សាកលវិទ្យាល័យភូមិន្ទភ្នំពេញ

ROYAL UNIVERSITY OF PHNOM PENH

វេទិកាសិក្សាតាមអ៊ីនធឺណិត

Personal Online Learning Platform

A Research Report
In Partial Fulfilment of the Requirement for the Degree of
Bachelor of Engineering in Information Technology Engineering

ណាត សុវណ្ណរតន៍

NATH SOVANROTH

June 2024

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June 2024

មូលន័យសង្ខេប

ការរៀនតាមអនឡាញត្រូវបានស្ថាប័នអប់រំជាច្រើនបានទទួលយកធ្វើជាវិធីសាស្ត្រដើម្បីធ្វើការអប់រំដល់សិស្ស ជាពិសេសក្នុងកំឡុងពេលនៃការរីករាលត្បាតនៃជំងឺកូវីដ១៩ ហើយវាហាក់ដូចជាមានឥទ្ធិពលទៅលើការអប់រំនាពេលអនាគត។ដូចដែលយើងបានឃើញទោះក្រោយពីជំងឺរីករាតត្បាតបានបញ្ចប់ក៏នៅមានសាកលវិទ្យាល័យមួយចំនួនក៏នៅតែបង្រៀនតាមអនឡាញ។ មិនត្រឹមតែនិស្សិតសកលវិទ្យាល័យទេ ប៉ុន្តែ សិស្សខ្លះនៅវិទ្យាល័យក៏ទទួលបានការបង្រៀនអនឡាញដែល សម្រាប់ថ្នាក់បន្ថែមរបស់ពួកគេ ក៏ដូចជា ការរៀបត្រៀបប្រឡង Contest ផ្សេងៗដែលមាននៅប្រទេសក្រៅ។

ABSTRACT

Online learning has been adopted by many educational institutions as a method of delivering education to their students, especially during the COVID-19 pandemic, and it appears to have a positive impact on students' education in the future. As we can see, since the pandemic ended, there are also still some university students teaching online. Not only university students, but some students at high school are also taking online teaching for their extra class or even preparation for a math contest.

Keywords: online learning; future of education; contest

SUPERVISOR'S RESEARCH SUPERVISION STATEMENT

TO WHOM IT MAY CONCERN

Name of program: Bachelor's Degree of Information Technology of Engineering
Name of candidate: **NATH Sovanroth**

Title of research report: **Personal Online Learning Platform**

This is to certify that the research carried out for the above titled bachelor's research report was completed by the above-named candidate under my direct supervision. This thesis material has not been used for any other degree. I played the following part in the preparation of this research report: Online Learning Platform

Supervisor's name: **CHHIM Bunchhun**

Supervisor's signature: ……

Date ……

CANDIDATE'S STATEMENT

TO WHOM IT MAY CONCERN

This is to certify that the research report that I, NATH Sovanroth, hereby present entitled "Personal Learning Platform" for the degree of Bachelor of Information Technology Engineering at the Royal University of Phnom Penh is entirely my own work and, furthermore, that it has not been used to fulfill the requirements of any other qualification, in whole or in part, at this or any other university or equivalent institution.

No reference to, or quotation from, this document may be made without the written approval of the author.

Signed by NATH Sovanroth: ……

Date: …….

Sign by CHHIM Bunchhun: ……..

Supervisor's signature: ……..…

Date……..……

ACKNOWLEDGNENTS

I would first like to pay my gratitude toward my supervisor, Mr. CHHIM Bunchhun for all his motivation, support and assistance getting through the process of earning bachelor's degree. You have helped in making this great experience for me during this research period to improve my new skill and more challenge with the time management.

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Finally, I must express my very profound gratitude to my parents for providing me with unfailing support and continuous encouragement throughout my year of study and through the process of researching and writing this report. This accomplishment would not have been possible without them. knowledge and teach me all new things that I can improve in my daily job. Thank you.

Sincerely,
NATH Sovanroth

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CHAPTER 1
INTRODUCTION

1.1 Background to the study

In our country, technology's impact on education is still limited. Recognizing this, the idea of an online learning platform was born. This platform aims to democratize education, especially e-learning. By using web application technology, it breaks down barriers to learning, offering an inclusive and dynamic environment. The platform emphasizes innovation and adaptability, seeking to redefine online learning by tailoring experiences to individual needs. Ultimately, it aims to revolutionize education by combining technology and learning in a way that's accessible and empowering for everyone.

1.2 Problem Statement

According to what I experience in class and what I've asked the student who is currently studying in our ITE department, I got the information that they somehow can't interact with the professor enough since they are sitting at the back, and more than that, they don't want to ask the professor in class to make sure about their misunderstood since they think their question may disturb others. Essentially, during classroom instruction, students struggle to comprehend the entirety of the material, leading them to seek alternative courses for further self-study. However, they still struggle to locate a teacher who can guide them and provide them with current resources.

And I also make a survey about to ask about the problem, which is I have met, and I got 7 responses from that survey say that 71.4% are facing the problem that they don't want to ask their misunderstood part in a lesson because you don't want to disturb the other students who are clearly about it?

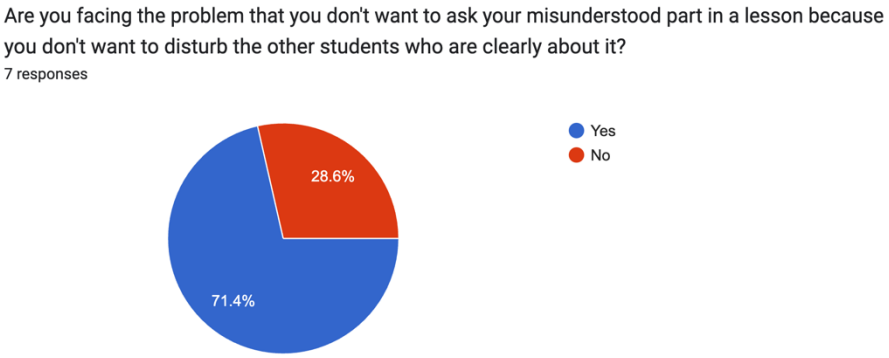

Figure 1 Proof of problem 1

Not only the first problem, but the second problem is that it is hard to find the lecture or structure to instruct you for self-learning or taking an online course. We also get 7 responses from that, and 87.5% agree that they have met this problem.

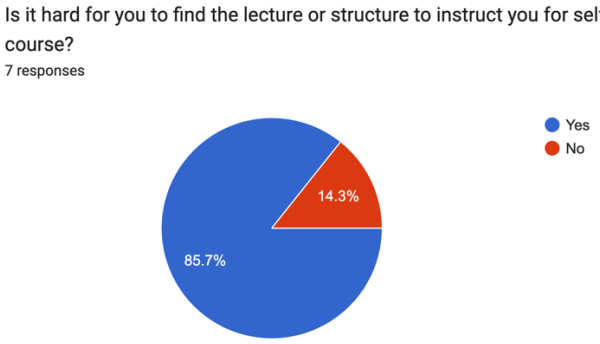

Figure 2 proof of problem 2

1.3 Aim and Objective of Study

The aim of this study is to develop and evaluate an online learning platform to address the shortcomings of traditional education and harness the potential of technology for educational empowerment. To achieve this aim, the following objectives will be pursued:

- Develop a user-friendly and accessible web application for online learning that is mainly focused on teaching and instructing Cambodian IT students who cannot speak or know about English.
- No more limited interaction with our platform; users can replay or rewatch the videos anytime. Plus, the lack of interaction will be solved by our users commenting and asking questions about their problems with the course that they have taken, and our admin will reply to solve their problem by saying that this can solve the lack of interaction because users will be more courageous and ask their problems online rather than asking in class, which is why they are afraid to ask.

1.4 Rational of the Study

The rationale behind this study lies in the urgent need to bridge the digital divide in education and leverage technology for inclusive and equitable learning opportunities. By developing an online learning platform, we seek to overcome the limitations of traditional

education, such as geographical constraints, resource scarcity, and rigid pedagogical frameworks. Moreover, the integration of technology enables personalized learning experiences, fosters collaboration, and cultivates digital literacy skills essential for success in the modern world. Thus, this study serves as a proactive response to the evolving educational landscape, aligning with the broader goals of promoting lifelong learning and sustainable development.

1.5 Limitation and Scope

While this study endeavors to address significant gaps in educational provision through the development of an online learning platform, it is not without limitations. Firstly, the scope of the study is delimited to the development and evaluation of the platform within a specific context, thereby limiting generalizability to other settings. Secondly, the effectiveness of the platform may be contingent upon factors such as internet connectivity, technological proficiency, and institutional support, which are beyond the scope of this study to control. Additionally, the study may encounter logistical challenges and resource constraints that could impact the implementation and outcomes. Despite these limitations, the study seeks to generate valuable insights and contribute to the ongoing discourse on leveraging technology for educational innovation and empowerment.

- Authentication

Since this is an application that requires the user to have an account to buy, watch, and comment on the course, we will have authentication for the user to sign up, login, and forget their password.

- Dashboard

As you know, this application was created for learning, so the dashboard for the user is where the course that was bought by the user is stored, and it is also easy for users to know which course was already bought.

- Browse

Moreover, on the dashboard, we have the browse page for users, where all the courses that are created are stored and allow the user to buy them for study. For the course that is owned by the user, we will have the badge owned for the user to know that course is already bought

and be able to buy that course there. and we also have the filter course by category, which is made for the user to filter the course by category.

- Search

Basically, every application will have a search function for the user to search for the data that they want, so in our application, we also have a search feature for the user to search for the data they want to buy or watch by their key word.

- Setting

Since this is an application that requires an account to access email, changing the password is one of the things we care about the most. In this setting page, we will have the option to change the password for the user, which allows the user to change their password, and more than that, we will allow users to comment with questions to ask about their problems related to the course. We also have the feature for the user to change their profile picture.

- Teacher mode

What is teacher mode in this application? So, in teacher mode, the feature is needed to be in the application, but this feature only develops for the account and has a role to access it only for creating the courses, updating the courses, and deleting the courses that contains videos.

1.6 Structure of Study

I've followed the structure of the previous research design, which studied education in Cambodia, from the document called eLearning in Higher Education Makes Its Debut in Cambodia: Implications of the Provincial Business Education Project from Mr.**Buenafe R. Abdon,** Mr. **Robert T. Raab** and Mr.**Seishi Ninomiya** and another document called Why Online Learning Is the Future of Education from Ms. **Seavmey Meng**.

CHAPTER 2

LITTERITURE REVIEW

2.1 Overview of the Research Topic

Research on online learning platforms focuses on several key areas. It looks at how the design and usability of these platforms affect student engagement and learning outcomes and explores the integration of new technologies. Overall, the goal is to enhance the educational experience through technological and pedagogical innovations while addressing the challenges of engagement, quality, and accessibility.

2.1.1 Design and Usability

The design and usability of online learning platforms significantly impact student engagement and learning outcomes. Research emphasizes the importance of intuitive interfaces, mobile responsiveness, and accessibility features to enhance the user experience (Al-Fraihat, Joy, & Sinclair, 2020).

2.1.2 Integration of Technologies

Online learning platforms integrate various technologies to enhance educational experiences. While not focusing on AI, advancements in learning management systems (LMS) and interactive tools play crucial roles in fostering engagement and supporting diverse learning styles (Chou & Peng, 2017).

2.1.3 Challenges in Engagement, Quality, and Accessibility

Engagement remains a challenge in online education. Studies highlight strategies such as gamification, interactive content, and collaborative learning environments to enhance student participation and motivation (Hartnett, St. George, & Dron, 2011). Ensuring accessibility for students with disabilities through features like screen readers and captioning is also essential (Seale, 2006).

2.2 Previous Studies and Finding

2.2.1 Overview of existing application

Since we have created a platform, there will be existing platforms that have the same goals or features as ours, so the existing platforms are:

- Oddompang Learning, which is a learning platform that allows students to learn from good lecturers and good courses for the jobs that are needed in everyday technology, but this platform limits users, such as creating accounts and forgetting passwords, and e-payment in application, That problem will be fixed on our platform by letting users create accounts by themselves and allowing them to reset passwords when they forget their passwords, and users can pay with PayPal, which is easy for users to buy whenever they need to, and there is no need to contact us to create accounts for them.
- Reanmore is also a learning platform, but a bit different from our website and Odompang. This web page only displays the course price. If a user is interested in a course, users can contact the admin to add them to the Telegram channel for learning.

2.2.2 Findings from Previous Studies

After we have reviewed the existing application, we have noticed a lot of features that need to be improved in our new application, which we are going to create, such as authentication with a forgotten password and creating accounts by user. One more main feature that we need to have in our new application is payment via PayPal.

2.3 Theoretical Farmwork

The theoretical framework provides the foundation for understanding how and why certain approaches and features in online learning platforms are effective. This section will discuss relevant learning theories and the Technology Acceptance Model (TAM), which are crucial for designing and evaluating online learning environments.

2.3.1 Learning Theories

Learning theories offer insights into how people learn and how educational experiences can be designed to maximize learning outcomes. Three key learning theories relevant to online learning platforms are:

- **Constructivism:** Constructivism posits that learners construct their own understanding and knowledge of the world through experiences and reflecting on those experiences. In the context of online learning, this theory supports the use of interactive and experiential learning activities that allow students to build knowledge through active engagement. Features like simulations, problem-based learning, and collaborative projects align with constructivist principles, as they encourage learners to explore, question, and apply their knowledge in meaningful ways.
- **Cognitivism:** Cognitivism focuses on the mental processes involved in learning, such as thinking, memory, and problem-solving. This theory emphasizes the importance of how information is received, organized, stored, and retrieved by the mind. Online learning platforms can apply cognitivist principles by providing structured content, using multimedia to cater to different learning styles, and incorporating assessments that help reinforce and test knowledge. Tools like quizzes, flashcards, and mind maps are commonly used to support cognitive processes.
- **Social Learning Theory:** Social learning theory, proposed by Albert Bandura, emphasizes the importance of observing and modeling the behaviors, attitudes, and emotional reactions of others. In an online learning environment, this theory highlights the value of social interactions and learning from peers and instructors. Features such as discussion forums, group projects, and peer reviews facilitate social learning by allowing students to interact, share ideas, and learn from each other's experiences.
-

2.3.2 Technology and Model (TAM)

The Technology Acceptance Model (TAM) is a framework that helps understand how users come to accept and use technology. TAM suggests that two primary factors influence users' decisions about how and when they will use technology:

- **Perceived Ease of Use:** This refers to the degree to which a person believes that using a particular system would be free of effort. For online learning platforms, ensuring that

the interface is user-friendly, intuitive, and accessible is crucial. Features such as clear navigation, responsive design, and helpful tutorials can enhance perceived ease of use, making the platform more attractive to users.

- **Perceived Usefulness:** This refers to the degree to which a person believes that using a particular system would enhance their job performance or, in the context of education, their learning outcomes. An online learning platform must demonstrate its value by providing high-quality content, effective learning tools, and tangible benefits like improved knowledge, skills, and academic performance. Integrating analytics to track progress and offering personalized learning paths can help users see the usefulness of the platform.

By applying these theories and models, online learning platforms can be designed to not only facilitate effective learning but also ensure that users are motivated to adopt and continue using the platform. Understanding and implementing these theoretical principles can lead to a more engaging, efficient, and user-friendly educational experience.

CHAPTER 3
METHODOLOGY

3.1 Research Design

When developing an application, we must address four points: data collection (how we collect data), tool (what tool are we using to create this application), algorithm for using this

app, system architecture, use case diagram and development technology (what technology or programming language are we using).

a. Collect data

For the collected data, as mentioned above, we will study the documents, which are based on the study on online learning, which will have an effect in Cambodia. Moreover, during the course for teaching, I will take the resources, such as documents from the official website, to create the course, follow it, and make the course effective and usable in real-world work. Additionally, the data I collected from surveys will inform the problem statement and the testing results for the UI/UX and functionality of the application.

b. Tools

For the tools that are going to be used for creating this web application, I will select the following:

- **GitHub**:
  - **Purpose**: Version control and code repository.
  - **Description**: GitHub will serve as the primary platform for storing and managing the project's codebase. It will allow for tracking changes, collaborating with team members, and managing different versions of the project.
- **Visual Studio Code (VS Code)**:
  - **Purpose**: Coding environment for both the backend and frontend.
  - **Description**: VS Code will be used as the integrated development environment (IDE) for writing, editing, and debugging code. Its extensive range of extensions and user-friendly interface will facilitate efficient development.
- **Postman**:
  - **Purpose**: API testing.
  - **Description**: Postman will be used to test and validate APIs. It provides a robust platform for creating, testing, and documenting APIs, ensuring they function correctly and meet the project's requirements.
- **Notion**:
  - **Purpose**: Project management.

    - **Description**: Notion will be utilized for organizing and managing the project's tasks, timelines, and documentation. It offers a versatile workspace for tracking progress, assigning tasks, and collaborating with team members.
- **Vercel**:
    - **Purpose**: Frontend deployment.
    - **Description**: Vercel will be used to deploy the frontend of the web application. It provides a seamless and efficient way to host and manage the frontend, ensuring quick and reliable access for users.
- **Amazon Web Services (AWS)**:
    - **Purpose**: Backend deployment.
    - **Description**: AWS will be employed for deploying and managing the backend services of the web application. Its scalable and reliable infrastructure will support the backend's functionality and performance.

By utilizing these tools, we will ensure a streamlined development process, effective project management, and a robust and scalable deployment of the web application.

c. Development Technologies

As this web application is created to be user-friendly on every device that has a browser, I am going to choose Tailwind CSS for styling and ReactJS for handling login on the front end, and for the backend, I will use NestJS with the database MySql. And using Postman for testing the endpoints before making them used in the frontend.

• In addition to the technology described above for this project, I have been utilizing a variety of third-party services to enhance functionality and streamline processes.

- For instance, I use Cloudinary for efficient image storage and management.
    - This service allows for easy handling and transformation of images, which is crucial for maintaining a responsive and visually appealing user interface.
- For handling the payment process, I have integrated PayPal.
    - This integration facilitates secure and seamless transactions, allowing users to purchase courses with confidence.
- For authentication and secure communication, I rely on JSON Web Tokens (JWT).

    - JWTs are instrumental in ensuring that user sessions are secure, and that data is exchanged safely.
- On the backend, I also employ Mulet for file uploads.
    - Mulet's robust capabilities ensure that files are uploaded efficiently and reliably, which is essential for maintaining a smooth user experience.
- Additionally, I use Nodemailer for sending messages from the backend.
    - Nodemailer is a powerful module that simplifies the process of sending emails, making it easier to handle user communications, notifications, and alerts directly from the server.

• On the front end, I use ReactJs, a highly popular JavaScript library known for building dynamic and responsive user interfaces.

- ReactJs allows for the creation of reusable UI components, which significantly enhances the development process and ensures consistency across the application.
- To manage the state of the application, I employ the Redux toolkit.
    - Redux provides a predictable state container, which simplifies the management of the application's state, especially in complex applications with numerous components and interactions.
- Additionally, I utilize Tailwind CSS for styling the user interface.
    - Tailwind CSS is a utility-first CSS framework that provides a highly customizable and efficient way to style applications.
    - By using Tailwind CSS, I can ensure that the user interface is not only aesthetically pleasing but also user-friendly and responsive across different devices and screen sizes.

This combination of technologies and services enables me to build a robust, secure, and user-centric application.

d. Algorithm for using the app

For making the purchase on the course, the user must find the course they want to buy first. After that, the user can make purchases by using PayPal, and after that, the user must confirm payment before it executes the payment, and the application will route the user to the dashboard page.

After buying courses, users can watch them by going to the dashboard and finding the courses they want to watch.

For the setting, the user can find it on their profile by clicking on it, and I will pop up the setting button, and the user can choose the data they want to update on that page.

For teacher mode, which is allowed access for the role user, if you want to create the course, you can click on the create course button, then fill in the course information. After that, you can fill in the video information, and you are good to go for creating the course.

For updating a course, you can see the course that exists on the table, and in the table, you will see the edit button. You can click the edit button, and you can edit the information, including the video information on that page.

Like the update, you will see the delete button next to the edit button, and after clicking on it, you must confirm delete before the course is deleted.

e. Project Management

For project management, I am going to use a model known as the agile method. The reason behind choosing this method is that since I develop both the backend and the frontend based on the module and deploy that feature when I complete it, when I move on to develop other modules, I can still come back to fix and add more features to the module that I have passed and deployed.

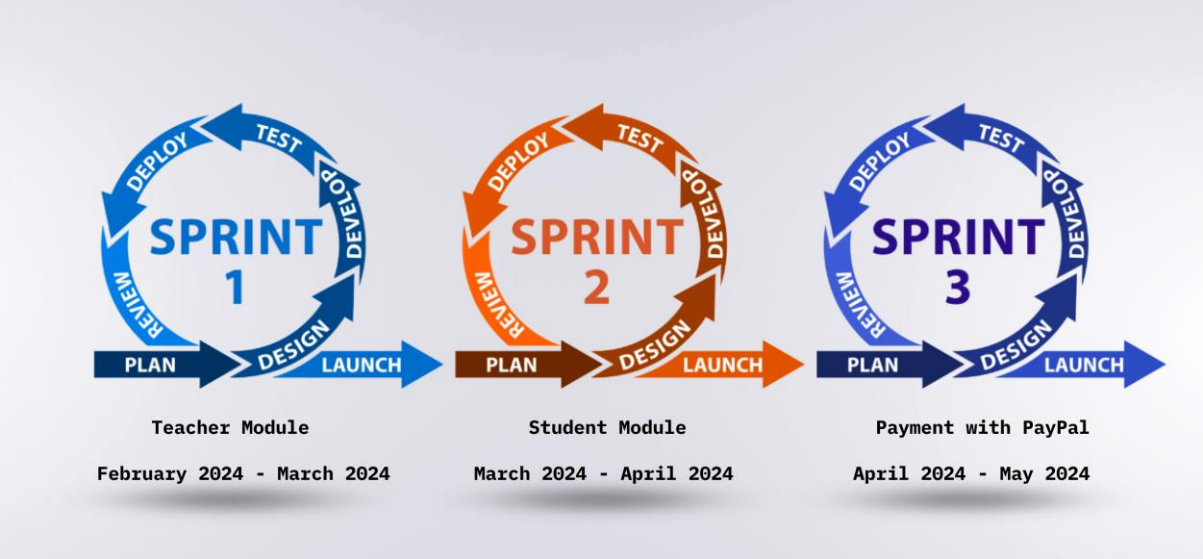

Figure 3 Project Management

f. Server Architecture

In this part, I am going to go through the server architecture, which is based on the deployment for the project. For the front end, I am going to use Vercel, which is a front-end cloud build for deployment, and I am going to use a subdomain for the front end to make it easy to find. For the backend, I am going to use AWS EC2, which is the compute cloud, where I am going to store the backend application and run it in background. To make the endpoint of the backend work in the deployment in the front end, I am going to use Nginx with certbot to generate the ssl to make the domain secure.

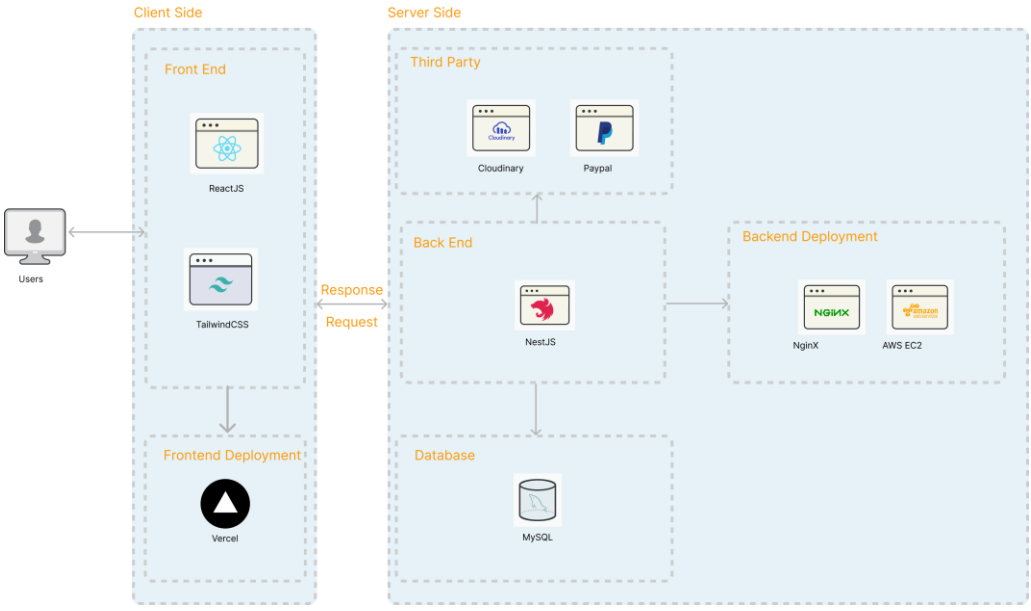

Figure 4 Server Architecture

g. Use case Diagram

In this use case diagram, the diagram is going to show how the project works and the process flow, so the first thing the user must have a device that can be used as a browser. and then the user can access our application through the browser. After that, the user will have to login or sign up, and then when the user logs in, our application will detect if that user has the role to access the teacher mode or not. If yes, they will have access to the teacher mode and can create courses, edit courses, and delete courses more than the user who does not have role access to the teacher mode and can only buy courses, search courses, view courses, and update settings. For buying the course, users must have an account logged in already, and the payment process will be done with PayPal. Before making any purchase, we also asked the user to confirm the payment to execute the payment.

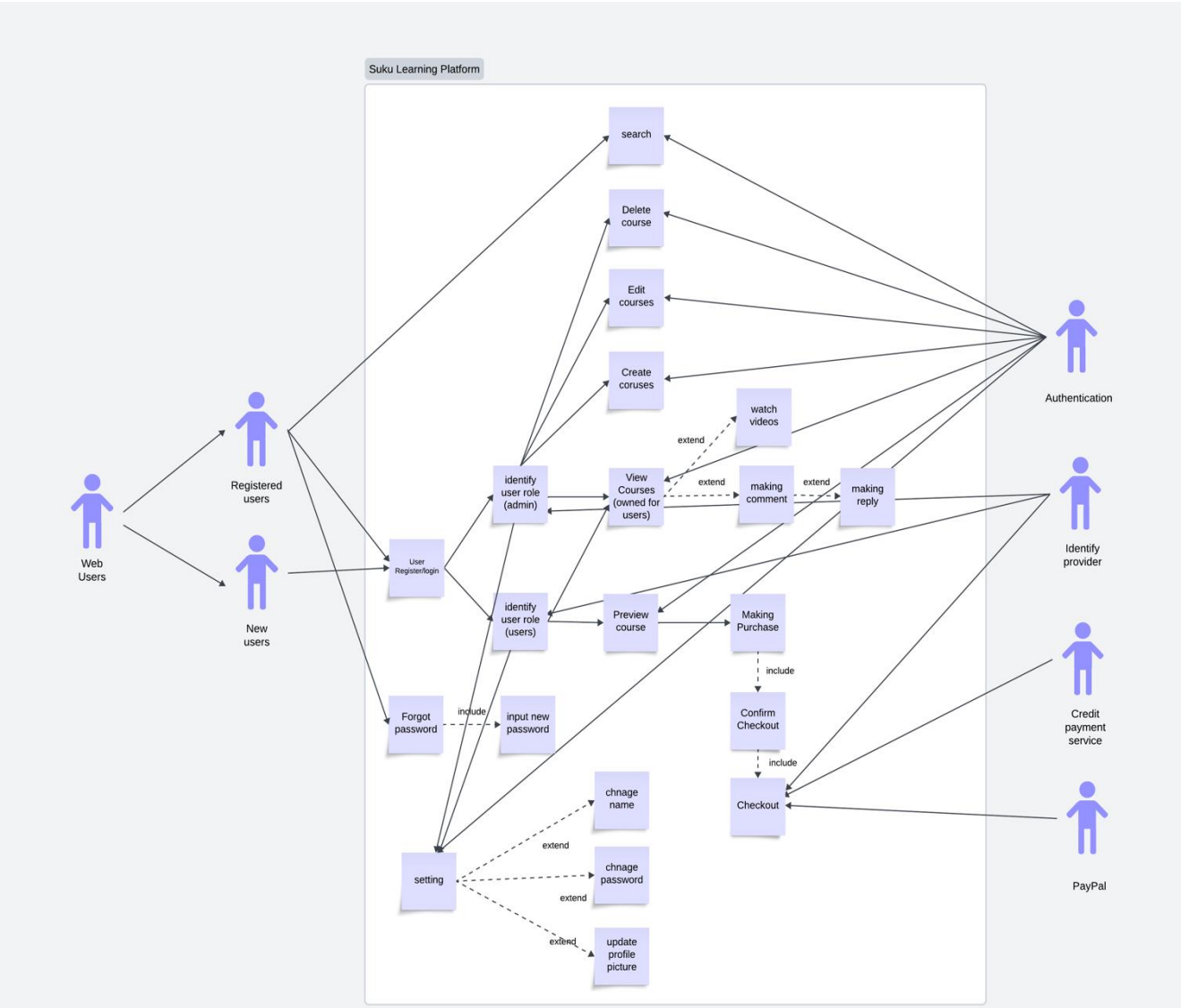

Figure 5 Use case Diagram

3.1.1 Study Population

More than taking the problems from the sources mentioned above, we also created a poll for the students who are studying in the IT field to fill out the information. and after conducting the survey, we received the following information:

- 31.6% of the student in the survey didn’t not clear about the IT field
- 31.6% of the student in the survey hard to find instructor to instruct where to start
- 26.3% of the student in the survey know where to start but lack of problem solving
- 10.5% of the student in the survey said they are good with the IT field and know how to start by themselves

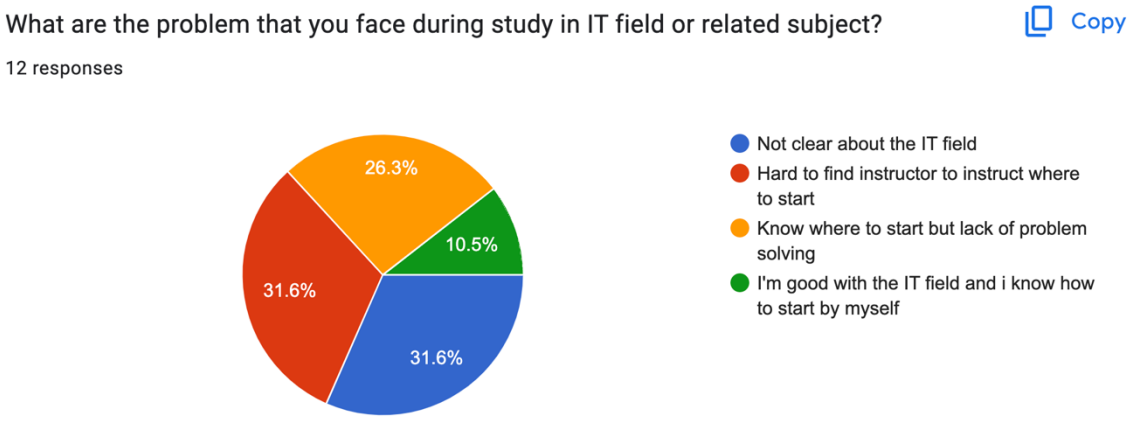

Figure 6 Survey from students

3.2 Requirements Analysis

Requirements analysis is crucial in defining what a system should achieve and how it should operate, forming the basis for system development. This process distinguishes between functional requirements, which specify system behaviors, and non-functional requirements, which outline quality attributes like performance and security. Effective analysis ensures a comprehensive understanding of both types, aligning the final product with user expectations and business goals. By capturing and validating these requirements, the development team is guided in creating a system that is both functional and robust.

3.3 Functional and Non-Functional Requirements

3.3.1 Functional Requirements

These are the basic demands of the end user that are to be met by the system. All these functionalities need to be necessarily incorporated into the system as part of the contract. These are basically represented in the form of input to be given to the system, the operation performed, and the expected output.

- Dashboard page for users
- Browse page for users
- Authentication (Login and Signup)
- Dashboard for admin
- Search Courses

- Filter Course
- Update Password
- Delete Courses
- Update Courses
- Add Courses
- Add Videos
- Delete Videos
- Update Videos
- Forgot password
- Logout
- Update username
- Update profile picture
- Upload profile picture

3.3.2 Non-Functional Requirements

These are requirements that specify criteria that can be used to judge the operation of the system, rather than specific behaviors. They are usually architecturally significant requirements. The extent to which these factors are implemented varies from project to project. They are also known as non-behavioral requirements.

- The processing of each request from the API within 10 seconds
- Performance

3.4 Database Design

3.4.1 Schema Design

For the database design, we are going to have 7 tables, which are the user table, profile table, user course table, course table, video table, comment table, and reply table.

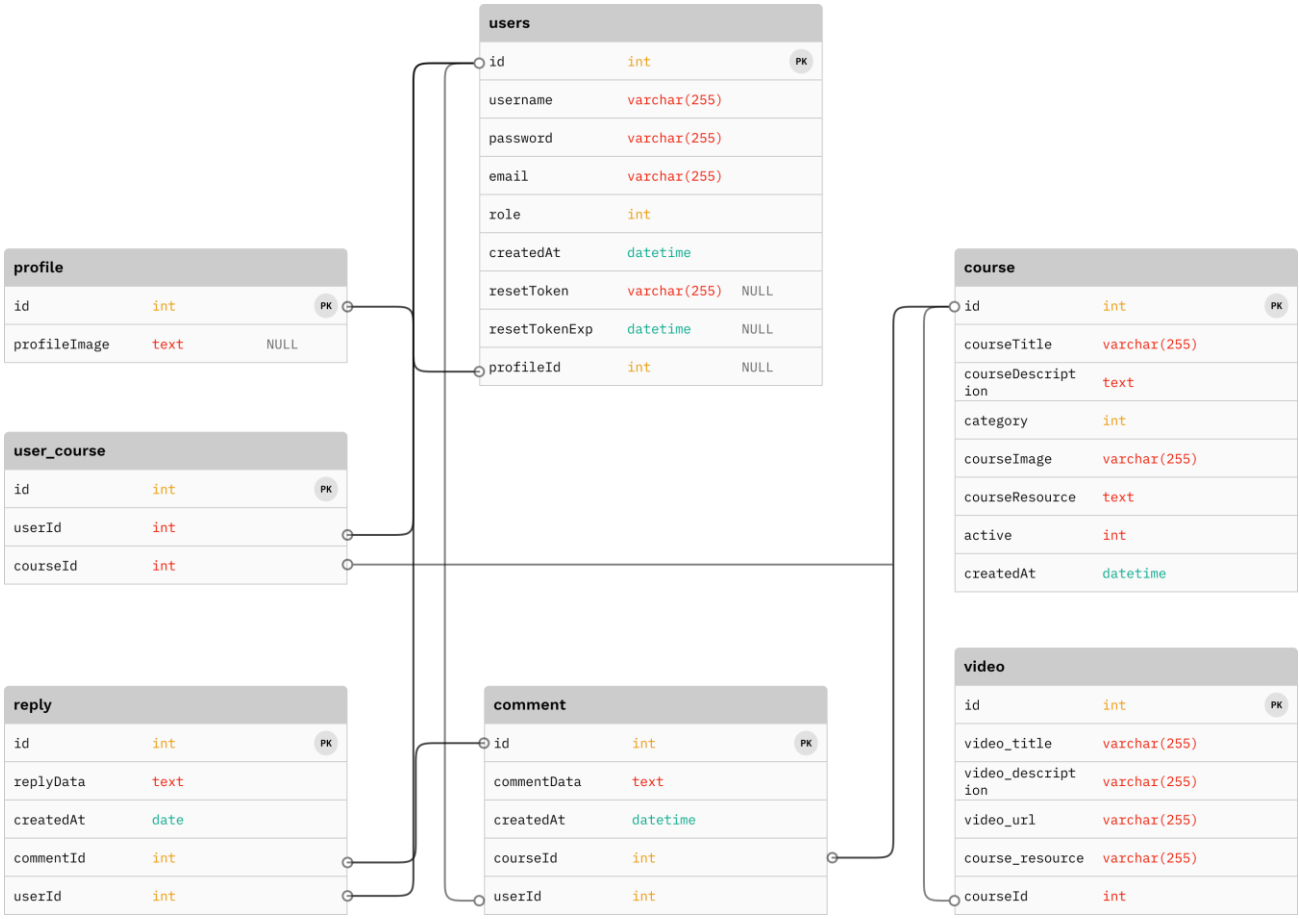

Figure 7 Database Relation

3.4.2 Data Relationship

Since this application has 2 roles, the user table will contain the following: ID, username, email, password, role, created At, reset token, and expiration token, along with the relationship with profile, user course, comment, and reply. The course, which contains an ID, course image, course price, course description, course resource, active, and category, will have a relationship with the video, which contains a video title, video URL, video description, and course resource, and the comment will have a relationship with the reply, and both have a relationship with the user. and comment, which contains comment data, id, and created At, have a relationship with the user; and reply, which contains reply to data, created At, and id.

CHAPTER 4
DATA ANALYSIS AND RESULT

4.1 How accurately that we solve the problem that we mentioned

4.1.1 Category Used

After finishing the development, we let some users test out the app. While testing is an essential part of any software development project, it's important to note that testing alone cannot guarantee a 100% error-free application. However, by involving users in the testing process, we can gather valuable feedback and insights into how our application performs in real-world scenarios. In this case, by letting users test our app, we were able to identify any potential issues with the UI/UX and make the necessary improvements. Additionally, through physical testing, we were able to verify the accuracy of our program and ensure that it solved the problems we had set out to address during the planning and study phases. Overall, while testing cannot guarantee a flawless application, it's a crucial step in ensuring that our app is functional, user-friendly, and meets the needs of our target audience.

4.1.2 Result Content of Analysis

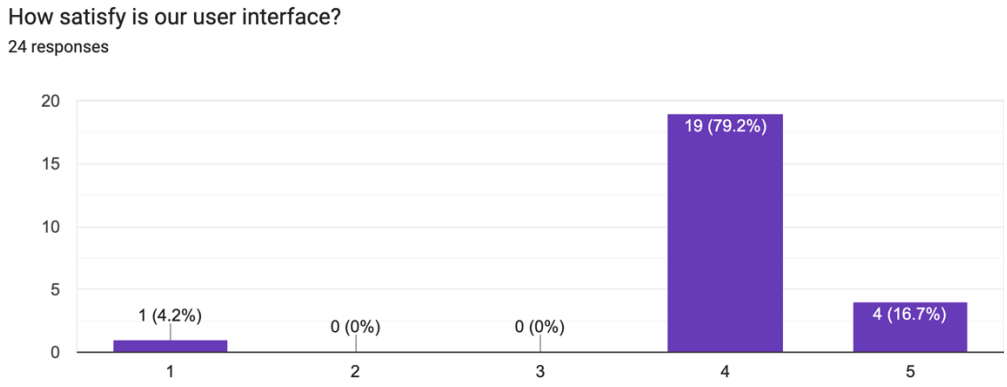

Figure 8 Survey for user interface

To further elaborate, the user testing phase was an essential step in ensuring the accuracy and functionality of our application. By testing our app with real users, we were able to identify and address any potential issues or bugs that could affect the user experience. Through this testing, we received valuable feedback and insights from the users, which helped us improve the accuracy and functionality of our app. Based on the results of the survey collected from users, we can confidently say that our app is accurate to around 80% and can

effectively solve most of the problems that we have identified. However, we recognize that there is always room for improvement, and we will continue to work on enhancing the app's accuracy and functionality in future updates.

4.2 Result

In this section, we will discuss our special feature that we are mainly focused on, which is the payment and reset password.

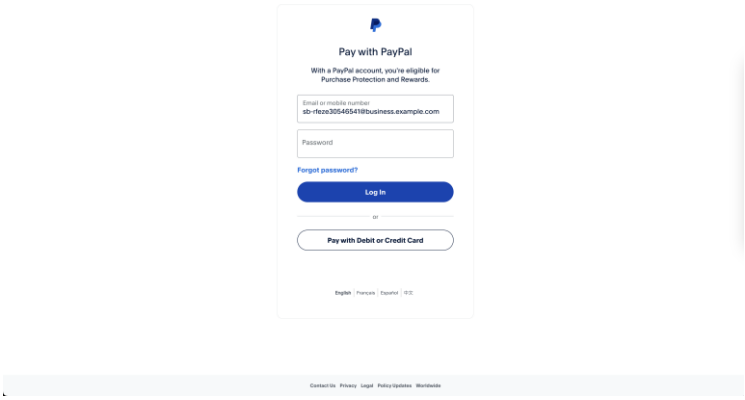

Figure 9 Payment using account

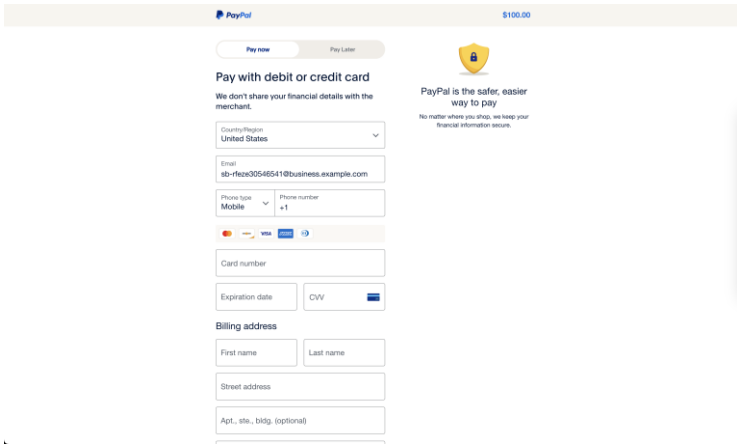

Figure 10 payment with card

In this figure 8, users will get this interface once they click to buy a course, and it will redirect the user to input their PayPal account if they have one. If they don’t have one, they can buy a course by credit card, which requires the user to input their card information, such as their card number, expiration date, CVV, and billing address, which is in figure 9.

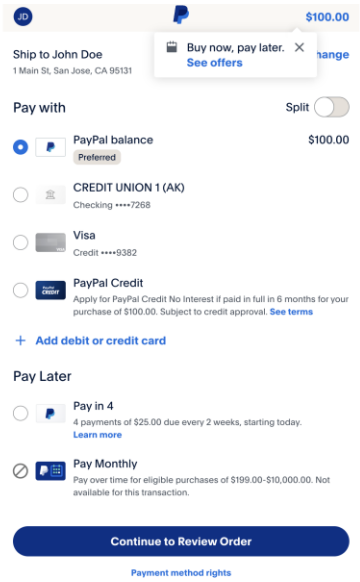

Figure 11 Review before confirming to buy

After entering their payment details, users are taken to an order review page (Figure 11). Here, they can review their order details before confirming the purchase. This step ensures that users can verify all information is correct before completing the transaction. Once they confirm, the payment is processed, and users are redirected to a confirmation page (Figure 12). At this point, users can return to the home page to access the course they have just purchased.

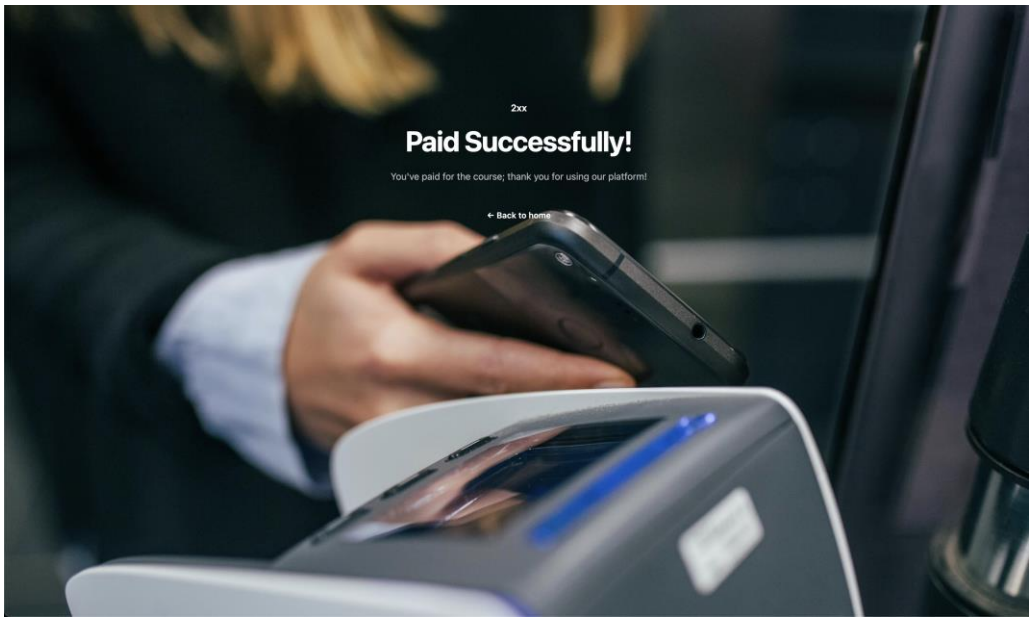

Figure 12 after bought successfully

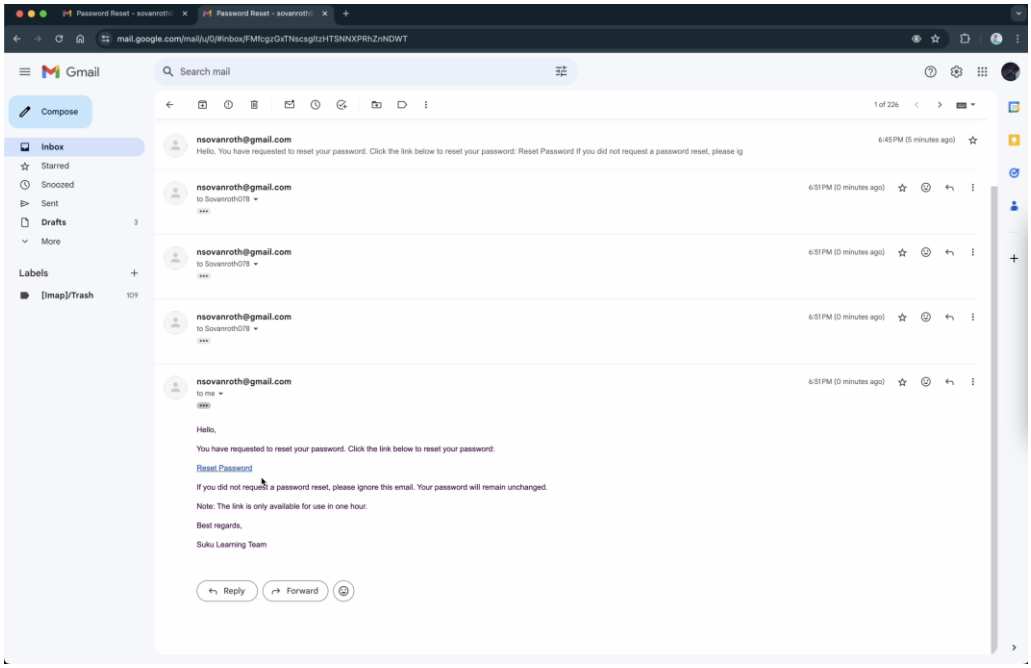

Figure 13 Reset password link from email

Our platform also features a robust password reset mechanism to help users regain access to their accounts quickly and securely. When users request a password reset, they are required to enter their registered email address. Upon submission, they receive an email from our platform containing a password reset link (Figure 13). This link is valid for one hour, ensuring security by minimizing the window of vulnerability. By clicking the link, users are redirected to a secure page where they can enter a new password, thereby regaining access to their account promptly.

By incorporating these key features, our platform ensures that users enjoy a seamless, secure, and user-friendly experience. The efficient payment processing options cater to a wide range of user preferences, while the robust password reset mechanism guarantees account security and ease of access. These improvements make our platform stand out in the competitive market, offering users the convenience and reliability they expect from a modern online learning environment.

CHAPTER 5
DISCUSSION

5.1 What are our unique compared to other?

Our platform distinguishes itself by addressing and resolving persistent issues associated with existing systems, particularly in the areas of authentication and payment processing through PayPal. These challenges, common in the current market offerings, undermine user experience and security. By overcoming these obstacles, we enhance the security, efficiency, and overall reliability of our application, making it more user-friendly. These improvements ensure that our application offers a unique and superior experience compared to other applications available in our country's market.

Specifically, our platform:

- Allows users to create accounts independently, without needing to contact support.
- Provides an easy and secure password reset mechanism.
- Facilitates seamless and secure payment processing through PayPal, which is widely trusted and used.

These features collectively ensure that our users enjoy a hassle-free, secure, and efficient experience, setting our platform apart from competitors.

5.2 Description of Result

Oddompang Learning: Oddompang Learning is a learning platform that allows students to access high-quality lectures and courses relevant to modern technology jobs. However, it has limitations, such as cumbersome account creation, difficulty in resetting forgotten passwords, and inconvenient payment methods. Our platform addresses these issues by:

- Enabling users to create accounts independently.
- Allowing users to reset their passwords effortlessly.
- Integrating PayPal for payments, making it easy for users to purchase courses at their convenience without needing to contact support.

Reanmore: Reanmore is another learning platform that differs from both Oddompang and our platform. This platform merely displays the course price, and interested users must contact the admin to be added to a Telegram channel for learning. In contrast, our platform offers a more streamlined and autonomous experience for users, with features such as:

- Independent account creation.
- Direct course purchases through PayPal, eliminating the need for intermediary steps or admin contact.

Suku LPF: Suku LPF is an online learning platform that stands out from the other two mentioned. Our application offers more comprehensive features to enhance user flexibility and autonomy. Key features include:

- Self-service account creation.
- Efficient password reset processes.
- Integrated PayPal payment system for easy and immediate course purchases.

These features ensure that users do not need to wait or contact administrators to create accounts or purchase courses. By addressing these critical aspects, our platform provides a seamless, user-centric experience that significantly improves upon the limitations of existing platforms.

CHAPTER 6
CONCLUSION

6.1 Future Works

Now that the application is running smoothly and has successfully implemented the majority of its functions, our attention turns towards future tasks that will further enhance its capabilities. One of our priorities is to implement email verification before account registration, ensuring enhanced security and authenticity for our users. Additionally, we are exploring the integration of third-party services such as Amazon S3, which will become feasible as the application generates sufficient revenue to support these expansions.

Looking ahead, we are eager to collaborate with banks in our country to introduce more payment gateways. This initiative aims to simplify the purchasing process for our users, making transactions seamless and efficient. By continually advancing and diversifying our service offerings, we aim to solidify our position as a leading platform in the tech industry, delivering unparalleled value and convenience to our growing user base.

6.2 Summary

In conclusion, I firmly believe that this application will effectively address the issues I have highlighted above. By providing comprehensive and accessible information about information technology, this application will empower IT students in Cambodia with a deeper and clearer understanding of the subject. This knowledge will not only enhance their academic and professional competencies but also improve their overall quality of life. As we advance further into the 4th Industrial Revolution, it is crucial for students to be well-equipped with the latest technological skills and knowledge. This application will play a pivotal role in bridging the knowledge gap and preparing Cambodian IT students to thrive in a rapidly evolving digital landscape. Through this initiative, we can foster a generation of tech-savvy individuals who are ready to contribute to the global tech industry and drive innovation within their own communities.

APPENDICES

1. Installing tailwindcss

```
npm install -D tailwindcss
npx tailwindcss init
```

```
/** @type {import('tailwindcss').Config} */
module.exports = {
  content: ["./src/**/*.{html,js}"],
  theme: {
    extend: {},
  },
  plugins: [],
}
```

```
@tailwind base;
@tailwind components;
@tailwind utilities;
```

2. Create ReactJS app

```
npx create-react-app my-app
```

3. Create NestJS app

```
nest new project-name
```

4. Run application in background using pm2

```
pm2 start application_name
```

5. Create nginx config on ec2

```
sudo nano /etc/nginx/conf.d/yourdomain.com.conf
```

```
server {
    listen 80;
    server_name yourdomain.com;

    location / {
        proxy_pass http://localhost:3000;  # Port where your PM2 app is running
        proxy_http_version 1.1;
        proxy_set_header Upgrade $http_upgrade;
        proxy_set_header Connection 'upgrade';
        proxy_set_header Host $host;
        proxy_cache_bypass $http_upgrade;
    }

    # Optional: Add SSL configuration if using HTTPS
    # listen 443 ssl;
    # ssl_certificate /path/to/ssl_certificate.crt;
    # ssl_certificate_key /path/to/ssl_certificate.key;
```

```
}

sudo nginx -t

sudo yum install -y certbot python2-certbot-nginx

sudo certbot --nginx -d yourdomain.com
```

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4. Seale, J. (2006). E-learning and Disability in Higher Education: Accessibility Research and Practice. Routledge.