EUROPEAN UNIVERSITY OF LEFKE

FACULTY OF ENGINEERING

Graduation Project I

Moodle for Faculty of Engineering

A web-based application

that enables e-learning

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My project is going to be developed for e-learning purposes for the faculty of engineering specifically. The main idea of the project is to make the study of e-learning easier to use by only focusing on engineering subjects and tools particularly rather than having various faculty subjects and users which may result difficulties for the students to find out their faculty platforms and the lack of educational information or tools for their specific fields. In my opinion, having e-learning platforms of the universities and specifically each faculties is very important in the current technological era because of the reason for helping students to keep studying with efficient and unlimited internet resources in different situations such as pandemics from all over the world. The goals of my web application are to give students chance to learn more by providing many of internet resources and to make it easier to test their knowledge quickly and to ease the ways of communication between teachers and students.

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1.Introduction

1.1 Problem definition

- Lack of resources to study in e-learning platforms which includes all faculties rather than engineering faculty specifically
- Testing and getting feedback for students independently are difficult in face-to-face education
- Providing students with education when traditional education might be impossible or result some problems in some situations (pandemics, bad weather...)

1. As a first problem, it can be mentioned that university will face into problems when providing students with good enough resources and references when there is all-faculty combined web platform. Since the university has a number of various faculties, administrators will only be able to provide common forms and news that are related to all fields in the main page of the website. As a consequence, students cannot feel comfortable to work or study jointly or giving feedbacks and exchange ideas with faculty administrators or teachers by this e-learning platform. The solution for that would be organizing a new e-learning platform for specific faculty such as engineering. By doing this, it will create an engineering atmosphere for both students and teachers which helps students to increase their passion to learn their subjects where all of the information, news, quizzes, references are all about engineering faculty.

2. Secondly, it is fact that working with each student individually is much harder in traditional education than online platform. Because the university lectures are kind of limited as time and teachers' resources and ability is not enough to teach and test all students and give them feedbacks at once. As a result, some students learning progress might be slower than others and, in this case, they will demand more attention to keep all students learning process equally. In this kind of situations, online e-learning platform comes to the stage to help instructors to deal with each student individually and give them feedback by the help of the overwhelming and unlimited internet resources. As well as that, organizing quizzes and tests are much easier and faster in online education, moreover, the students are able to watch the lecture videos repeatedly until they understand the topic clearly.

3. As a third case which will show the need for e-learning platform of the universities is stopping or postponing the lectures because of some particular conditions such as whimsy weather or pandemics which all the world are facing it currently and etcetera. As well as that sometimes the instructors might not be available for their lectures on time or the students might face some difficulties for attending the face-to-face lectures. In such situations as well, the e-learning online platform can help universities'

teachers and students for continuing their education wherever they are staying with the resources and tools which are well enough to get and test their knowledge.

1.2 Goals

- The main goal is to create an engineering atmospheric e-learning web-application rather than having common or multi-faculty Moodle based platform.
- Helping students to get more resources of knowledge such as visiting links, watching more videos, downloading lecture notes.
- Helping the teachers to organize more tests and giving more assignments and easing the ways to announce the news to all students immediately.
- Having more communication between teachers and students by direct massages or Q/A sessions

2. Literature Survey

Compare1: When I did research in similar e-learning Moodle web applications of the universities I found that most of the Moodle platforms has got many different information or university news or pages and links that might not be important for all the faculties. As well as that, all faculty combined Moodle platforms sometimes make difficulties for students to find out their courses to enrol since different faculty courses might have the same course code with different names. In my web application, everything including courses, pages, news, helpful links and all other information are only about faculty of engineering. Hence, it makes student easy to use and feel comfortable when they see the engineering environment of the website.

Compare2: Secondly, according to my research I found that most of the university Moodle platforms' courses pages are missing discussion part of students about the topics or assignments of the course. It is fact that, the course page has got Q/A section to chat with and instructor if the students have questions but, in my project, I decided to make a discussion section as well where they can exchange or share useful links between to help the others to learn the course effectively.

Compare3: Thirdly, according to my experience of using Moodle platform of the university, one of the issues that I face is missing the important news or announcements of the courses. To be more precisely, when the user enters his page, all courses will show up and checking out each course if they have an important announcement will take a time and makes the user angry to redirect to each course page and checking the announcement page and most of the time finding out the recent or important announcement between all announcements might be a bit

difficult. For such cases, I decided to add a footer session for the dashboard of the user where they can only read the most recent or the most important announcements those are marked as important by the instructors of all courses. After that, the student can check that part of the dashboard to be aware of the important announcements and save time by redirecting to that announcement part of the course rather than going for all courses' pages.

3. Background Information

3.1 Required software

- **C# .NET 5 :**

  C# .NET is good programming framework to develop the backend of web-applications with updated features of version. NET 5

- **Angular 10:**

  For designing the website as a front-end software since Angular 10 makes the job easier with the help of combination of components which include Typescript, HTML and CSS together.

- **Visual Studio Code:**

  VS Code is clean, easy to understand and much faster code editor including all features inside to develop web applications.

- **SQLite:**

  SQLite is easy to use and there is a package of SQLite for VS Code where I can work with database inside VS Code.

3.2 Other software

- **Postman:**

  For checking the API requests and responds

- **Bitbucket :**

  Used for repository.

- **PowerPoint:**

  Used for making a poster

4. Modules

4.1.1 The Student Mode

This mode is for the students who can log in to their accounts and see and follow their courses online. Their account information is saved to the database and whenever there is a call to the database the account of the student will be redirected if the correct username and password are entered. As well as that, they can still read the faculty news from the main page even though they are not logged in.

4.2 Teachers' mode

For the teacher's mode, the instructors of the courses can use to manage their courses by adding course notes or organizing tests or quizzes by logging into their private accounts which are assigned by the administrator or developer of the application using the C# .NET User Identity Modules which can sort the users such as teachers by giving them specific username identified in the program itself.

4.3 Administrator & Developer Mode (front-end & backend workers)

For the administrator's mode, the admin of the website can publish the general announcements and news for all users of the application and also, he can register new students, teachers and courses to the database or assign the teachers and students to the courses and etcetera. By registering and assigning the students, teachers and courses, the web-pages for each user will be populated with Angular front-end markups by getting the information from the database

4.3.1 Developer Module

As for the developer module, they are responsible for the backend side of the application such as running the servers or fixing some bugs if they occur or adding new features to the application.

5. Risk Analysis

The first risk of my web-application could be weak server. Since the server that is running the application is not big or strong, it can stop working when the number of users increase to thousands which will make the job hard to run for the server for responding to the users.

The second risk is not having SSL or HTTPS protocol which makes the websites secure. As we know that, if the website is having user information such as log in requirement and payments, it has to be secured by the browser by having SSL protocol. In my case, since the application is storing user data such as the students and teacher's username and passwords, it is possible for hackers to hijack the session and steal their user information. I searched that, mostly having a SSL protocol is costly but there are also free ways to have the protocol but they require a bit more time and server system knowledge.

The third risk could occur later, if the database will not be cleaned from cache files and information. It is true that, while using the website the users could upload the assignments or other documents to the application submission sections and they will be stored to the database, and it may require to clean the database in every semester from the cache files. Otherwise, the database could be full or could face some difficulties to get the data from it.

6. Ethics

- As for the ethics, firstly it can be mentioned that my e-learning Moodle platform web application provides the users with clearance of information, easiness to use and understandable and beautiful user interface.
- Secondly, even though the application does not have SSL protocol, it can still provide the secureness of the user data. To be more precisely, when the user is signed up or when the user data such as username and password are stored to the database, JSON Web Tokens are used to store the passwords to secure them from hacking. The entered password is not directly stored in the database, firstly it is being hashed by Encoding.UTF8 hashing algorithm, then to secure more , I used salting algorithm to hash again the hashed password so that, even though the passwords are same or the hacker tries to enter some common passwords to predict, the password had already been hashed so the entered password should have the same hashed and salted passwords as well which is not visible for the user and generated and stored only in the database when the user signed up for the first time.
- Thirdly, the application is accessible from everywhere and only limited with students of the faculty meaning that, not anyone can create an account and use the application. Also, there are not any ads and advertisements that makes the user angry to redirect to other websites.
- As for the social ethical impact, the teacher will have more chances to share more information or knowledge about their lectures such as videos, links, references whereas the students are able to communicate with the teachers or exchange ideas on topics and watch videos whenever they want to understand the topics clear and fully. Thereafter, the e-learning platform can help to students to be more intelligent of their fields by providing more potentials and knowledge.

7. Conclusion

As for the advantage of the project once completed, I can mention that it will be very beneficial platform where the students can get more knowledge from the resources in the specified engineering faculty website and in the meantime the university can get the benefit from providing more qualitative and continuous education all the time.

7.1 Benefits

a. Benefits to users:

1. Helps instructors to organize more tests and assignments

2. Students can have more chances to communicate with instructors and classmates

3. The instructors are able to report about new announcements or the students can be aware of news immediately at once without going somewhere or asking someone else to check.

b. Benefits to me:

1. Putting my knowledge of C# and Angular into a real project practice

2. Learning new skills such as how to add video, photo, file upload, messaging functionalities, developing different user interfaces and functionalities for different user types (teacher, student)

3. Good advantage for my CV which is going to help to get good job by showing the project in the job interviews

Why did I choose this project?

The main reason for choosing this project is to put my knowledge of C# .NET into a real-world individual project. While looking through the project ideas in the Moodle of our university I found that this is the only web project. Since I have been learning creating web applications using .NET framework for nearly a year, I was planning to create an application individually with my own ideas and own implementation. I found that the project idea of creating a Moodle web application for Faculty of engineering suits my desires and plans.

Firstly, some of my friends was telling me about the hardships and advising about not to choose this project. However, as far as I can do something practically on my own and learn something new, I can say that I got the best advantage regardless of grade that I am going to get.

7.2 Future Works

In the future, I am going to continue the project by adding extra features. Because If I want to deploy my application it has to be fully ready without any bugs and it has to have more different features from the current Moodle website and most importantly the application has to be responsive. I am planning to make my Moodle application responsive for mobile size web-versions and application version as well so that the university will have their own e-learning platform for engineering faculty.

8. References

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