Development of Web-Based Uteach Tutoring Application

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Abstract

In the rapidly evolving digital era, challenges in the field of education have become increasingly complex. This research aims to develop the UTeach learning guidance application, designed to assist students of Universitas Klabat in addressing academic issues. The application enables students to book mentors and meet face-to-face for guidance sessions. By implementing and utilizing the prototype model development method using the Software Development Life Cycle (SDLC), this study designs a prototype application aimed at facilitating student access to learning guidance by reducing time and distance barriers. Prototype testing is conducted through trials to evaluate the performance and usability of the application. This application is anticipated to serve as a potential tool in supporting Universitas Klabat students in improving academic performance and addressing financial issues. Development recommendations for this application may include adding conversation features, incorporating notification features, and developing a mobile application to enhance user efficiency. This research contributes to the advancement of educational technology by offering innovative solutions to enhance student learning experiences.

Keywords— SDLC, Academic Guidance, Prototype Model, Website, Application

1. INTRODUCTION

Education is a form of human interaction [1]. It is a conscious and planned effort to create an environment and learning process where learners can actively develop their potential and skills, benefiting society, the nation, and the state [2]. Education is a human endeavor in learning and gaining knowledge [3]. The world of education must be able to play an active role in preparing educated human resources who can face various challenges of life, both local, regional, national, and international [4]. Education plays a very important role in the development of the country. With quality education, a person gains the knowledge and skills needed to progress and create better living conditions. In addition, education also contributes to the economic development of a country, because good education can improve the quality of the workforce and encourage innovation and creativity. However, the implementation of educational activities has mostly been carried out in formal schools, but not always formal school education can run smoothly and provide good results as desired. Many people, especially elementary school children to universities, cannot be separated from the name of obstacles and difficulties in learning, for example, such as obstacles in achievement and also lack motivation in learning [5].

Students are individuals who are in the process of learning or studying science. Registered students are undergoing education at one of the colleges, namely from academics, universities, colleges, institutes, and polytechnics. The main purpose of being a student is to learn and gain knowledge given by lecturers. Therefore, students must achieve their targets to get a good grade point average and complete their lectures on time. However, the fact is that not all students focus on lectures only, some students have to do activities outside of their lecture activities, such as working [6]. Working students are individuals who are studying, taking part in learning activities in higher education, and are active as learners while working or running a business to meet the costs of lectures [7]. Studying while working is no longer something rare and only done by

students who are weak in the economy, because the reality is that the daily cost of living is often not proportional to the pocket money given by parents [8]. Another reason for studying while working is financially related, i.e. earning an income to pay for education and daily needs while easing the burden on the family [9]. However, this decision usually has positive and negative impacts, the positive impact is that students gain work experience and earn money, and the negative impact is that lectures will be neglected because of their work so students are often careless about their main task, namely learning and completing their lectures. In addition, there are also students who even though they do not work while studying, it is very difficult for them to complete their targets and also lecture well because of difficulties in learning. The main reason for learning difficulties is due to a lack of understanding of concepts and also the way lecturers teach [10]. Therefore, many students sometimes feel unsuitable with existing lecturers and choose to find a study buddy or tutor.

Tutoring is a process of assisting an individual in facing and solving academic problems by creating a conducive teaching-learning atmosphere to avoid learning difficulties and achieve the best learning results [11]. Tutoring activities have a significant influence [12]. The implementation of tutoring is an effort to help students overcome learning problems more effectively [13]. The purpose of tutoring is to find out the problems of learning difficulties that occur in students so that we can help overcome the problems experienced by students. Help overcome the problems experienced, by students, so that the objectives of education are expected to be achieved [14]. Tutoring can usually be in the form of teachers or mentors who can teach about whatever is needed. Mentor is generally translated as a guide or carer who is usually used to guide students. A mentor can usually be a friend, companion, and also a helper to a trusted person [15]. Mentors exist because many people need to be guided to solve their problems, be it in everyday life or education.

In Airmadidi, North Minahasa, located in the province of North Sulawesi, there is a foundation university called Universitas Klabat, or Unklab for short [16]. On this campus, there are also many types of students, both labor students who work on campus and also students who pay normally, and there are also students who take side jobs outside the campus to meet living costs and lecture needs. But sometimes for students who take side jobs outside the campus, it is very difficult to divide their time to do assignments and also work, so there are often students who do assignments on the sidelines while working and it is very disturbing. In addition, on this campus, some students are inseparable from the name of difficulty in learning and doing assignments, because they do not understand the lessons given. Sometimes these students are embarrassed to ask or consult with lecturers of related courses because of the characteristics of the lecturer and prefer to ask friends.

The title of the research material is “Development of a Web-Based UTeach Tutoring Application”. The term “Uteach” combines “Unklab” and “Teach”. Research background related to the problem when students want to find mentors among their peers, so researchers developed this application. Additionally, students who need to earn extra money can also register as mentors using the Uteach application.

The problem statement is, how to create a web-based tutoring application that helps students navigate academic and financial challenges while integrating seamlessly into their educational journey? In this study, the research aims to develop the UTeach tutoring application to support Universitas Klabat students facing academic and financial difficulties.

The benefits of this research are divided into two categories: benefits to researchers and benefits to students. For researchers, the study provides valuable insights and knowledge about web-based applications and helps identify students who need additional income. For students, the application facilitates the opportunity to relearn difficult courses by seeking mentors. Additionally, mentors can earn extra income while continuing their studies without having to work off-campus.

2. RESEARCH METHODS

In developing the UTeach application, researchers use the Software Development Life Cycle (SDLC) development method. The SDLC method of the waterfall model is a development stage method that has 6 stages. The stages include planning, design, Development, Implementation, testing, and maintenance [17]. Consequently, each phase must be done sequentially and cannot be randomized. This ensures that each step builds on the previous one, leading to a well-structured and functional final product. [18]. SDLC is crucial for both software production and maintenance, as archiving development data simplifies future software upkeep for companies [19]. System development will use the Prototype model. The prototyping method is used in this research to create a concept to develop the model into a whole system. This means that the system developed is much faster and the cost is certainly lower [20]. The prototype model can be used to address the customer's lack of technical understanding and clarify the specification of the customer's requirements to the software developer [21].

The prototype model aims to show users how the system or application will work, and then evaluate with the developer regarding the development of the system or application created. By using this method, developers and users can interact directly in the system or application development process.

In Figure 1 in the Prototype model there are 6 stages of development, namely Requirements, Quick Design, Build Prototype, User Evaluation, Refining Prototype, and Implement and Maintain.

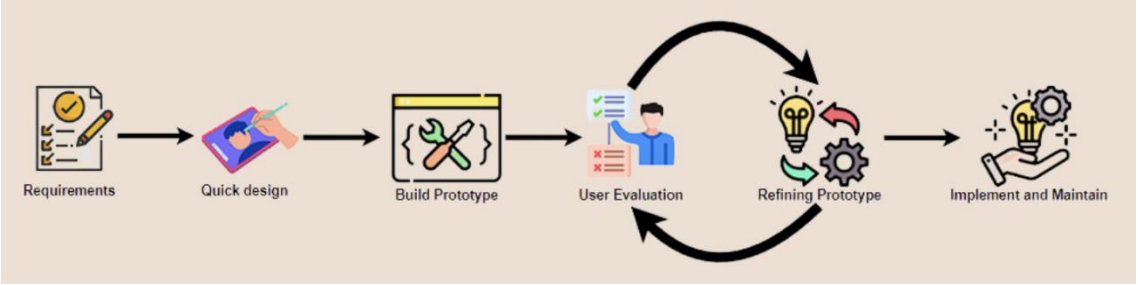

Figure 1. Prototype Model Process

The following is an explanation of the stages of the Prototype Model carried out by researchers in developing this application:

a) Requirements
In this first stage, the researcher as a developer will analyze and identify the needs and outline of the system to be created.

b) Quick Design
After the researcher understands the needs of the user, the researcher will pour these ideas into a simple design which will make it easier for the user to understand what this system will be like.

c) Build Prototype
When the design created in the previous stage has been approved, the developer will continue by building a prototype that will be presented to the user, for example by displaying the input and output.

d) User Evaluation
After that, the user will evaluate whether the prototype made is to the needs of the user or not.

e) Refining Prototype
If in the evaluation some parts are not suitable, then the developer will fix the prototype and return to stages 4 and 5. However, if there are no parts to be fixed then the developer can continue to the last stage.

f) Implementation and Maintain
Finally, when the evaluated parts are as required, the product will be built by the developer based on the last approved prototype. After the system is successfully built, it will be tested

again and after that, it will be submitted to the user. The last stage is the maintenance stage so that the system can run well without any problems during its use [22].

In building this application the MERN stack technology (MongoDB, Express.js, React, and Node.js) is used. MongoDB is a NoSQL database. Express.js is a web application framework for Node.js. React is a front-end JavaScript library. Node.js is a server-side JavaScript runtime. Together, these technologies enable developers to create full-stack applications using JavaScript for both client-side and server-side development.

3. RESULT AND DISCUSSION

This section discusses the conceptual framework of the application which explains the concept of how this application runs and also the implementation of the interface in this UTeach application.

3.1. Application Conceptual Framework

This application is built to have three different types of users, namely Admin, students, and mentors. These three users are distinguished by different tasks as well, the features possessed by these three users will certainly be different. But students and mentors will log in using the same account, except the admin will use a separate account the admin, and can only be accessed by the admin.

Figure 2. Conceptual Framework of Uteach Application

The client, or web application, is the first part. The API, which is the second part, is documentation that includes classes, functions, interfaces, and building blocks for creating software. The server, which houses the resources and services, is the last component. Either a database server or a web server can be the server.

The steps in the conceptual framework shown in the above image are explained below:

1. Users will use the web application to access UTeach.
2. Depending on the kind of API being used, the web application uses a protocol, like HTTP or HTTPS, to send requests to the server.
3. After receiving the request, the server handles it. This could entail getting information from other sources or a database.
4. The server sends a response back to the web. This response usually contains data or information requested by the web.
5. The web receives the response and performs the appropriate action. Responses can include displaying data to the user or using the information obtained for further processing.

3.2. Interface Implementation

The following is the interface implementation of the UTeach web application that has been made by researchers:

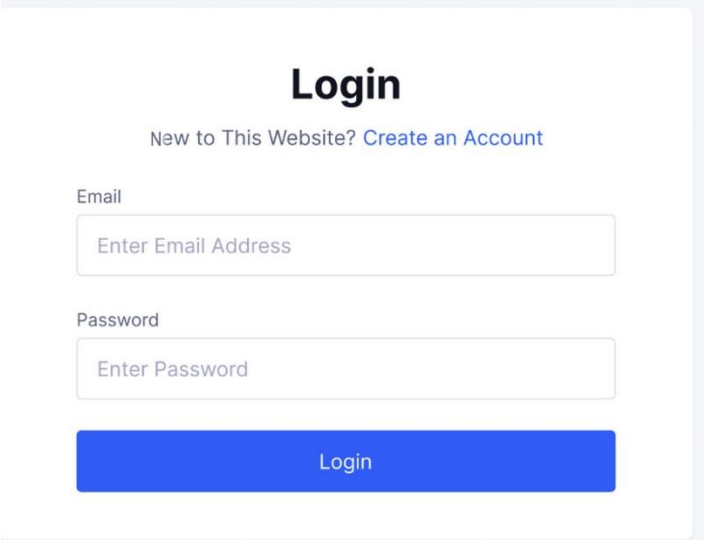

Figure 3. Implementation of the Login page interface

Figure 3 shows the interface implementation of the login page. The login page is the initial page display of admins and users when they access the UTeach website link. Users can fill in their email and password in the login form using their registered account.

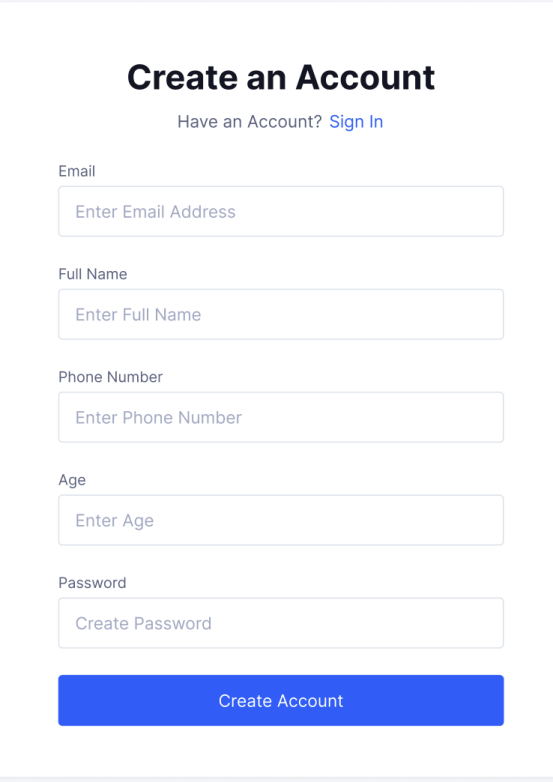

Figure 4. Implementation of the register interface

Figure 4 shows the interface implementation of the register page. Users can register by creating a new account via the form by filling in their email, full name, telephone number, age, address, and password. Account registration is the first step that allows users to access services and features in the application.

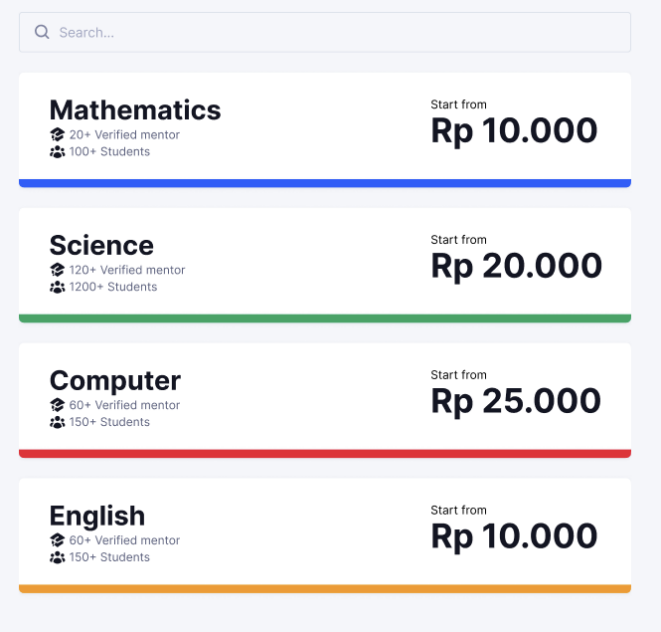

Figure 5. Home page interface implementation

Figure 5 shows the interface implementation of the home page. The home page is the initial page displayed to the user when successfully logging in. On this home page, some courses are available and can be ordered in the UTeach application.

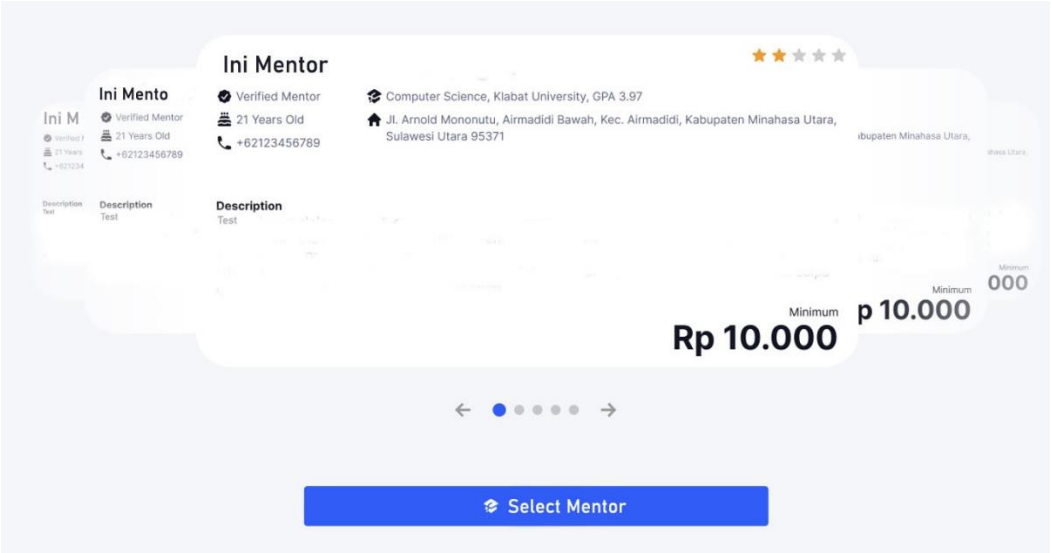

Figure 6. Implementation of the select mentor page interface

Figure 6 shows the interface implementation of the select mentor page. Users can access this page by selecting the courses they want to study first on the previous page. Here users can choose a mentor according to their preference.

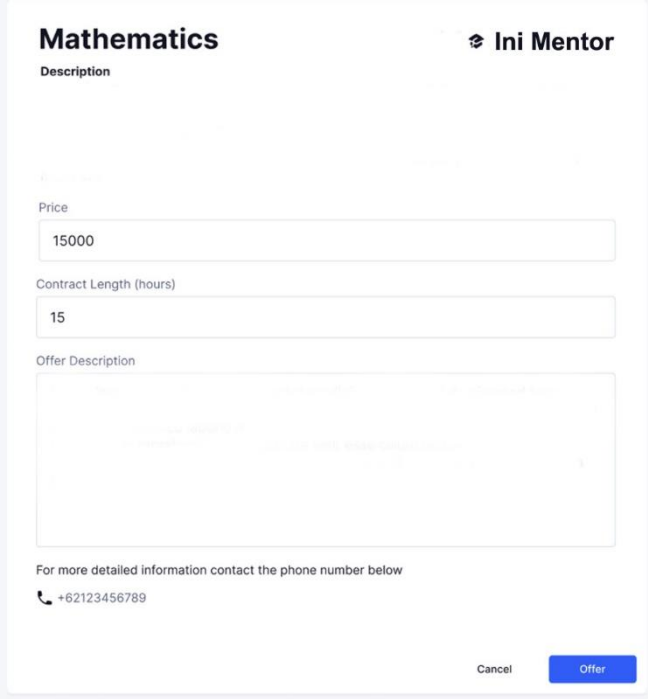

Figure 7. Implementation of the checkout page interface

Figure 7 shows the interface implementation of the checkout page. Users can set the price, and contract period based on hours, and also fill in a description of what material they want to study on this page.

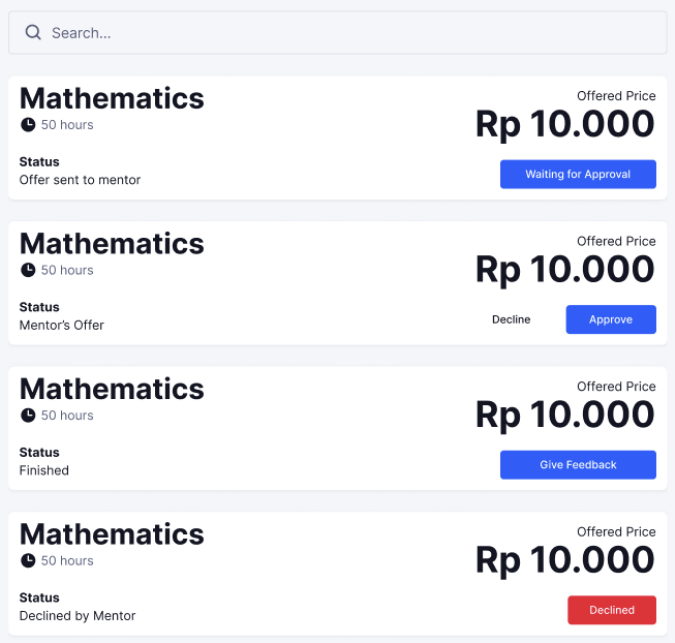

Figure 8. Implementation of the contract history page interface

Figure 8 shows the interface implementation of the Contract history page. This interface shows that here users can see the history or activities that have occurred, whether they are ongoing, awaiting approval, or those that have been completed.

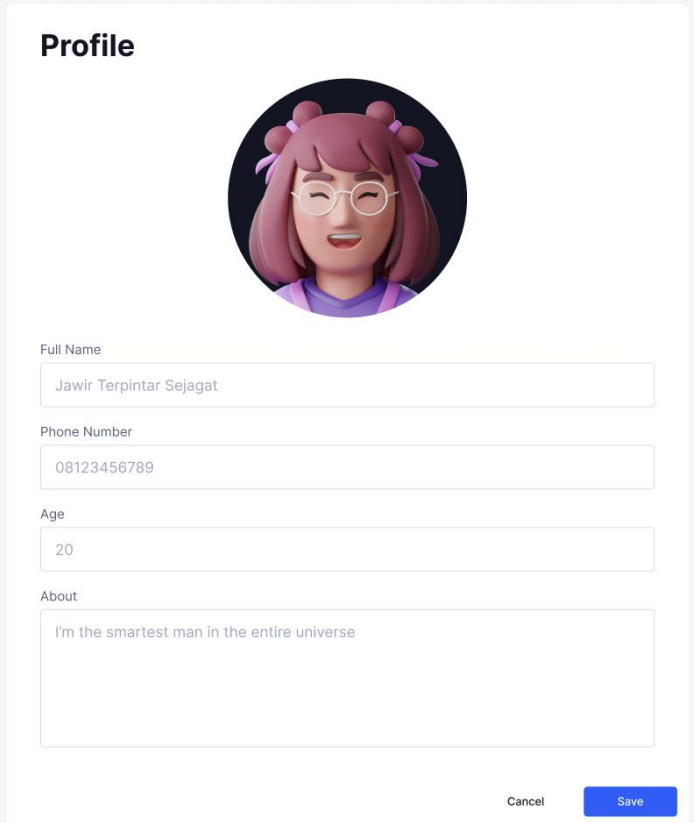

Figure 9. Implementation of the Profile page interface

Figure 9 shows the interface implementation of the user profile page. The profile page is a page that shows data from the user, namely Profile picture, Full name, Phone number, Age, and also About. On this page, users can also edit their profile.

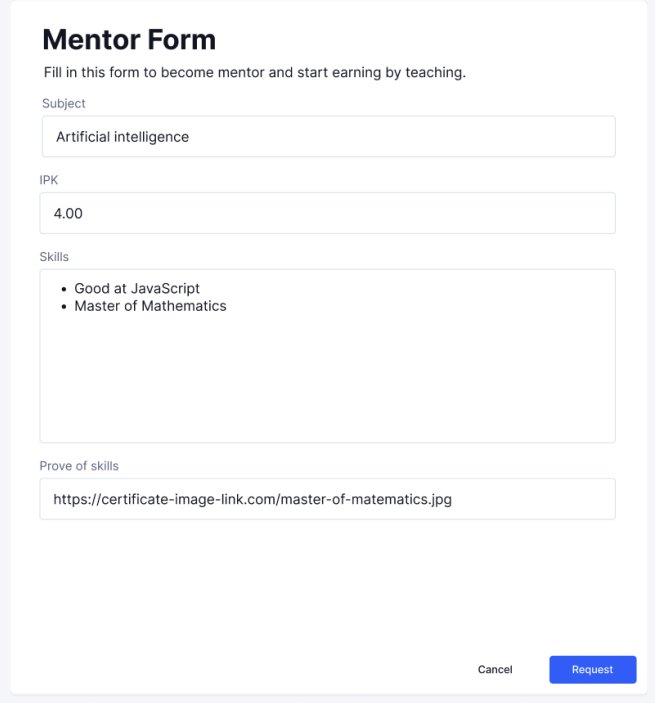

Figure 10. Implementation of the Request Mentor Interface

Figure 10 shows the interface implementation of the mentor request page. On this page, users can choose what courses they want to teach, fill in GPA, Skills, Certificate Link, and also Description to fill in details of what material can be taught.

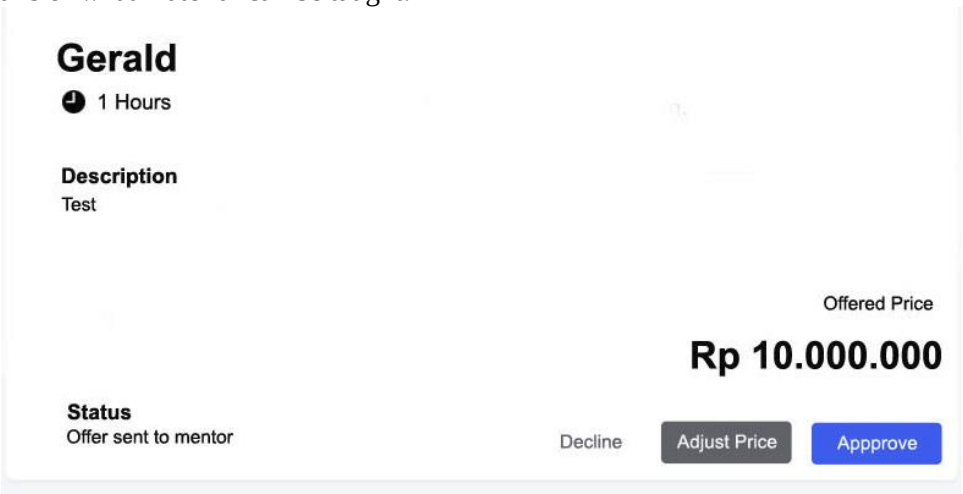

Figure 11. Implementation of the mentor home page interface

Figure 11 shows the interface implementation of the mentor home page, users can access this page if the user has been accepted by the system to become a mentor. On this page the mentor can approve, reject, or adjust the price which can be sent back to the person who ordered, here the status of completed orders is also displayed.

Figure 12. Implementation of the admin dashboard interface

Figure 12 shows the interface implementation of the admin Dashboard page. This page displays all users who want to become mentors.

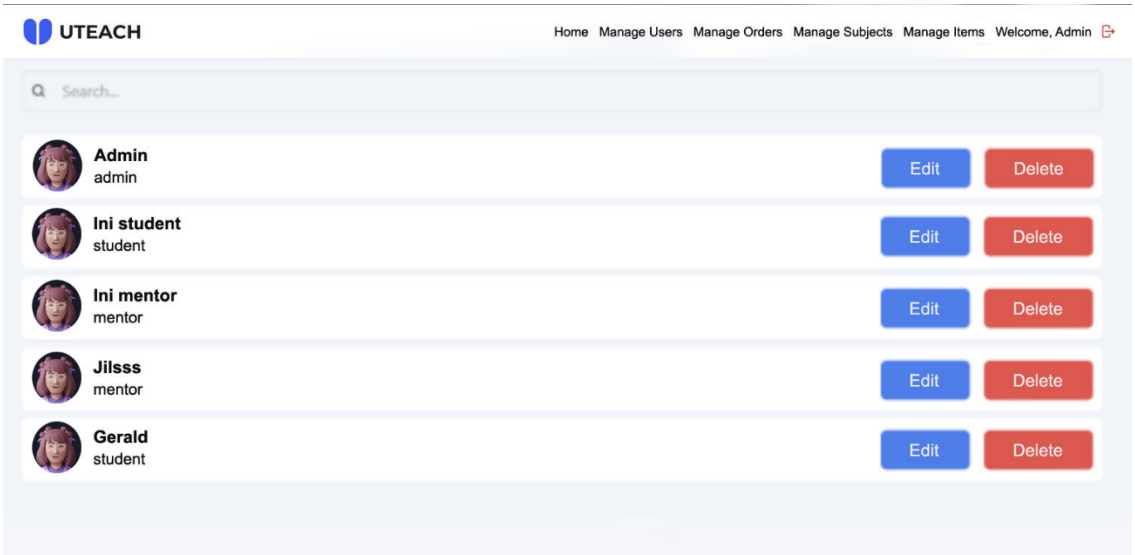

Figure 13. Implementation of the Admin Manage Users interface

Figure 13 shows the interface implementation of the Manage Users page. On this page, admins can manage all users in the UTeach application. Admin can edit and also delete user data from the database.

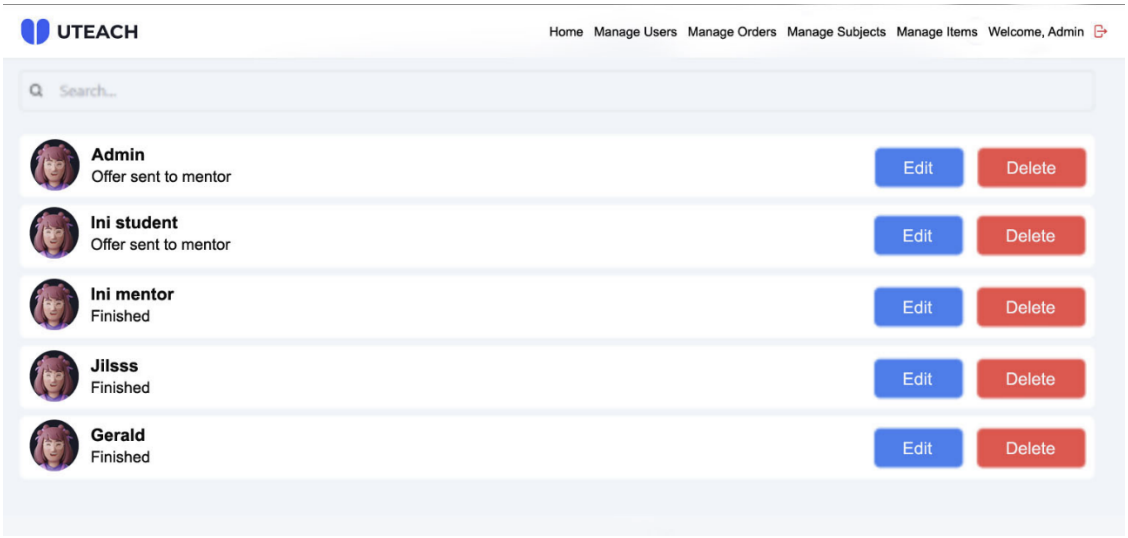

Figure 14. Implementation of the Admin Manage Orders interface

Figure 14 shows the interface implementation of the Manage Orders page. On this page, admins can view and manage all activities in the UTeach application. Admin can edit and also delete activities from the database.

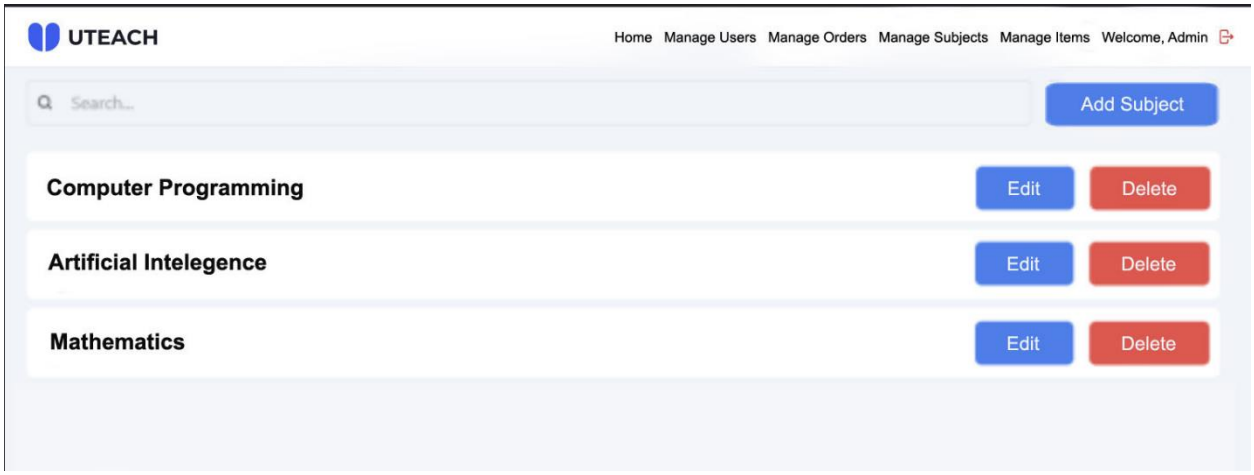

Figure 15. Implementation of the Admin Manage Subjects interface

Figure 15 shows the interface implementation of the Manage Subjects page. On this page, admins can manage courses in the UTeach application, either deleting or editing courses. Here the admin can also add the required courses.

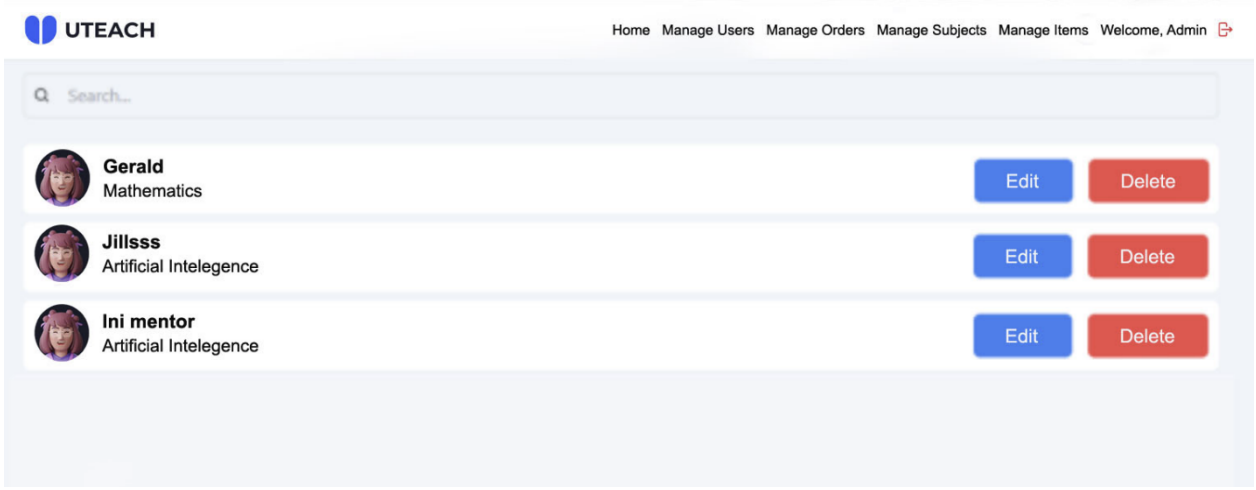

Figure 16. Implementation of the Admin manage items interface

Figure 16 shows the interface implementation of the Manage Items page. On this page, admins can manage mentors in the UTeach application, either deleting or editing the entered mentor data.

4. CONCLUSION

4.1. Conclusion

Based on the results of the study, the conclusions are:

1. UTeach applications can be created with SDLC using MERN stack technology.
2. The UTeach application as a tutoring application is expected to have a positive impact on Klabat University students. This research opens up opportunities to deepen knowledge about the effectiveness of tutoring through mentoring. This application can support the development of researchers' academic knowledge in this field. For users, this tutoring application offers good effectiveness and benefits. Users can directly book a mentor through this app and can meet face-to-face so that the effectiveness of learning can be felt well. In addition, with this application users

can also earn additional income by becoming mentors and helping Universitas Klabat students to learn. Future researchers can also utilize this research as a valuable reference in developing similar applications.

3. The UTeach application that has been created can only be run in a browser.
4. The UTeach application can be used free of charge by all users, especially Universitas Klabat students.

4.2. *Future Works*

Future works for the application features can be improved by:

1. add the ability for instance send a push notification: where the app sends a message like "You just got yourself booked!" which is particularly useful as mentors wouldn't have to check the application frequently, they would be notified immediately whenever someone books their mentor session.
2. add chat feature (Live Chat): In this chat feature, the students can interact with their mentor before meeting face-to-face and read what they need to find out as well.
3. develop mobile app versions: You can create an app version of your mobile for the Android and iOS platforms as well.

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