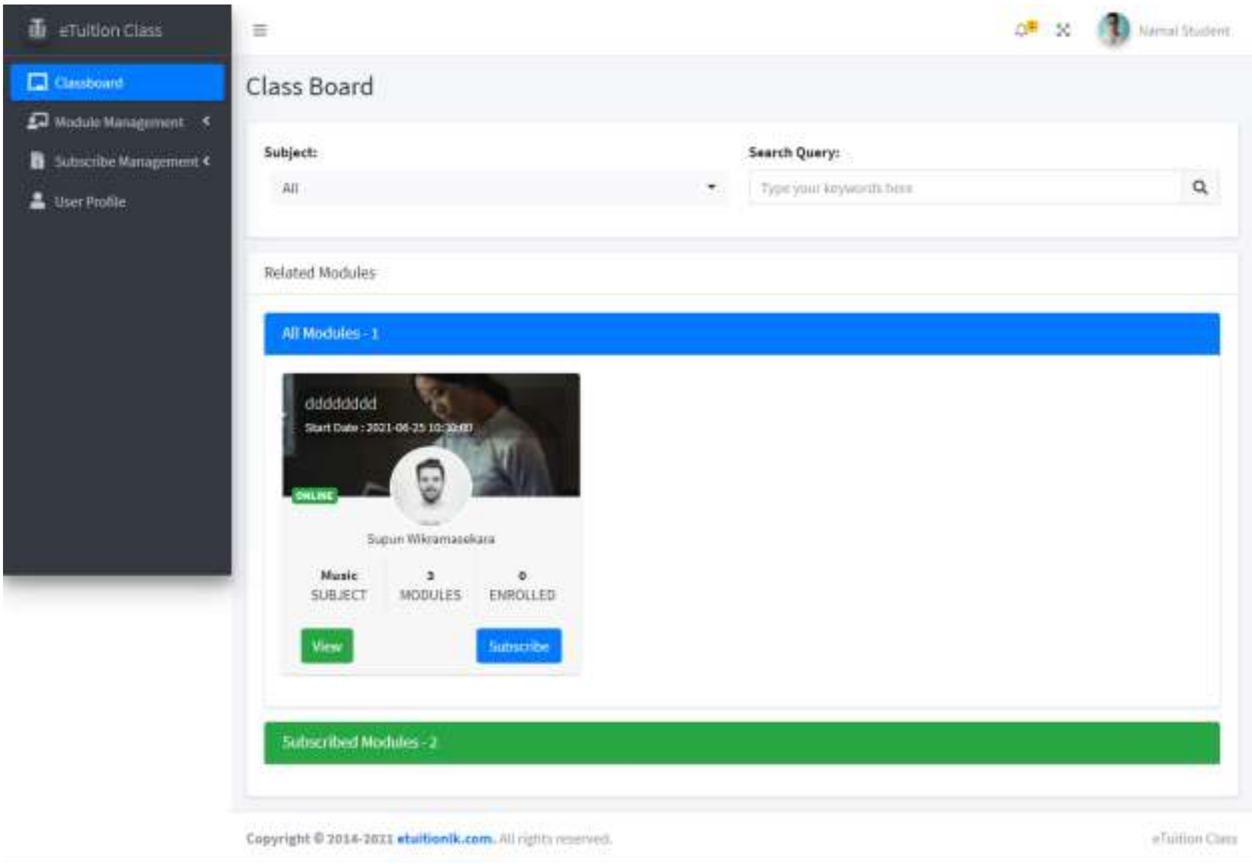
Figure 8: Chapter 3: User profile: Student Screen of the e tutor application

Class board is a major functionality for a student, all the subject related modules can be seen in this class board page. Depends on selection of subject and the search criteria, it will show module related details. Student can view a module related details by clicking on the top od the view, button if satisfied it user can subscribe the relevant module by clicking on the top of the subscribe button. All the subscribed modules will be shown at the bottom of the screen inside a separator

`



Class Board

Subject: All

Search Query: Type your keywords here

dddddddd

Start Date : 2021-06-25 10:30:00

Supun Wikramasekara

Music	3	0
SUBJECT	MODULES	ENROLLED

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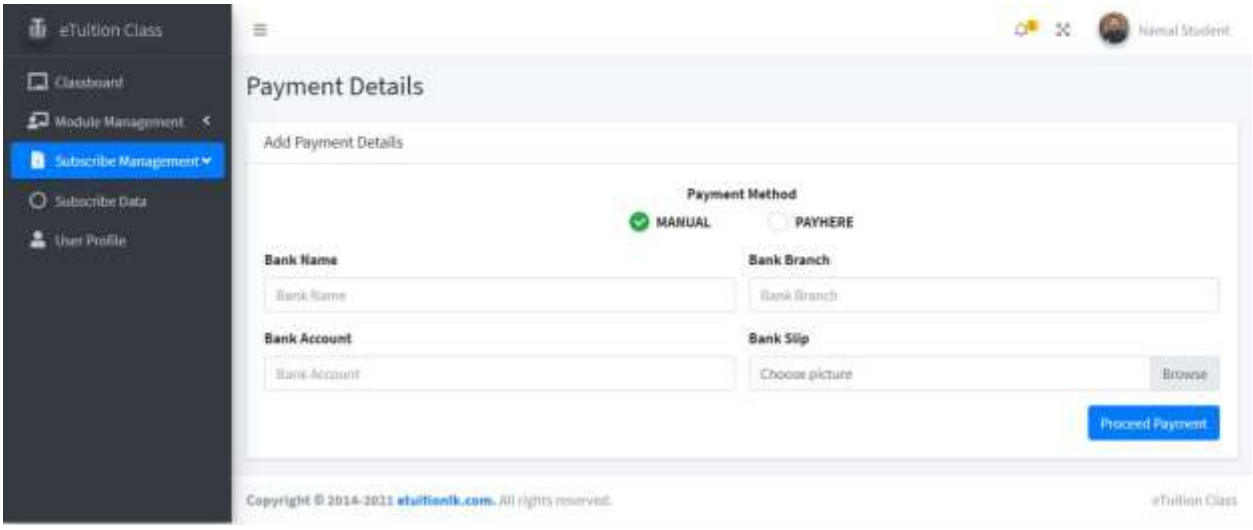
Figure 9: Chapter 3: Class Board Screen of the e tutor application

If student wants to subscribed into a module, user will be navigated to a payment details screen, from there student will be able to select the payment method, There will be two payment methods, Manual and PayHere

If the student selects manual as the payment method, it will show the relevant module related tutors bank details, once the user did the payment, he/she can upload the bank slip from the provided upload field. Once provided student can proceed payment. Subscription will be pending until the relevant user check and accept the payment

`



Payment Details

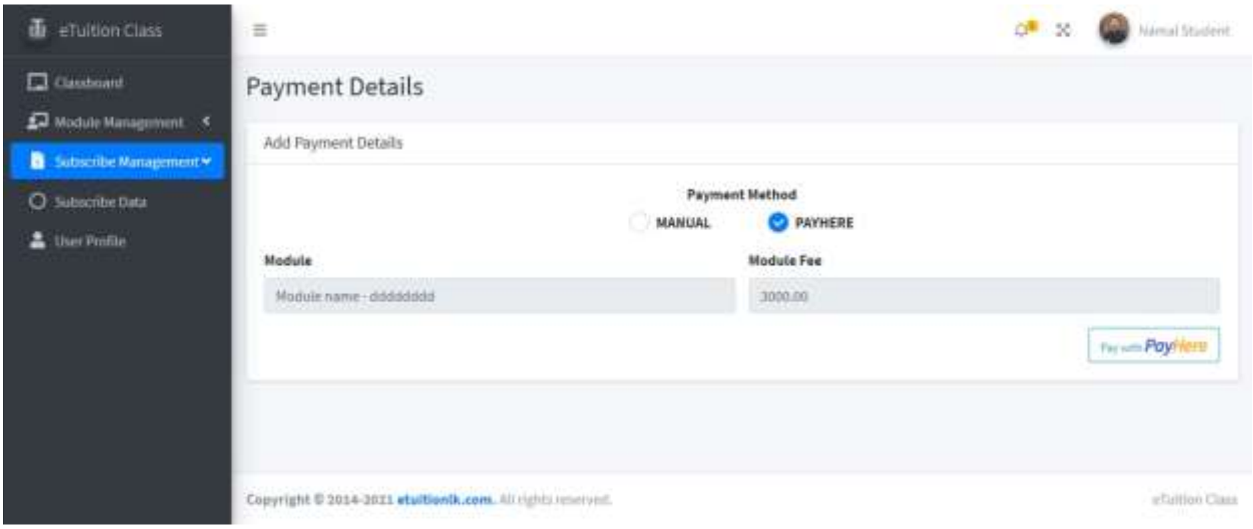
Add Payment Details

Payment Method
● MANUAL ○ PAYHERE

Bank Name: Bank Name
Bank Branch: Bank Branch
Bank Account: Bank Account
Bank Slip: Choose picture

Figure 10: Chapter 3: Payment details screen of the e tutor application

If user select the transaction through Pay here undermentioned screen will be shown



Payment Details

Add Payment Details

Payment Method
○ MANUAL ● PAYHERE

Module: Module name - dddddddd
Module Fee: 3000.00

Figure 11: Chapter 3: Pay here payment Screen of the e tutor application

Once selected the student will be navigated to the pay here internet payment gateway

`

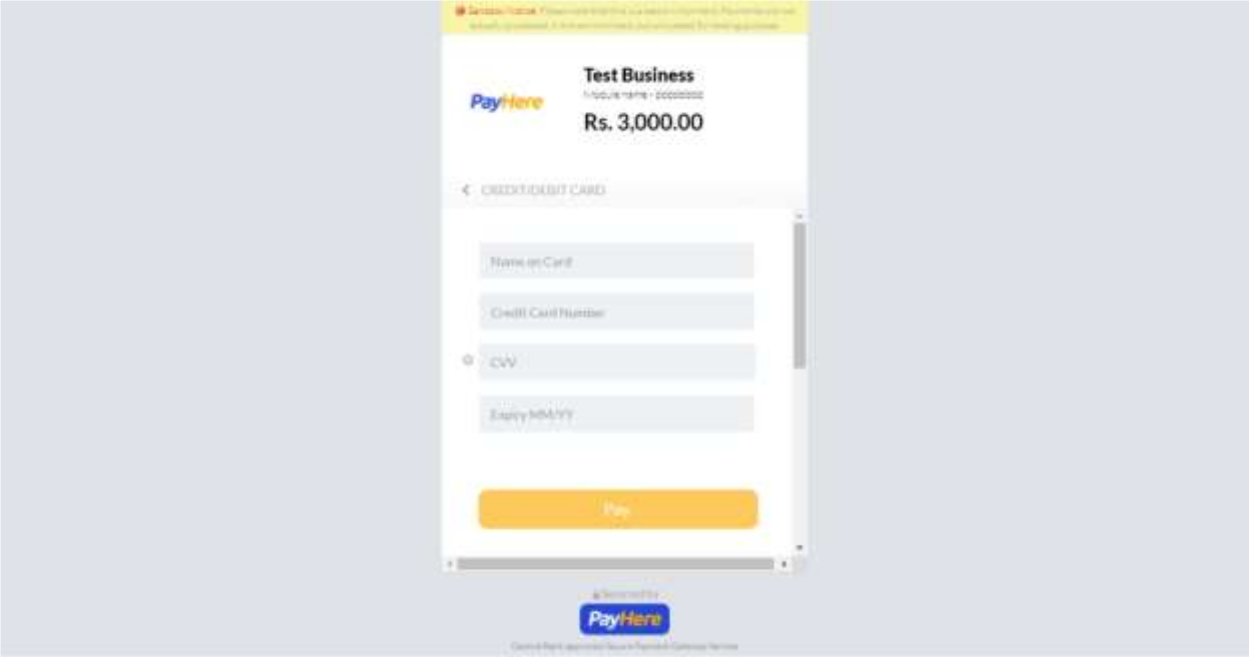
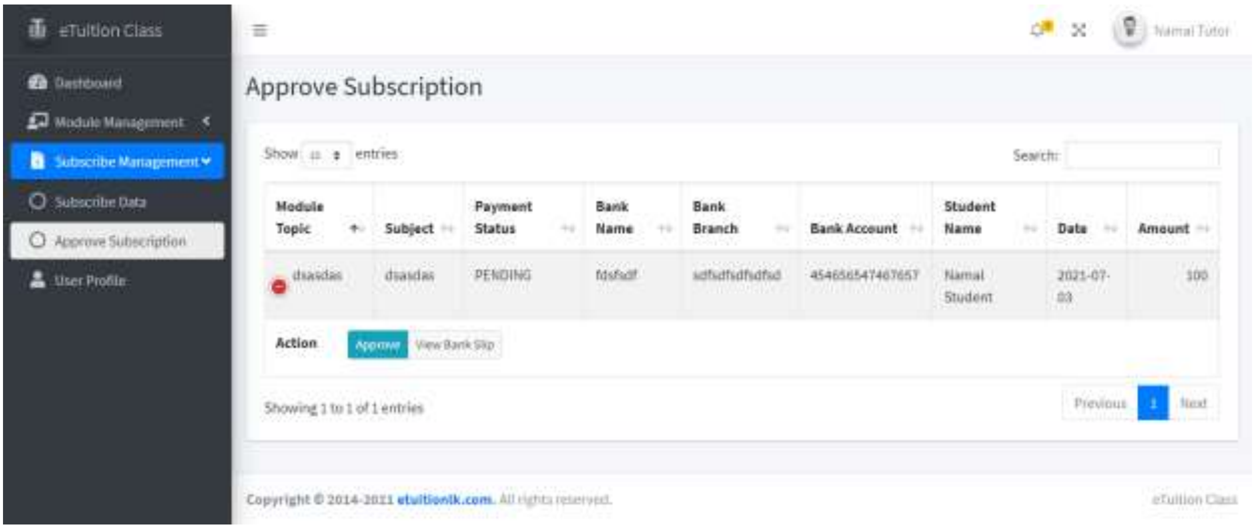


Figure 12: Chapter 3:Pay here IPG screen of the e tutor application

Undermentioned screen will show how the tutor will be able to accept the manual payments which were received by the relevant students



Approve Subscription

Show 10 entries Search:

Module Topic	Subject	Payment Status	Bank Name	Bank Branch	Bank Account	Student Name	Date	Amount
dsasdas	dsasdas	PENDING	fdsfsdf	sdfsdfsdfsdfsd	454656547467657	Namal Student	2021-07-03	100

Action Approve View Bank Slip

Showing 1 to 1 of 1 entries

Previous 1 Next

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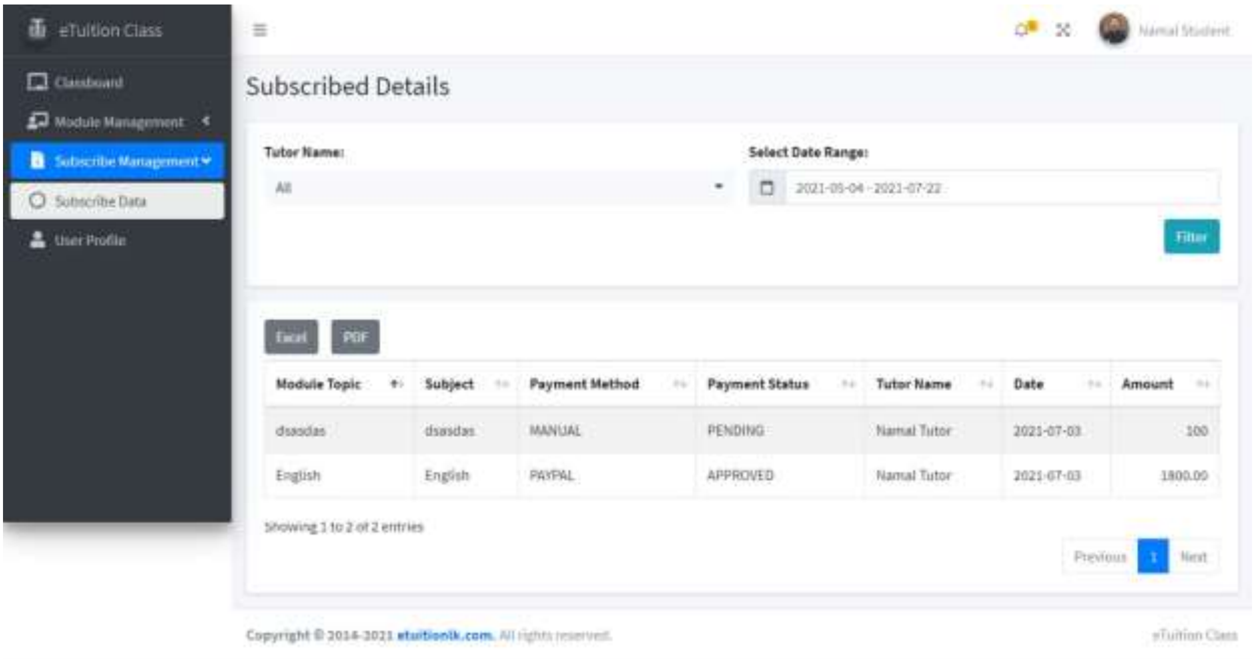
Figure 13: Chapter 3:Tutor accepting the subscription Screen of the e tutor application

Once student done student can check these subscription related details inside the subscription details page. Also, student can download payment related reports from here

`



Subscribed Details

Tutor Name: All

Select Date Range: 2021-05-04 - 2021-07-22

Module Topic	Subject	Payment Method	Payment Status	Tutor Name	Date	Amount
dsasdas	dsasdas	MANUAL	PENDING	Namal Tutor	2021-07-03	100
English	English	PAYPAL	APPROVED	Namal Tutor	2021-07-03	1800.00

Showing 1 to 2 of 2 entries

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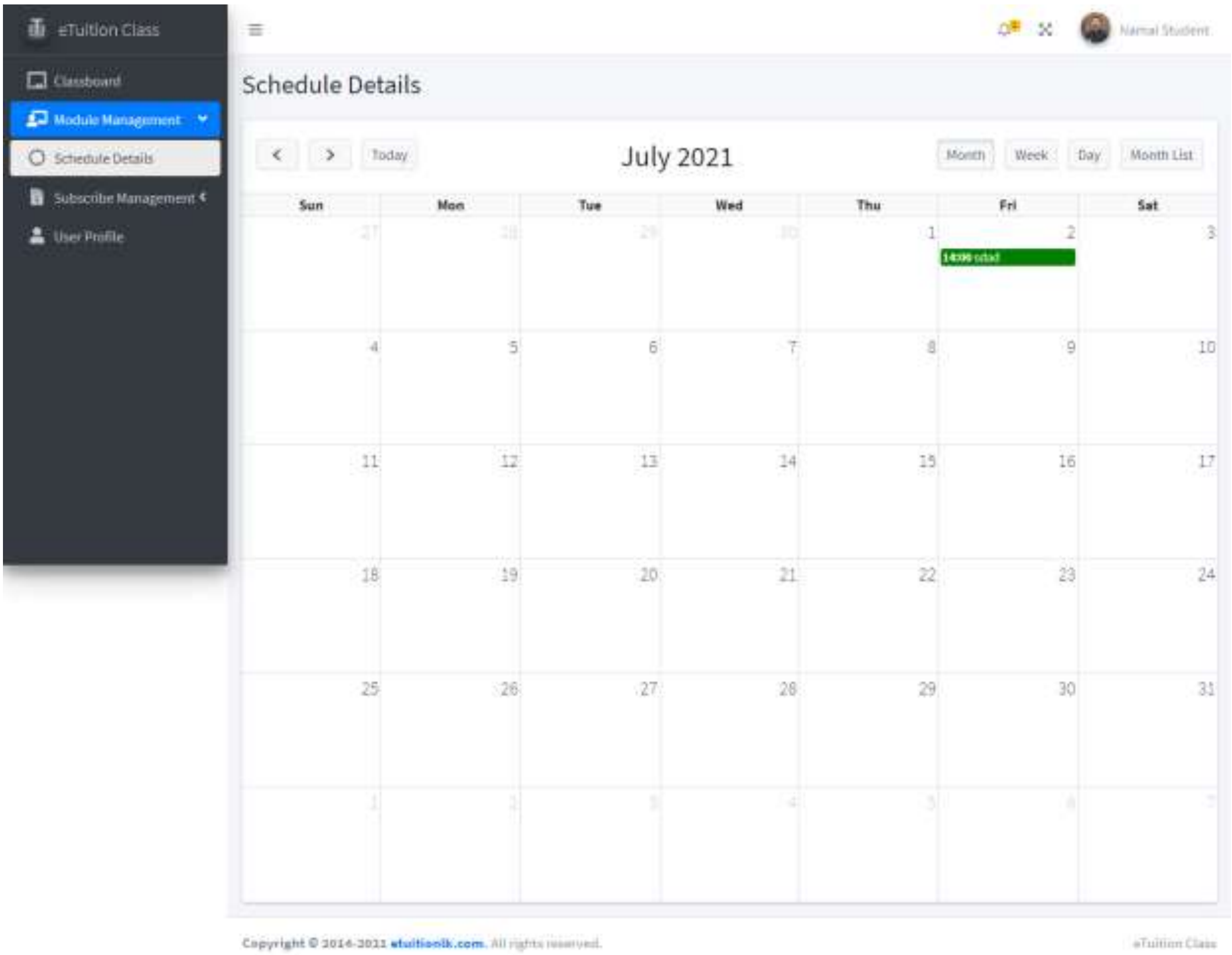
Figure 14: Chapter 3: Student checking payment details Screen of the e tutor application

Once the student navigated to the module management, student can check the already subscribed online classes modules inside a timetable. so that user will never miss an online class

`



Schedule Details

July 2021

Sun	Mon	Tue	Wed	Thu	Fri	Sat
27	28	29	30	1	2 14:00 sdad	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
1	2	3	4	5	6	7

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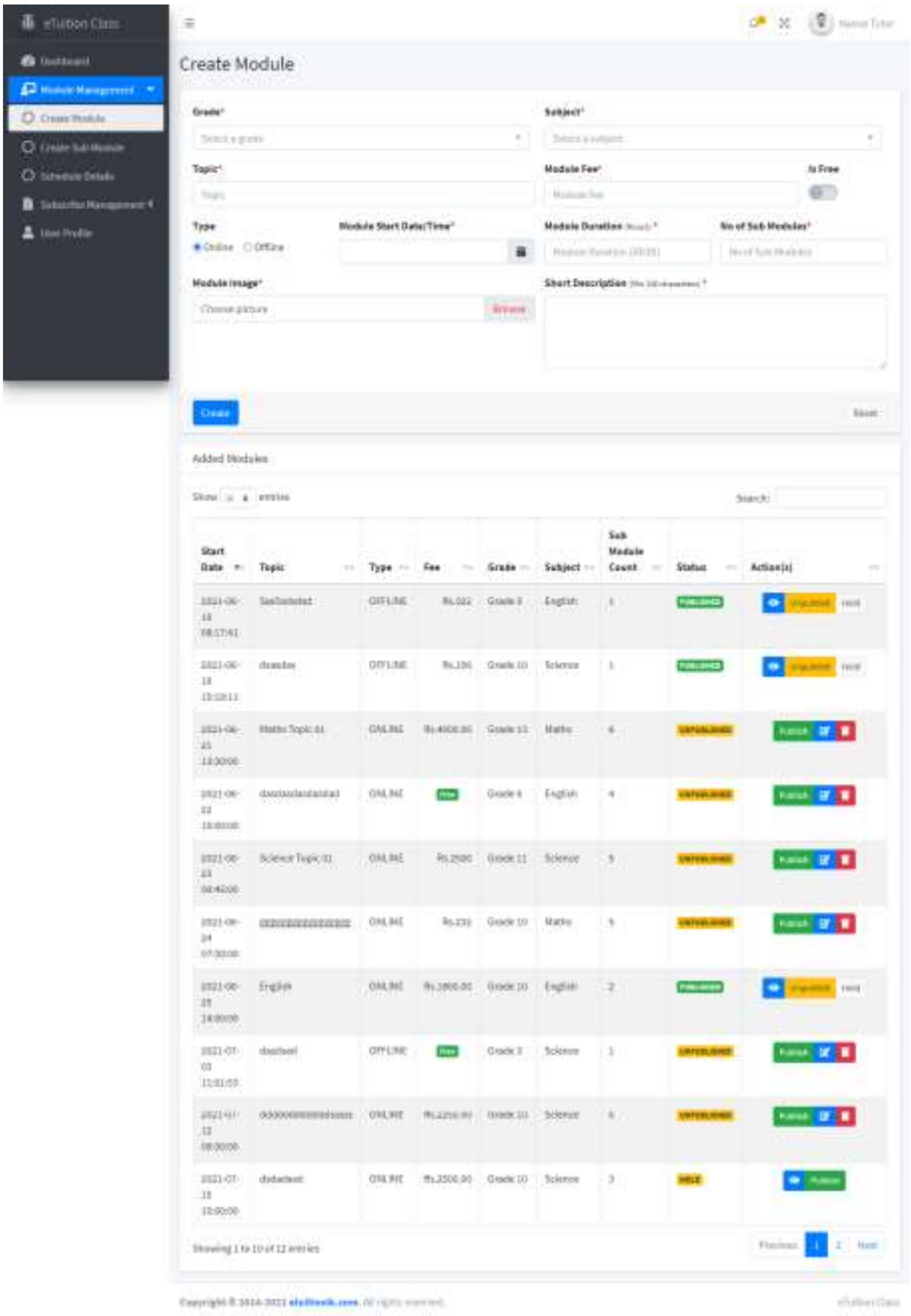
Figure 15: Chapter 3: Scheduled details Screen of the e tutor application

Tutor can create modules from the module management -> create module page, once navigated tutor can select a grad. Note that one grade selection for a single module, subject will be listed down based on the selection which he/she made in the User Profile page, once selected tutor can give a topic for a relevant module, module fee can be mentioned and also, he/she can produce this module as free community service. Once selected there will be two types of modules, Online module where tutor must publish a zoom, teams or google meeting etc. related link. Note that this link will be published inside each sub module part. Then user can provide module start date and time. Once provided system ask for the single sub module related duration, this is basically helping system to maintain the schedule management for both tutor and student. Once done it will ask for number of sub modules. If the tutor selects the module type as online then thing will be a single week related class instance. If not, it will be act as a regular module once done tutor need to upload a module related picture, it will be size into

`

2000px to 1333px. Once done the tutor can provide a short description minimum of 100 characters. Once done tutor can create this module. All the pre created modules can bee seen inside the added modules table



Create Module

Grade* Select a grade

Subject* Select a subject

Topic* Topic

Module Fee* Module Fee

Is Free

Type ● Online ○ Offline

Module Start Date/Time*

Module Duration (Hours) * Module Duration (HH:II)

No of Sub Modules* No of Sub Modules

Module Image* Choose picture Browse

Short Description (Min 100 characters) *

Create Reset

Added Modules

Show 10 entries Search:

Start Date	Topic	Type	Fee	Grade	Subject	Sub Module Count	Status	Action(s)
2021-06-18 08:17:41	[illegible]	OFFLINE	Rs.022	Grade 8	English	1	PUBLISHED	Unpublish Hold
2021-06-18 15:19:11	dsasdas	OFFLINE	Rs.156	Grade 10	Science	1	PUBLISHED	Unpublish Hold
2021-06-25 13:30:00	Maths Topic 01	ONLINE	Rs.4000.00	Grade 11	Maths	6	UNPUBLISHED	Publish
2021-06-22 18:00:00	dasdasdasdasdad	ONLINE	Free	Grade 6	English	4	UNPUBLISHED	Publish
2021-06-23 08:42:00	Science Topic 01	ONLINE	Rs.2500	Grade 11	Science	5	UNPUBLISHED	Publish
2021-06-24 07:30:00	[illegible]	ONLINE	Rs.231	Grade 10	Maths	5	UNPUBLISHED	Publish
2021-06-28 14:00:00	English	ONLINE	Rs.1800.00	Grade 10	English	2	PUBLISHED	Unpublish Hold
2021-07-03 11:01:55	dasdsad	OFFLINE	Free	Grade 3	Science	1	UNPUBLISHED	Publish
2021-07-12 08:00:00	[illegible]	ONLINE	Rs.2250.00	Grade 11	Science	6	UNPUBLISHED	Publish
2021-07-18 10:00:00	dsdasdasd	ONLINE	Rs.2500.00	Grade 10	Science	3	HOLD	Publish

Showing 1 to 10 of 12 entries

Previous 1 2 Next

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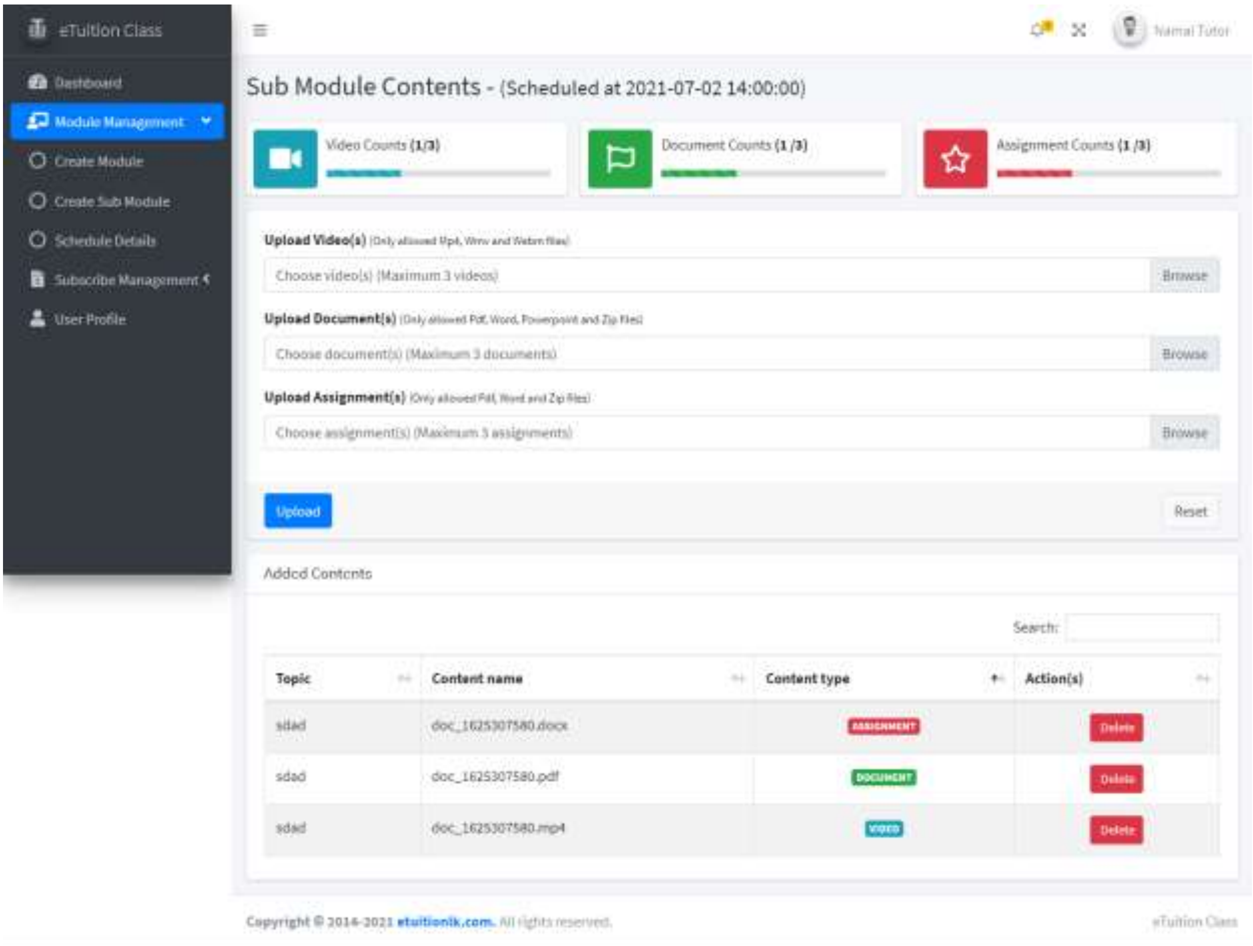
Figure 16 : Chapter 3: Create Module of the e tutor application

Note that each of these modules has mentioned occurrences related sub module. Hence prior to the publishing module tutor must create the module related sub modules inside the system. Hence to perform that there will be separate page to create sub modules.

`

To create a sub module tutor must select module from dropdown, once done it will ask tutor to provide a topic to the sub module and it will show that the user can upload videos, documents and assignments maximum of three per each category. Note that if the main module type is online, system will ask to enter zoom, google meeting, teams etc related link over there. Once done tutor can upload these details to the server. If tutor needed, he/she can change them whenever they required



Sub Module Contents - (Scheduled at 2021-07-02 14:00:00)

Video Counts (1/3)

Document Counts (1 /3)

Assignment Counts (1 /3)

Upload Video(s) (Only allowed Mp4, Wmv and Webm files)

Choose video(s) (Maximum 3 videos) Browse

Upload Document(s) (Only allowed Pdf, Word, Powerpoint and Zip Files)

Choose document(s) (Maximum 3 documents) Browse

Upload Assignment(s) (Only allowed Pdf, Word and Zip files)

Choose assignment(s) (Maximum 3 assignments) Browse

Upload Reset

Added Contents

Search:

Topic	Content name	Content type	Action(s)
sdad	doc_1625307580.docx	ASSIGNMENT	Delete
sdad	doc_1625307580.pdf	DOCUMENT	Delete
sdad	doc_1625307580.mp4	VIDEO	Delete

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eTuition Class

Figure 17: Chapter 3: Sub module content screen of the e tutor application

Note that if the tutor navigated to the class dashboard it will show all the published, online, offline and subscribed users in his/her account

`

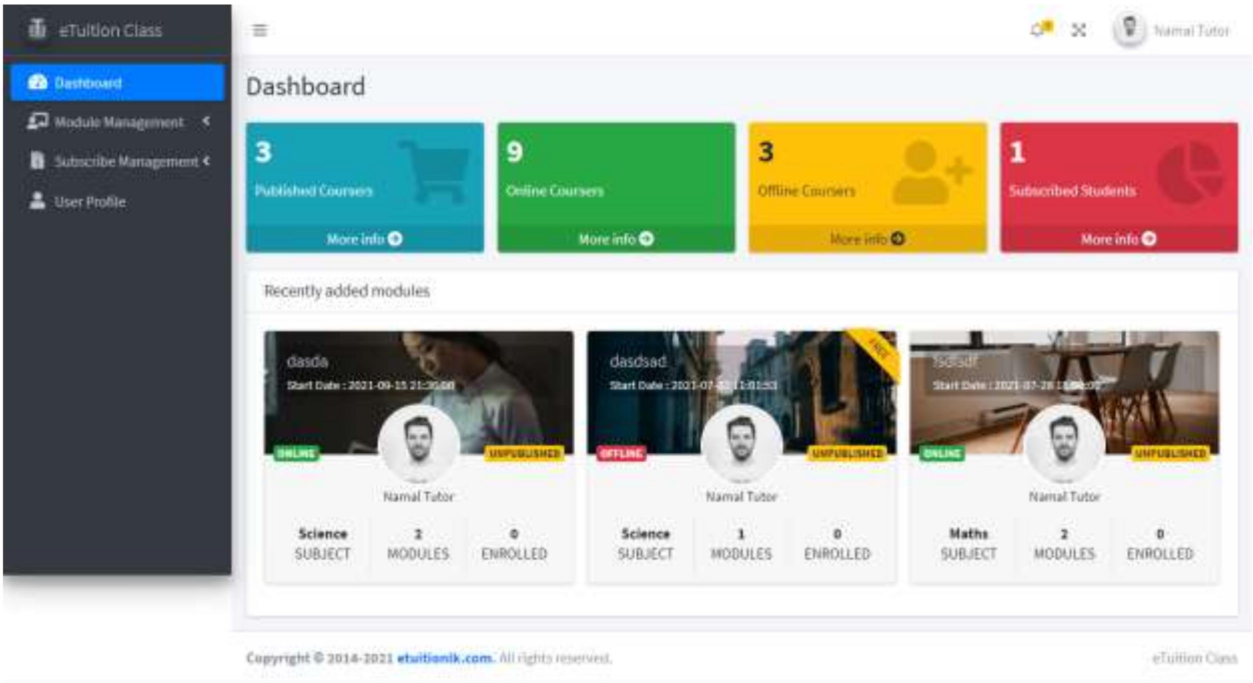


Figure 18: Chapter 3: Dashboard Screen of the e tutor application

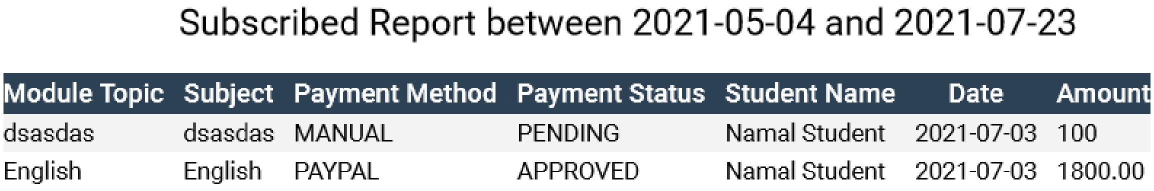
3.2.4 MIS Report

This section will assist each relevant user in producing reports and gaining insights into their category. When it comes to the E tuition class, all of the data, including payment arrays and so on, is stored in the SQL database. These details can be derived and represented in a useful way to assist business decision-makers in making important business decisions. The following are some reports that can be generated by the application's users.

Tutor can generate report to extract the payments which he/she received for certain date time period

This report includes Module's topic, subject which is relevant to the topic, received payment's method of transaction, Payment made student's name, the date of payment which the student made and finally the amount of the payment

`

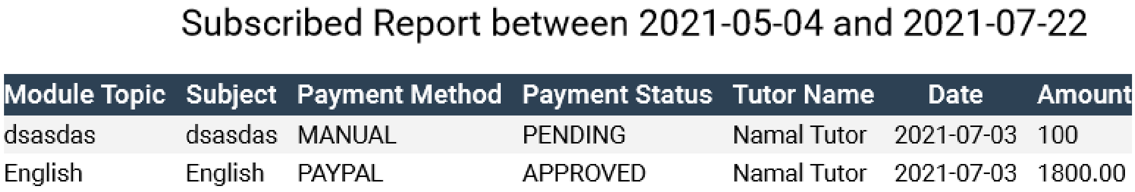


Subscribed Report between 2021-05-04 and 2021-07-23

Module Topic	Subject	Payment Method	Payment Status	Student Name	Date	Amount
dsasdas	dsasdas	MANUAL	PENDING	Namal Student	2021-07-03	100
English	English	PAYPAL	APPROVED	Namal Student	2021-07-03	1800.00

Figure 19: Chapter 3: Tutor's payment report of the e tutor application

Not only the tutor but also the student be able to generate reports for a certain time period to validate the payments which he/she has made out to tutors. Here also the report mentioned the relevant module topic, subject, payment status (whether the payment is already approved or not), tutors name, date of the payment and finally the amount of the payment



Subscribed Report between 2021-05-04 and 2021-07-22

Module Topic	Subject	Payment Method	Payment Status	Tutor Name	Date	Amount
dsasdas	dsasdas	MANUAL	PENDING	Namal Tutor	2021-07-03	100
English	English	PAYPAL	APPROVED	Namal Tutor	2021-07-03	1800.00

Figure 20: Chapter 3: Student's payment reports the e tutor application

Tutors can check out the attendance of the online module which was already derived by him/her

Student is also be able to get the attendance sheet for a relevant date time period

`

4 CHAPTER 4: IMPLEMENTATION DETAILS

4.1 Introduction

In this chapter, the implementation details such as tools and technology stacks that will be used to develop the application, major codes, codes reused in the application, and implementation environment-related details will be discussed here.

4.2 Development Tools & Technologies

4.2.1 Development Tools

Phpstorm idea will be used as the development IDE. Phpstorm idea has a freeware source code editor for Windows, Linux and macOS. It has been redefined and optimized for building and debugging modern web and cloud applications. `

WAMP will be used as the local test server for the application development. WAMP is a free and opensource web server solution stack package developed by Apache Friends, consisting mainly of the Apache HTTP Server, MySQL database, and interpreters for scripts written in the PHP and Perl programming languages. Since most actual web server deployments use the same components as WAMP, it makes transitioning from a local test server to a live server possible.

4.2.2 Server-Side Technology

The PHP Hypertext Preprocessor (PHP) is selected as the server-side scripting language for the proposed application. PHP is a popular general-purpose scripting language that is especially suited to web development that allows creating dynamic content that interacts with databases. PHP has below beneficial features that would be helpful during the implementation of the application.

`

- PHP supports a large number of major protocols such as POP3, IMAP, and LDAP.
- PHP is integrated with several popular databases, including MySQL, PostgreSQL, Oracle, and Microsoft SQL Server.
- 30
- PHP is compatible with a large majority of operating systems including UNIX, Solaris, and Linux.
- PHP is cost-efficient since it is an open-source web language, hence is completely free.

4.2.3 Client-Side Technology

Hyper Text Markup Language (HTML), Cascading Style Sheet (CSS), and JavaScript (JS) will be used as the client-side scripting language. HTML allows to create and structure sections, paragraphs, headings, links, and block quotes for web pages and applications. CSS describes how HTML elements are to be displayed on the screen. CSS saves a lot of work by controlling the layout of multiple web pages all at once. JavaScript is a scripting or programming language that allows the implementation of complex features on web pages. JS provides a capability to create dynamically updating content, control multimedia, animate images, etc.

4.2.4 Data Management and Storage Technology

Structured Query Language, commonly known as SQL will be used as the Database Management System, SQL is a standard programming language for relational databases. Despite being older than many other types of code, it is the most widely implemented database language. SQL can be used to share and manage data, particularly data that is found in relational database management systems, which include data organized into tables. Below are some beneficial features of SQL that would bring value to the application.

- Faster query processing where large amounts of data can be retrieved quickly and efficiently.
- Operations like Insertion, deletion, manipulation of data is also done in almost no time.

- Maintains well-defined standards.
- High data security.

4.3 Reusable Plugins

Bootstrap

Bootstrap gained a lot of traction after it was released in 2011, and for good reason. Bootstrap is popular among web designers and developers because it is versatile and simple to use. Its main advantages are that it is responsive by design, that it supports a wide range of browsers, that it provides a consistent design by using reusable components, and that it is simple to use and learn. It comes with built-in support for jQuery plugins and a programmatic JavaScript APIs

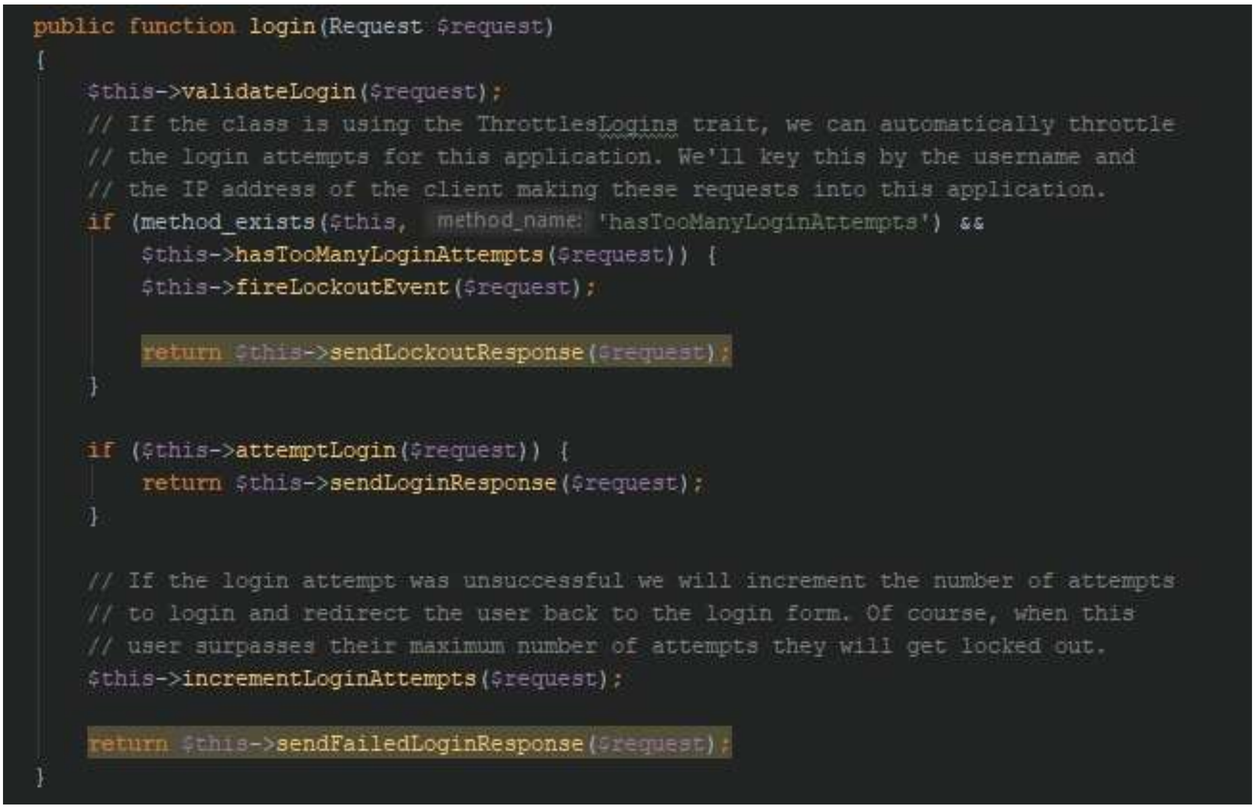
Laravel

Authentication logic, mailer library drivers, security and cross-site scripting, error and exception handling, web routing, and message queuing are just a few of the features that come standard with Laravel's framework.

4.4 Major codes

The e- tutor application's major code segments are discussed in detail below. The code segment of the login in e- tutor application's major code segments are discussed in detail below. Within in the Laravel framework it has its own login functionality. It will check for the user’s input criteria has match the data which is already in the database -> users table

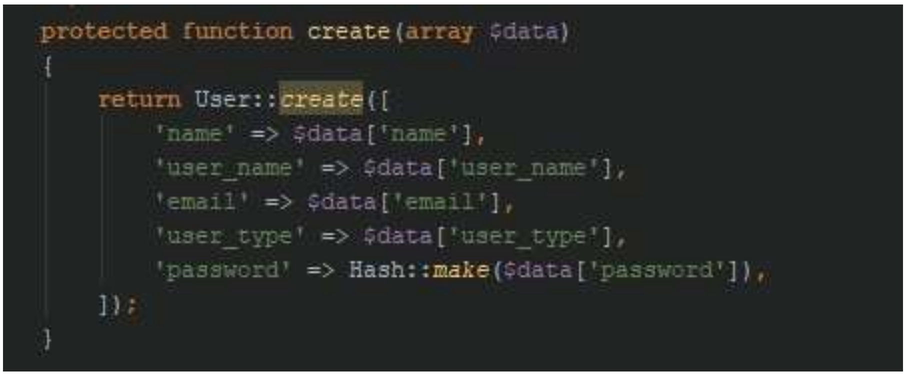
`



```
public function login(Request $request)
{
    $this->validateLogin($request);
    // If the class is using the ThrottlesLogins trait, we can automatically throttle
    // the login attempts for this application. We'll key this by the username and
    // the IP address of the client making these requests into this application.
    if (method_exists($this,  method_name: 'hasTooManyLoginAttempts') &&
        $this->hasTooManyLoginAttempts($request)) {
        $this->fireLockoutEvent($request);

        return $this->sendLockoutResponse($request);
    }

    if ($this->attemptLogin($request)) {
        return $this->sendLoginResponse($request);
    }

    // If the login attempt was unsuccessful we will increment the number of attempts
    // to login and redirect the user back to the login form. Of course, when this
    // user surpasses their maximum number of attempts they will get locked out.
    $this->incrementLoginAttempts($request);

    return $this->sendFailedLoginResponse($request);
}
```

Figure 21: Chapter 4: Login Verification code snippet

This code snippet will show you how the signup is facilitated with in the e tutoring system. Based on the provided email address system will check if the user is already within the system. There are two types of main users within the system tutor and student. Note that the provided password will be sent through hash functionality and it will be saved inside the database-> users table

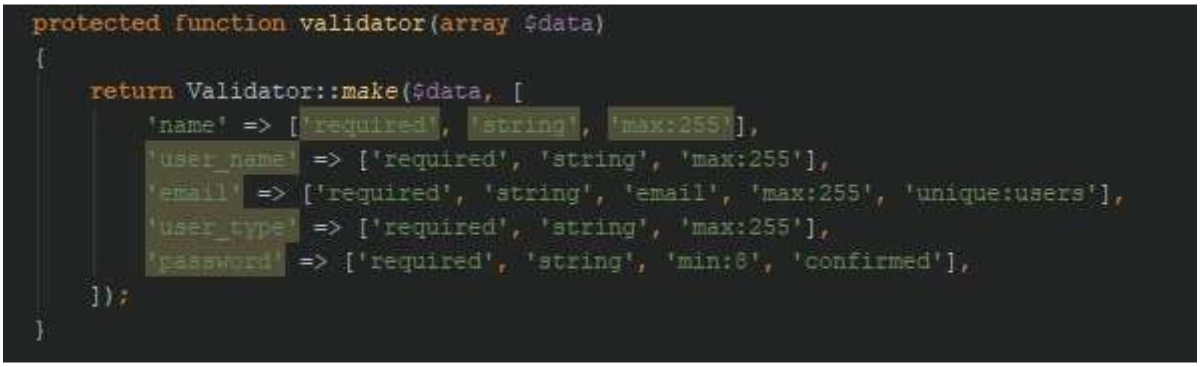


```
protected function create(array $data)
{
    return User::create([
        'name' => $data['name'],
        'user_name' => $data['user_name'],
        'email' => $data['email'],
        'user_type' => $data['user_type'],
        'password' => Hash::make($data['password']),
    ]);
}
```

Figure 22: Chapter 4: Login Email Verification code snippet

Underneath code will show you how the string validation was provided when creating a user

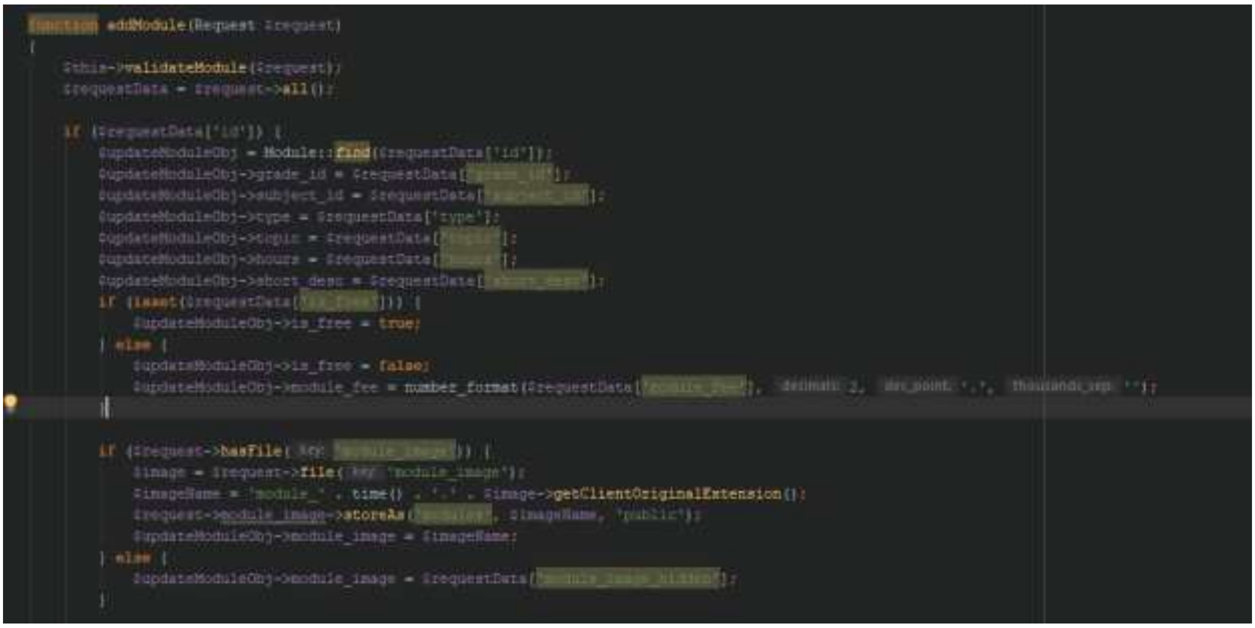
`



```
protected function validator(array $data)
{
    return Validator::make($data, [
        'name' => ['required', 'string', 'max:255'],
        'user_name' => ['required', 'string', 'max:255'],
        'email' => ['required', 'string', 'email', 'max:255', 'unique:users'],
        'user_type' => ['required', 'string', 'max:255'],
        'password' => ['required', 'string', 'min:8', 'confirmed'],
    ]);
}
```

Figure 23: : Chapter 4: User creation code snippet

Module creation code snippet was provided in the below , the request will be take down all the provided data and it will be mapped into the add module object once, also it will check the module related picture related content as well. Once done user will be able to create the module.

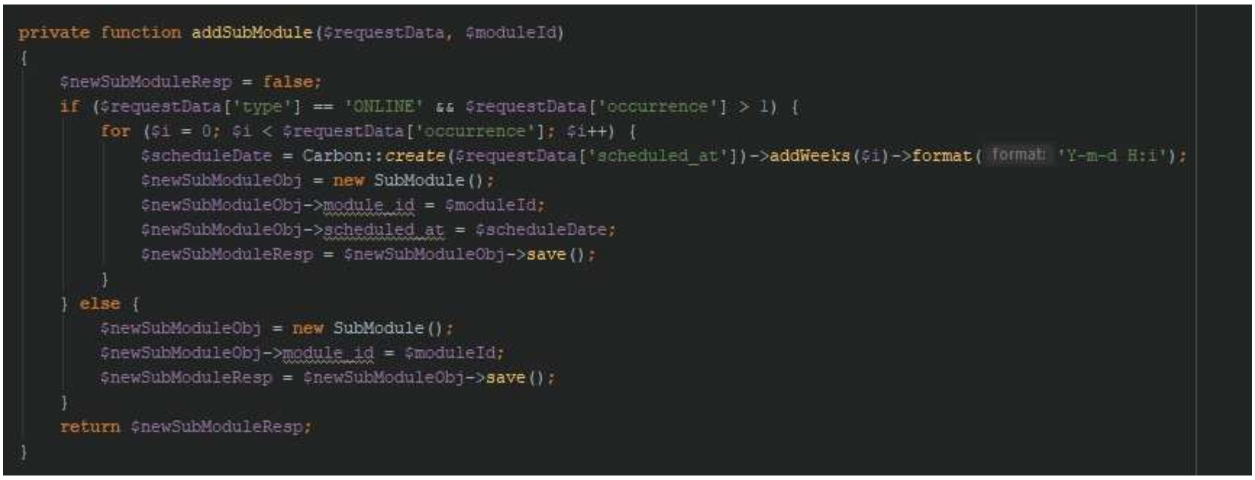


```
function addModule(Request $request)
{
    $this->validateModule($request);
    $requestData = $request->all();

    if ($requestData['id']) {
        $updateModuleObj = Module::find($requestData['id']);
        $updateModuleObj->grade_id = $requestData['grade_id'];
        $updateModuleObj->subject_id = $requestData['subject_id'];
        $updateModuleObj->type = $requestData['type'];
        $updateModuleObj->topic = $requestData['topic'];
        $updateModuleObj->hours = $requestData['hours'];
        $updateModuleObj->short_desc = $requestData['short_desc'];
        if (isset($requestData['is_free'])) {
            $updateModuleObj->is_free = true;
        } else {
            $updateModuleObj->is_free = false;
            $updateModuleObj->module_fee = number_format($requestData['module_fee'], decimals: 2, dec_point: '.', thousands_sep: '');
        }

        if ($request->hasFile( key: 'module_image')) {
            $image = $request->file( key: 'module_image');
            $imageName = 'module_' . time() . '.' . $image->getClientOriginalExtension();
            $request->module_image->storeAs('modules', $imageName, 'public');
            $updateModuleObj->module_image = $imageName;
        } else {
            $updateModuleObj->module_image = $requestData['module_image_hidden'];
        }
```

Figure 24 : Chapter 4: Module creation code snippet

Following code snippet will show you how the occurrence will show save into the module object

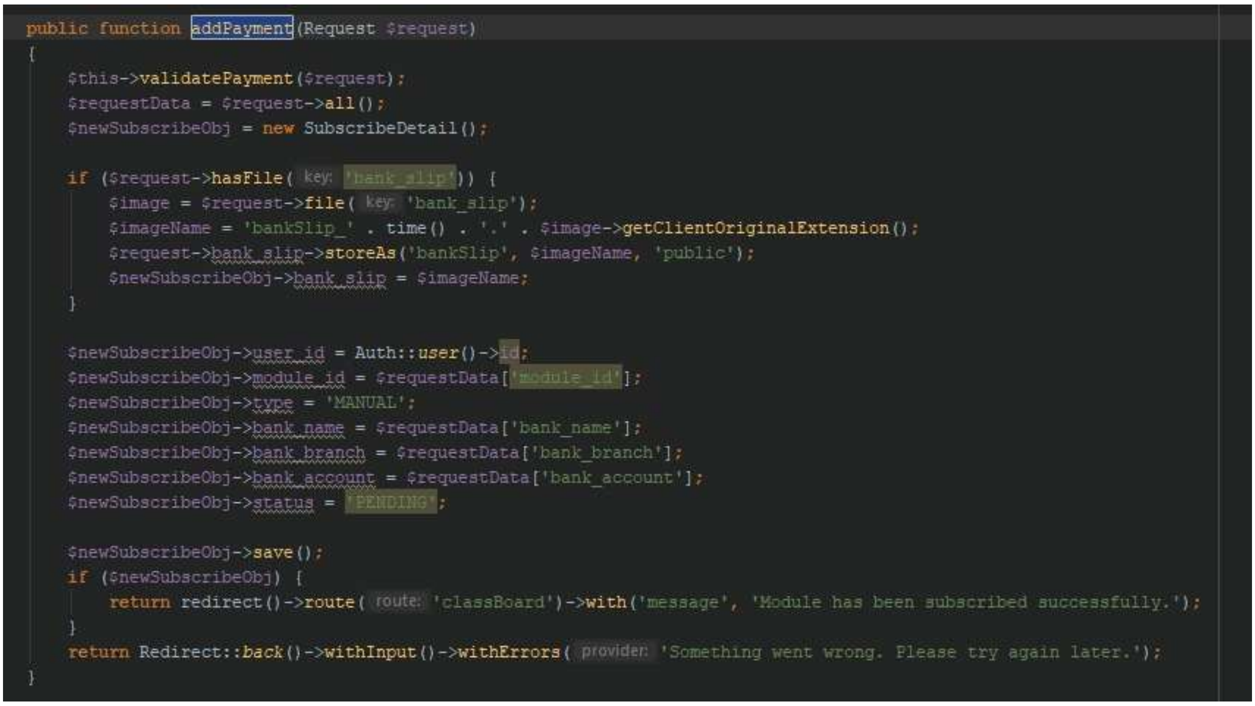
`



```php
private function addSubModule($requestData, $moduleId)
{
    $newSubModuleResp = false;
    if ($requestData['type'] == 'ONLINE' && $requestData['occurrence'] > 1) {
        for ($i = 0; $i < $requestData['occurrence']; $i++) {
            $scheduleDate = Carbon::create($requestData['scheduled_at'])->addWeeks($i)->format( format: 'Y-m-d H:i');
            $newSubModuleObj = new SubModule();
            $newSubModuleObj->module_id = $moduleId;
            $newSubModuleObj->scheduled_at = $scheduleDate;
            $newSubModuleResp = $newSubModuleObj->save();
        }
    } else {
        $newSubModuleObj = new SubModule();
        $newSubModuleObj->module_id = $moduleId;
        $newSubModuleResp = $newSubModuleObj->save();
    }
    return $newSubModuleResp;
}
```

Figure 25: Chapter 4: Module Object Creation

Below code will show you how manual add payment code works. Here it will allow user to provide bank details and the bank payment slip photo. Once provided it will be saved into the database and the default status will be shown as PENDING.



```php
public function addPayment(Request $request)
{
    $this->validatePayment($request);
    $requestData = $request->all();
    $newSubscribeObj = new SubscribeDetail();

    if ($request->hasFile( key: 'bank_slip')) {
        $image = $request->file( key: 'bank_slip');
        $imageName = 'bankSlip_' . time() . '.' . $image->getClientOriginalExtension();
        $request->bank_slip->storeAs('bankSlip', $imageName, 'public');
        $newSubscribeObj->bank_slip = $imageName;
    }

    $newSubscribeObj->user_id = Auth::user()->id;
    $newSubscribeObj->module_id = $requestData['module_id'];
    $newSubscribeObj->type = 'MANUAL';
    $newSubscribeObj->bank_name = $requestData['bank_name'];
    $newSubscribeObj->bank_branch = $requestData['bank_branch'];
    $newSubscribeObj->bank_account = $requestData['bank_account'];
    $newSubscribeObj->status = 'PENDING';

    $newSubscribeObj->save();
    if ($newSubscribeObj) {
        return redirect()->route( route: 'classBoard')->with('message', 'Module has been subscribed successfully.');
    }
    return Redirect::back()->withInput()->withErrors( provider: 'Something went wrong. Please try again later.');
}
```

Figure 26: Chapter 4: Manual payment code snippet

`

5 CHAPTER 05: TESTING AND EVALUATION

5.1 Introduction

The implemented system is intended to be tested and evaluated with an emphasis on both functional and non-functional requirements. This chapter will go over the testing that was done on the developed system, including test cases, test results, and user feedback.

5.2 Testing Overview

E tutor application is made out to ensure both functional and nonfunctional requirements. Blackbox is the testing method which have used to do end to end testing . The application The requirements phase starts with gathering needs, then moves on to test planning, where risk and mitigation methods are defined. To cover the requirements specified in the criteria, test cases are created and executed. Any faults or defects detected during the process are fixed and retested. Several black box testing approaches, including Equivalence Partitioning, Boundary Value Analysis, and Error Guessing, are assessed during the test design process

A non-functional test is used to determine a program performs a specific task rather than checking the software is capable of performing that task.

`

5.2.1 **Functional Test Cases**

This testing has been performed to cover inside the E tutor application

Test Case ID	Test Description	Pre Conditions	Test Steps	Test Data	Expected Result	Test Status
001	view existing user login	N/A	Navigated to the login screen	N/A	User should be navigated to the login screen.	Pass
			User enter incorrect email address and password	UN: asd@ PW:112	error message will be displayed	Pass
			User enter incomplete email address with correct password	UN: asd@ PW:112@13Sg	User should be navigated to the login screen and should publish an error message	Pass
			User enters correct email and password	UN: TestingUAT123@gmail.com PW: Asd@12345	User should be navigated to the profile page	Pass
002	Create new user login	user must select Don't have account from the login page	Provide full name	Supun Wickrama	N/A	Pass
			Provide user name	Supun Wick	N/A	Pass
			Select either "I'm tuitor" or "I'm student" Button	Select both for separate two times	selection will be highlighted	Pass
			Enter valid email address	supun@gmail.com	N/A	Pass
			Enter invalid/incomplete email address	Supun@.com	error message will be displayed	Pass
			Enter password with one special character, one number, one captial letter, simple letter	Asd@1234	N/A	Pass
			Enter password with incorrect validation	ASD	error message will be displayed	Pass

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			Re enter password with matching to the previously entered password	Asd@1234	N/A	Pass
			Re enter password with no matching to the preiviously enter password	!!	error message will be displayed	Pass
			Press Register	N/A	Once selected the login related email will be sent to the relevant user's provided email address, user will be navigated to the login screen. At the initial login user will be navigated to the user profile page	Pass
003	User fills user profile details	user must log into the e tuition class application and must be navigated to the user profile page from the main menu	user can change pre provided name	Supun	N/A	Pass
			user cannot edit pre provided username	N/A	unable to select the field	Pass
			user can provide About me description	Hi my name is supun	updated	Pass
			User can put profile image of 100px in 100px photo	N/A	updated	Pass
			User trying to put profile image of 100px in 100px photo	N/A	error message will be displayed	Pass
			if user: tutor : enters multiple subjects	Maths, Science	this will be shown in separate tabs	Pass
			if user: tutor : enters teaching experience in numbers	7	Teaching experience will be shown	Pass
			if user: tutor : enters teaching experience in letters	N/A	unable to put alpha numeric letter in the field	Pass
			if user: Student: enters Grade	10	user can select this from the dropdown	Pass

`

			user presses update by putting valid data	N/A	Update will be successful and shown the success message	Pass
			user presses update by putting invalid data	N/A	error message will be displayed	Pass
004	Tutor navigated to the dashboard	tutor must logged into the e tuition class and must be navigated to the Dashboard page	tutor can see the already published courses	N/A	Number will be displayed	Pass
			tutor can see the created online courses	N/A	Number will be displayed	Pass
			tutor can see the created offline courses	N/A	Number will be displayed	Pass
			tutor can see the number of subscribers to all the published courses	N/A	Number will be displayed	Pass
005	Tutor creates online module	tutor must logged into the e tuition class and must be navigated to the Module management -> Create module page	must select the grade	Grade 10	There will be a drop user can select single grading for a single module	Pass
			must select the subject	Maths	Already applied subjects (in the user details page) will be listed down and use can select single subject for a single module	Pass
			must provide topic name	Basic Calculus 101	should alpha numeric letters	Pass
			must provide module fee	1000	user can type or either select it from the up scale button	Pass
			if the module is free	toggle should be enabled	once enabled if user put any fee as module fee will be disabled	Pass
			type must be selected as online		Radio button should be activated	Pass
			must provide Module start date time	2021-08:10 08:00	user must select date time from the provided calander and the timer	Pass
			must provide module duration	01:00	HH:MM should be provided for a single session	Pass

			Must provide No of sub modules	4	user can type or either select it from the up scale button	Pass
			Module image should be provided	N/A	Provided module image must be 2000px X 1333px	Pass
			Short description must be provided	Lorem ipsum dolor sit amet, consectetur adipiscing elit. Sed mauris dolor, placerat vitae mollis at, elementum id nisi	should content at least 100 characters	Pass
			Press Create	N/A	Once pressed success message will be published and created module will be shown in the added modules table	Pass
006	Tutor creates online sub module for selected module	tutor must logged into the e tuition class and must be navigated to the Module management ->	must select a module	calculus	there will be a dropdown user can select pre created sub module from the list	Pass
			must select a schedule	2021-08:10 08:00	There will be dropdown and depends on the provided number of sub modules in the module creation, it will listed down by adding seven days for each pre- selected date time	Pass
			Must provide a sub topic	Integral calculus	provided name will be displayed	Pass
			Must provide the course URL	meet.google.com/ex4gl	valid meeting URL need to be provided	Pass

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		Create sub module page	Must provide the content	Lorem ipsum dolor sit amet, consectetur adipiscing elit. Sed mauris dolor, placerat vitae mollis at, elementum id nisiLorem ipsum dolor sit amet, consectetur adipiscing elit. Sed mauris dolor, placerat vitae mollis at, elementum id nisiLorem ipsum dolor sit amet, consectetur adipiscing elit. Sed mauris dolor, placerat vitae mollis at, elementum id nisi	200 characters must be exceeded	Pass
			Must select create button		Module will be created user can put content from the Added sub modules table	Pass
			Add content for a sub module	Select add contents button	Once selected, user will be navigated to the relevant sub module related page	Pass
			can upload 3 videos	abc.flv	user can put maximum of 3 videos for a single module	Pass
			can upload Documents	abc.pdf	user can put maximum of 3 documents for a single module	Pass
			can upload Assignments	abcex.pdf	user can put maximum of 3 assignments for a single module	Pass
			press Reset button	N/A	Once selected pre-uploaded everything	Pass

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					will be vanished from the selection	Pass
			press Upload button	N/A	Once selected pre uploaded everything will be uploaded to the server, and it will be visible in the added contents table underneath the upload button	Pass
			Edit pre provided sub module content	N/A	Once press th edit button Added contents table, system will be navigated to the sub module related add content page, system will load all the pre uploaded content	Pass
007	Tutor creates Offline module	tutor must log into the e tuition class and must be navigated to the Module management -> Create module page	must select the grade	Grade 11	There will be a drop user can select single grading for a single module	Pass
			must select the subject	science	Already applied subjects (in the user details page) will be listed down and use can select single subject for a single module	Pass
			must provide topic name	Biology 101	should alpha numeric letters	Pass
			must provide module fee	2000	user can type or either select it from the up scale button	Pass
			if the module is free	toggle should be enabled	once enabled if user put any fee as module fee will be disabled	Pass
			type must be selected as offline		Radio button should be activated	Pass
			unable to provide Module start date time	N/A	user must unable to select date time from the provided calander and the timer	Pass
			unable to module duration	N/A	HH:MM should be unable to provided for a single session	Pass
			Must provide No of sub modules	4	user can type or either select it from the up scale button	Pass

`

			Module image should be provided	N/A	Provided module image must be 2000px X 1333px	Pass
			Short description must be provided	Lorem ipsum dolor sit amet, consectetur adipiscing elit. Sed mauris dolor, placerat vitae mollis at, elementum id nisi	should content at least 100 characters	Pass
			Press Create	N/A	Once pressed success message will be published and created module will be shown in the added modules table	Pass
008	Tutor check already scheduled classes	tuitor must logged into the e tuition class and must be navigated to the Module management -> Scheduled details page	Once navigated user can select the visibility from buttons month, week, day or month list wise	N/A	Depends on the selection the visibility of the page will be differed	Pass
009	Student navigated to the dashboard	Student must logged into the e tuition class and must be navigated to	Number of subscribed online courses	N/A	Number will be displayed	Pass
			Number of subscribed offline courses	N/A	Number will be displayed	Pass
			special notes or up next	N/A	if any special note such as cancel sub module or upcoming online classes will be displayed	Pass

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		the Dashboard page				
010	Student navigated to the Class board	Student must logged into the e tuition class and must be navigated to the class Board page	Related modules section	Subject: All Search Query:	It will display all the published module for grade 10 student related modules by all the tutors	Pass
			Subject or tutor specific search query	subject: Maths Search Query: Namal	Once selected maths subject and tutor Namal related modules will be shown into the relevant section	Pass
			Subject or module search query	subject: Maths Search Query: calculus	Once selected maths subject and module calculus related modules will be shown into the relevant section	Pass
011	Student check the module related sub modules and tutor related criteria prior to the purchase of the module	Student must log into the e tuition class and must be navigated to the class Board page	select view button against a relevant module	N/A	Once selected it will show the relevant tutor related Bio description, review rating for the relevant user, module related short description, last reviews given by the students and also it will show the sub module related topics and sub module related short description	Pass
012	Student navigated to the subscribed module related	Student must log into the e tuition class and must be navigated to the Module Management	view already subscribed module/s	N/A	Once visited user can check the module related content, sub module related content from there	Pass

`

		-> Subscribed Modules page				Pass
013	Student subscribed to a module	Student must logged into the e tuition class and must be navigated to the class Board page	select subscribe button against a relevant module	N/A	Once selected user will be navigated to the pay here IPG, user can setup the card related details over there and do the transaction from there	Pass

Table 2: Chapter 5:: Functional Testing Results table

5.2.2 Non-Functional Test Cases

Non-functional tests are just as important as functional tests when it comes to client satisfaction. These tests are intended to assess the application's readiness based on non-functional parameters that are never addressed in functional testing. Non-functional tests are created with a focus on parameters such as safety, usability, and efficiency

5.2.2.1 Security Testing

The goal of the security test is to find the application's flaws and weaknesses by exposing vulnerabilities.

Test Case ID	Test Description	Pre Conditions	Test Steps	Test Data	Expected Result	Test Status
NFS001	Register new user and verify the password field in Database	N/A	N/A	N/A	Password need to be encrypted and stored in the database	Pass
NFS002	Tutor Password update in Database	N/A	N/A	N/A	Stored encrypted value need to be changed. password need	Pass

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					to be encrypted and stored in the database	
NFS003	Student Password update in Database	N/A	N/A	N/A	Stored encrypted value need to be changed. password need to be encrypted and stored in the database	Pass

Table 3: Chapter 5::Security Testing Results table

5.2.2.2 Usability Testing

The goal of this usability testing is to find out whether application is user friendly to the end users. Here the target demographic users have contacted to the perform this usability testing

Test Case ID	Test Description	Pre Conditions	Test Steps	Test Data	Expected Result	Test Status
NFU001	Tutor can check pre scheduled modules	N/A	N/A	N/A	created module content can be seen	Pass
NFU002	Tutor can modify everything inside a module and a sub module	N/A	N/A	N/A	created module content can be modified	Pass
NFU003	Tutor can check history of the payments with pagination	N/A	N/A	N/A	Pagination is visible	Pass
NFU004	Students can check subscribed modules	N/A	N/A	N/A	Subscribed modules can be seen	Pass
NFU005	Student can check payments with pagination	N/A	N/A	N/A	Pagination is visible	Pass

Table 4: Chapter 5: Usability Testing Results table

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5.2.3 User Evaluation

This centered on how well users could learn and use the e tutor application to complete its agreed functionalities. It also refers to how satisfied users are with the developed application. A variety of feedback gathering approaches can be used to gather this information from users. Note that this is tested by visiting to the relevant personals home by obeying to the COVID 19 Guidelines which were declared by the government of Sri Lanka

These were the response which got from system tested demographics

More than 75% tested demographics from both students and tutors satisfied with the actual functionalities which already developed

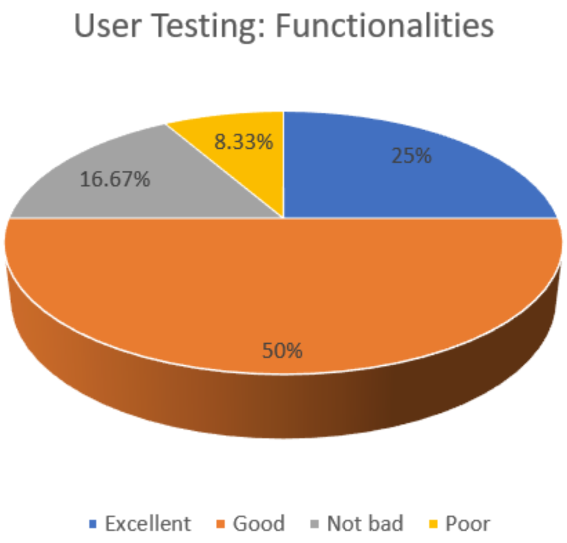

Figure 27: Chapter 5: Functionality Testing result

More than 87% tested demographics from both students and tutors satisfied with the user-friendliness which already developed.

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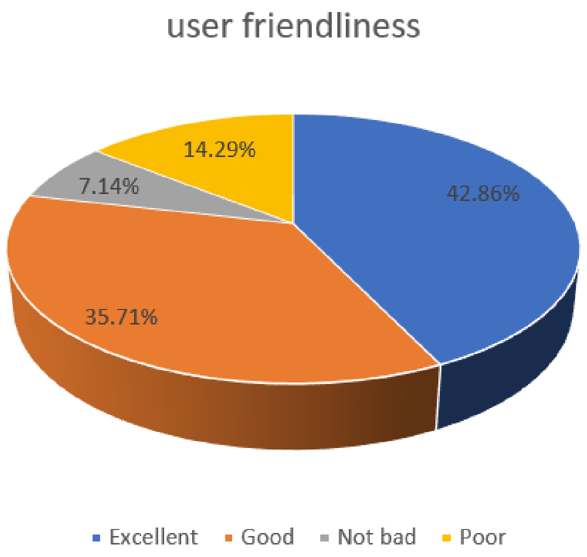

Figure 28: Chapter 5:User Friendliness Testing result

More than 70% tested demographics from both students and tutors satisfied with the overall product

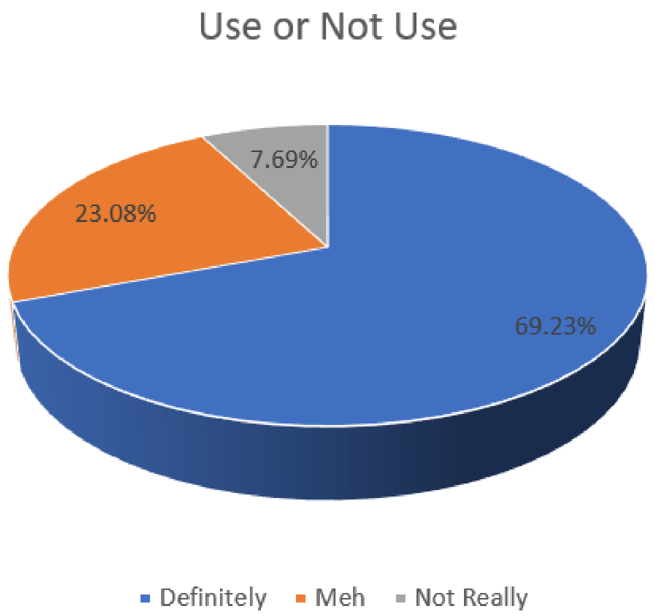

Figure 29: Chapter 5: Overall Result

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6 CHAPTER 06: CONCLUSION

This project involved a thorough examination of a number of factors, including, but not limited to, user behavior, particularly user friendliness for both student and tutor parties.

E-tutoring is more than just a technological advancement. It's part of a broader rethinking of how we as a species pass on our knowledge, skills, and values to future workers and students. I'll close this book by speculating on how e- tutoring and the functions it supports will evolve in the future.

This type of community project requires capturing the entire behavioral details of both students and tutors, the timeline was dragged due to the pandemic situation. Prior to development work, there was a lot of communication involved with sample set of people. This also made it difficult to evaluate the application because it was impossible to contact a large number of system users to obtain more accurate information.

Throughout the project, it was discovered that the academic program's success is highly dependent on how well the tutors and students are managed, and this type of project helps especially young tutors and to the personals to grab a mass audience, since the platform is for free I'm thinking that there will be huge tutor crowd engagement, Since I'm doing this as a community work, once after project goes live, my intention is to start invest the money for infrastructure and to start a patreon page and invite other enthusiastic social supporters personals like myself for a contribution for infra.

Future Enhancements

Current system will unable to publish zoom or teams link by itself due to the unavailability of such an open API

As a future enhancement I'm considering developing a freeze time for assignments. And with in couple of months trying to purchase out teams or zoom for schools' key and provide the arrange classes in secure way

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List of references

[1] Phobun, P. and Vicheanpanya, J. (2010). Adaptive intelligent tutoring systems for e-learning systems. Procedia - Social and Behavioral Sciences, [online] 2(2), pp.4064–4069. Available at: https://www.sciencedirect.com/science/article/pii/S1877042810006816 [Accessed 26 Nov. 2020].

[2]Online Tutoring System. (n.d.). Anasayfa. [online] Available at: https://www.onlinetutoringsystem.com [Accessed 26 Nov. 2020].

[3]Code Conquest. (n.d.). Lynda.com Developer Training Review. [online] Available at: https://www.codeconquest.com/reviews/lynda-developer-training/ [Accessed 26 Nov. 2020].

[4]Tiny Workshops. (2020). What is Domestika? Is it worth it? Review, best courses, and more. [online] Available at: https://tinyworkshops.com/2020/08/22/domestika/#what-is-domestika [Accessed 13 Jan. 2021].

[5]Don’t Do It Yourself. (2020). My Review of Thinkific & Avoid This Mistake When You Start Selling Courses. [online] Available at: https://ddiy.co/thinkific-review/#Recognizable_Thinkific_Customers [Accessed 13 Jan. 2021].

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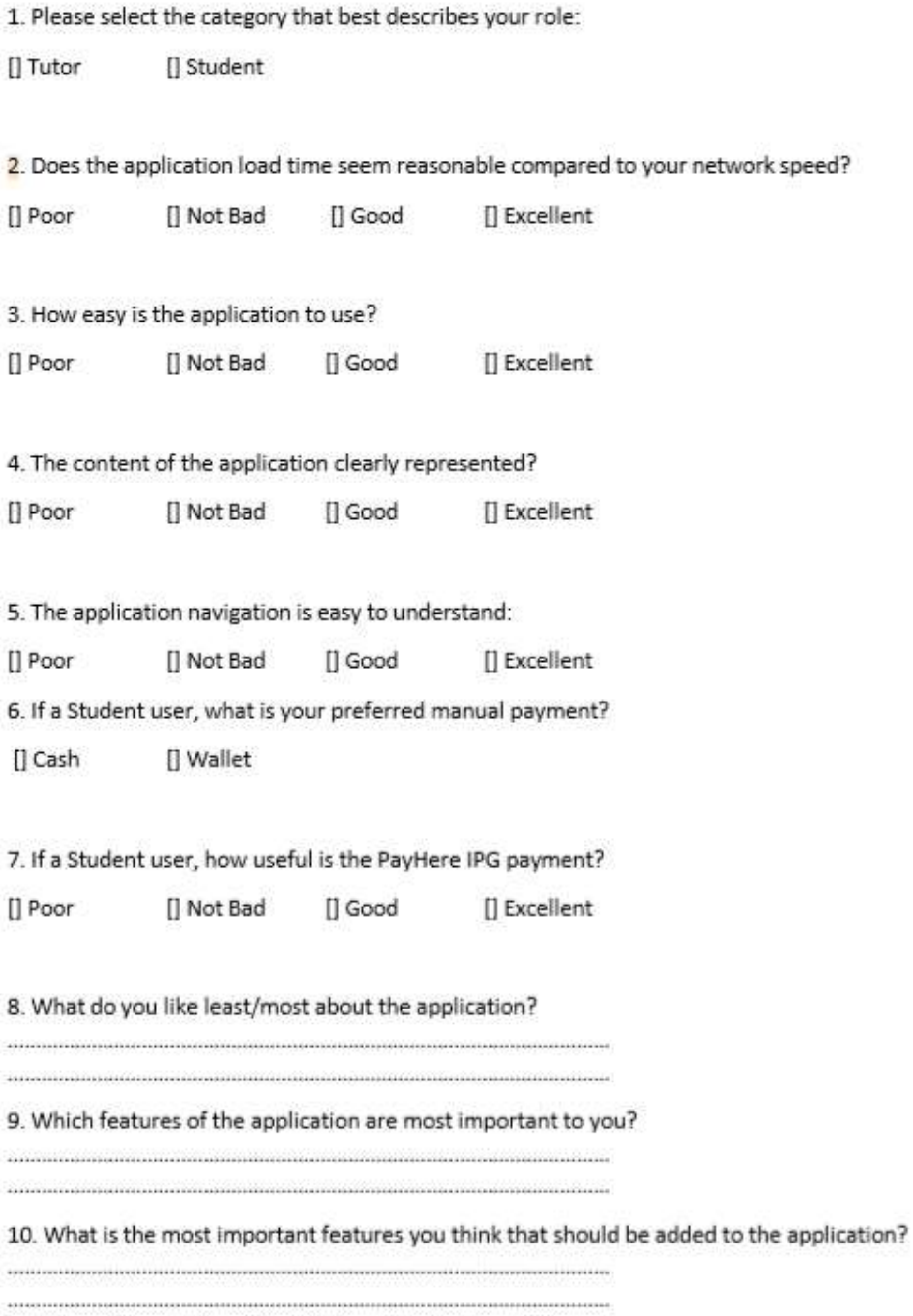
Appendices

Appendix A: Sample Questionnaire



1. Please select the category that best describes your role:

[] Tutor [] Student

2. Does the application load time seem reasonable compared to your network speed?

[] Poor [] Not Bad [] Good [] Excellent

3. How easy is the application to use?

[] Poor [] Not Bad [] Good [] Excellent

4. The content of the application clearly represented?

[] Poor [] Not Bad [] Good [] Excellent

5. The application navigation is easy to understand:

[] Poor [] Not Bad [] Good [] Excellent

6. If a Student user, what is your preferred manual payment?

[] Cash [] Wallet

7. If a Student user, how useful is the PayHere IPG payment?

[] Poor [] Not Bad [] Good [] Excellent

8. What do you like least/most about the application?

…………………………………………………………………………………………………

…………………………………………………………………………………………………

9. Which features of the application are most important to you?

…………………………………………………………………………………………………

…………………………………………………………………………………………………

10. What is the most important features you think that should be added to the application?

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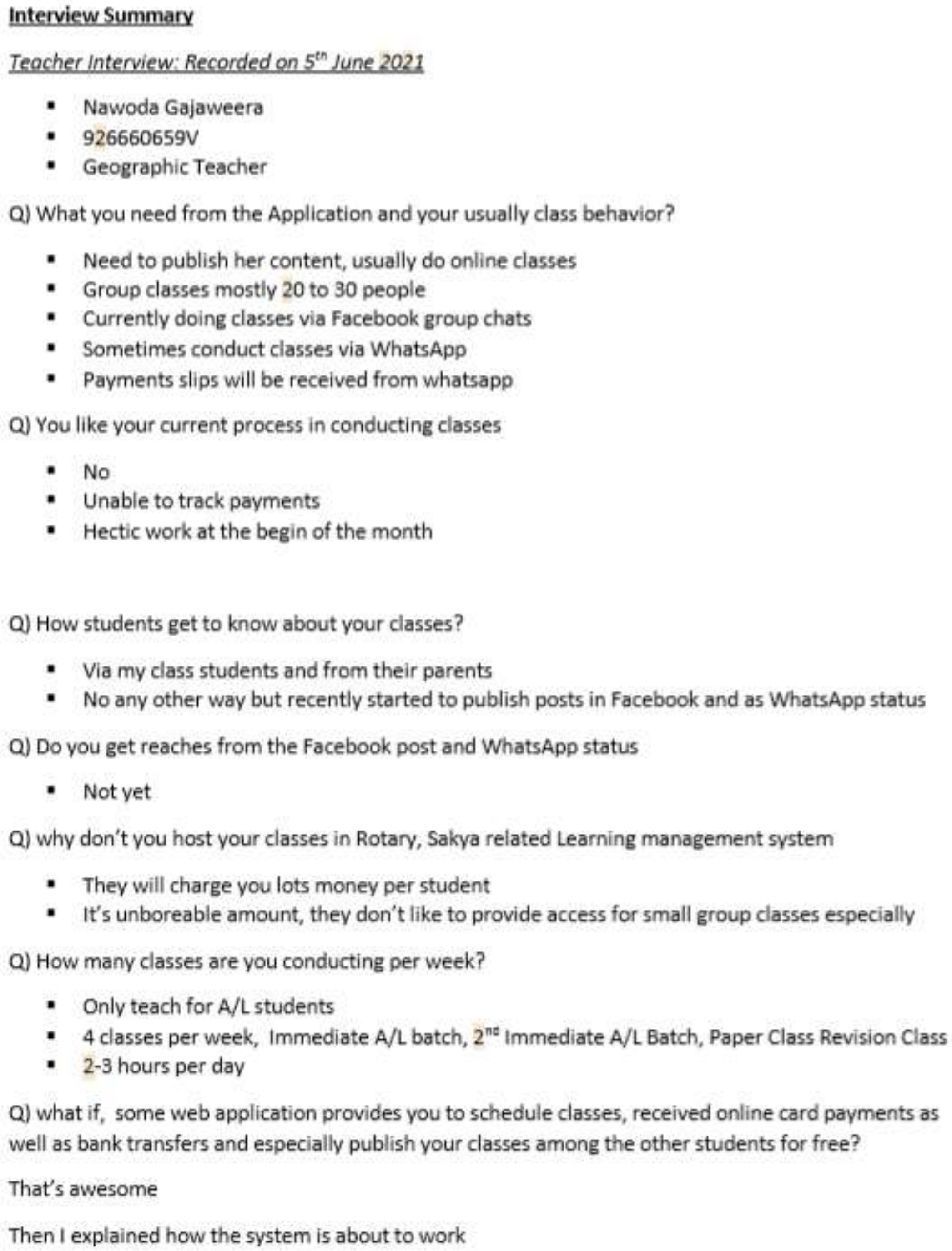
Appendix B: Sample Interview



Interview Summary

Teacher Interview: Recorded on 5th June 2021

- Nawoda Gajaweera
- 926660659V
- Geographic Teacher

Q) What you need from the Application and your usually class behavior?

- Need to publish her content, usually do online classes
- Group classes mostly 20 to 30 people
- Currently doing classes via Facebook group chats
- Sometimes conduct classes via WhatsApp
- Payments slips will be received from whatsapp

Q) You like your current process in conducting classes

- No
- Unable to track payments
- Hectic work at the begin of the month

Q) How students get to know about your classes?

- Via my class students and from their parents
- No any other way but recently started to publish posts in Facebook and as WhatsApp status

Q) Do you get reaches from the Facebook post and WhatsApp status

- Not yet

Q) why don't you host your classes in Rotary, Sakya related Learning management system

- They will charge you lots money per student
- It's unboreable amount, they don't like to provide access for small group classes especially

Q) How many classes are you conducting per week?

- Only teach for A/L students
- 4 classes per week, Immediate A/L batch, 2nd Immediate A/L Batch, Paper Class Revision Class
- 2-3 hours per day

Q) what if, some web application provides you to schedule classes, received online card payments as well as bank transfers and especially publish your classes among the other students for free?

That's awesome

Then I explained how the system is about to work