



Assignment Title: **Assignment 2**

Module Title: **ACCC5004 Web Development**

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Research

Rasmus Lerdorf invented a product based on the C programming language called PHP/FI, in 1994. A year later, in 1995, Ramus released a free open-source version of PHP Tools, a collection of scripts known as “Personal Home Page Tools”. Since then, a lot of improvements have been made to the source code and in 1998 PHP 3.0 was declared the official successor of the previous PHP/FI versions. A new interpretation was given to its name, representing an acronym for Hypertext Preprocessor. The year 2020 came with the latest release of PHP version 8.0 and it is considered one of the most popular programming languages [1] [2].

As it was based on C programming language, PHP was initially developed as a procedural programming language, being extended to an object-oriented programming language starting with PHP 3.0, where object-oriented concepts were introduced. [3]

A set of PHP frameworks has been developed, including: Laravel, CodeIgniter, Symphony, CakePHP, Zend Framework.

 [4] [5]	
Laravel	
First released by Taylor Otwell in 2011	
Architecture	MVC (Model-View-Controller)
Official documentation	https://laravel.com/docs/8.x
Advantages	Disadvantages
It is an MVC framework (well-known pattern - easy to follow by developers) Flexible and human-friendly syntax Built-in ORM (Object-Relational Mapper) Email integration system (Mandrill, Amazon SES, Sendmail) Excellent documentation	No built-in support functions Upgrade between versions might be problematic Migration from legacy systems might be problematic

Table 1: Laravel framework characteristics

 [6] [7]	
CodeIgniter	
First released by EllisLab company in 2006	
Architecture	MVC (Model-View-Controller)
Official documentation	https://codeigniter.com/docs
Advantages	Disadvantages
Easy to setup and use Easy to migrate legacy applications Built-in security features Performance features (e.g., full page caching) Data encryption and form validations mechanisms	No build-in ORM (Object-Relational Mapper) A migration to PHP 5 and later requires an upgrade of CodeIgniter as well Suitable for small and medium solutions

Table 2: CodeIgniter framework characteristics

 [8] [9]	
Symfony	
First released by Fabien Potencier in 2005	
Architecture	MVC (Model-View-Controller)
Official documentation	https://symfony.com/doc/current/index.html
Advantages	Disadvantages
Best modularity and reusable components Expandable plugin bundles (Django, Perl, Cocoa, Rails, TinyMCE) Caching management User-friendly and an excellent documentation	Difficult to upgrade bundles as many changes can happened between updates Configuration yml files difficult to write and understand Long time for build and launch

Table 3: Symfony framework characteristics

 [10] [11]	
CakePHP	
First released by Cake Software Foundation in 2005	
Architecture	MVC (Model-View-Controller)
Official documentation	https://book.cakephp.org/4/en/index.html
Advantages	Disadvantages
Easy to use and learn Easy to debug and test Offers easy management of database Good modularity and reusable components Fast and flexible templating system	Reduce documentation Different routing approach comparing with other frameworks. Migration can be problematic

Table 4: CakePHP framework characteristics

 [12] [13]	
Zend Framework	
First released by Zend Technologies in 2006	
Architecture	MVC (Model-View-Controller)
Official documentation	https://framework.zend.com/learn
Advantages	Disadvantages
Useful for big data applications HTML5 compliant Comprehensive documentation Highly powerful and fast	Documentation difficult to follow as a beginner Tough to learn Expensive plug-ins

Table 5: Zend framework characteristics

Each framework has its own advantages and disadvantages and the choose of one or the another depends on the size of the project, the knowledge of the developers, and the business specifications.

Introduction

CertHELearning is a web-based application designed and implemented to meet the functionality of a student course management system. The main function of the system is the ability to register for a desired course chosen from the list of Level 4 CertHE courses (including CertHE in Skills for the workplace and Health and Social Care).

An anonymous user can access the system for searching courses details, but other functionalities require an authenticated and authorized user. The user can register in the system and can has the role of student or administrator. For each type of user, a profile dashboard is created.

Once authenticated, the student can send a registration request for a course. The administrator approves or rejects the request based on system's validations (e.g., a student cannot register for multiple courses at the same time). A student visualizes his/her courses, grades and personal details in the student dashboard. Also, a student can claim the certificate once a course has been completed.

CertHELearning application has a simple architecture that includes several components:

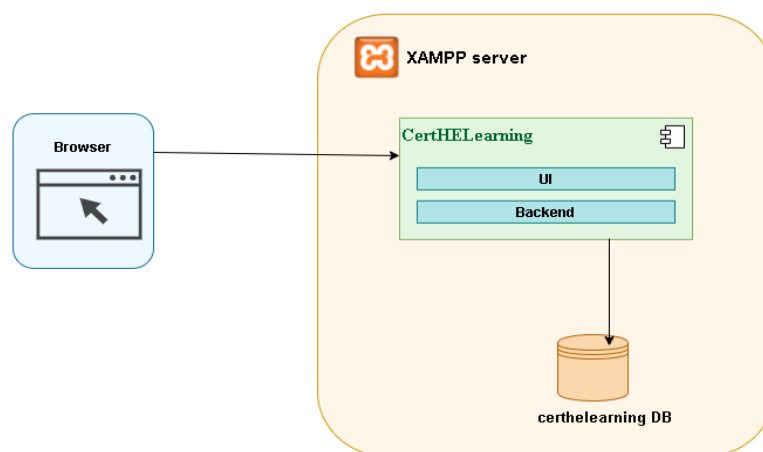


Figure 1: CertHELearning system architecture

The application has a user-interface component responsible for the presentation layer and a backend component responsible for the business logic of the system and the communication with the database.

The data is stored into a MySQL database. The ERD (Entity Relationship Diagram) describes how data is stored into tables and relationships between them:

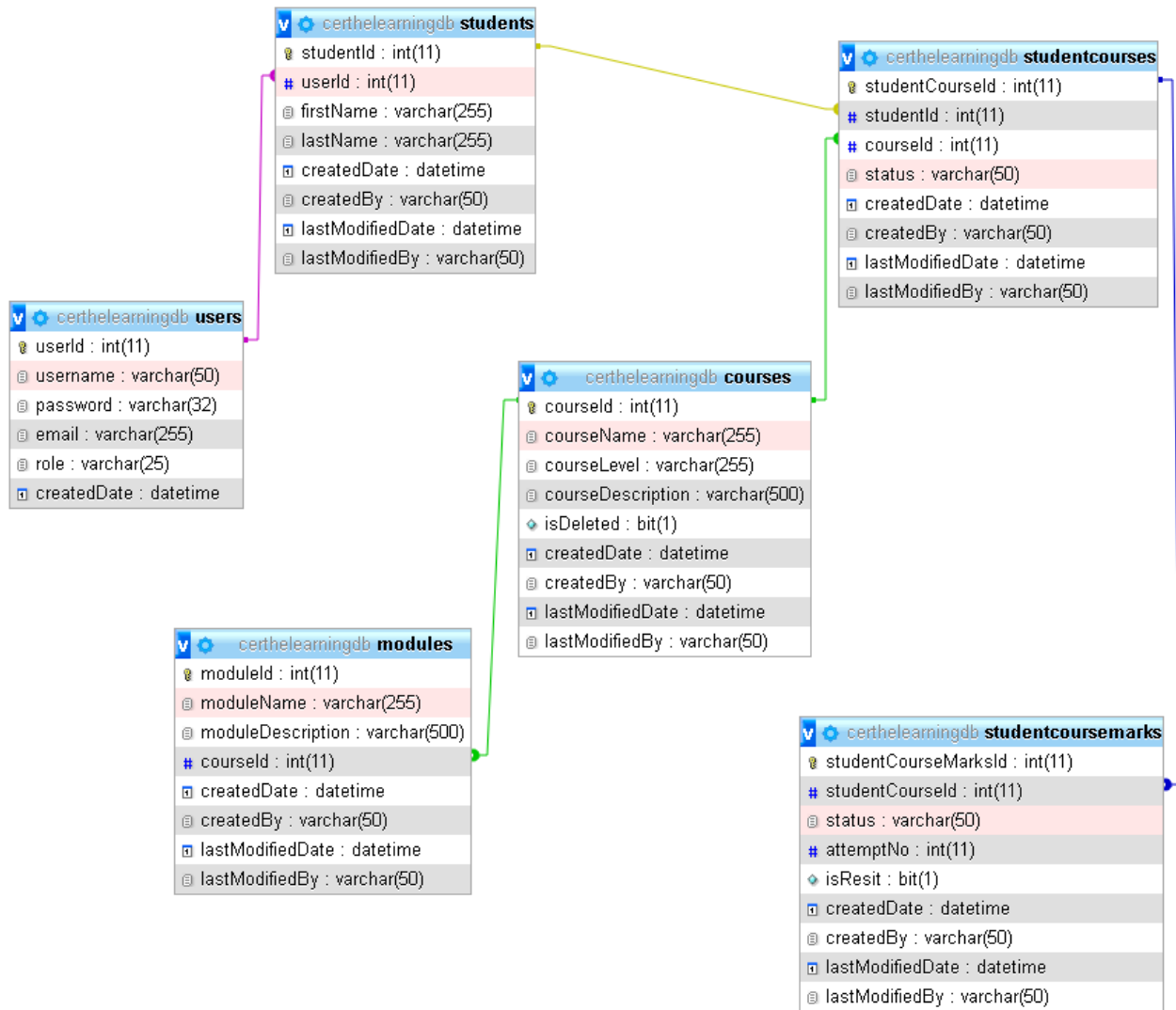


Figure 2: CertheLearning database - ERD

The two modules, the application and the database, run using XAMPP, which represents an abbreviation for Apache, MySQL, PHP and Perl [14] and acts as a web server responsible for delivering the response when a client sends a request from the browser.

The system requirements are described using a set of use cases and UML (Unified Modeling Language) diagrams were created:

- An anonymous user can navigate in the system, can search and view courses/modules details, can contact university, can register into the system

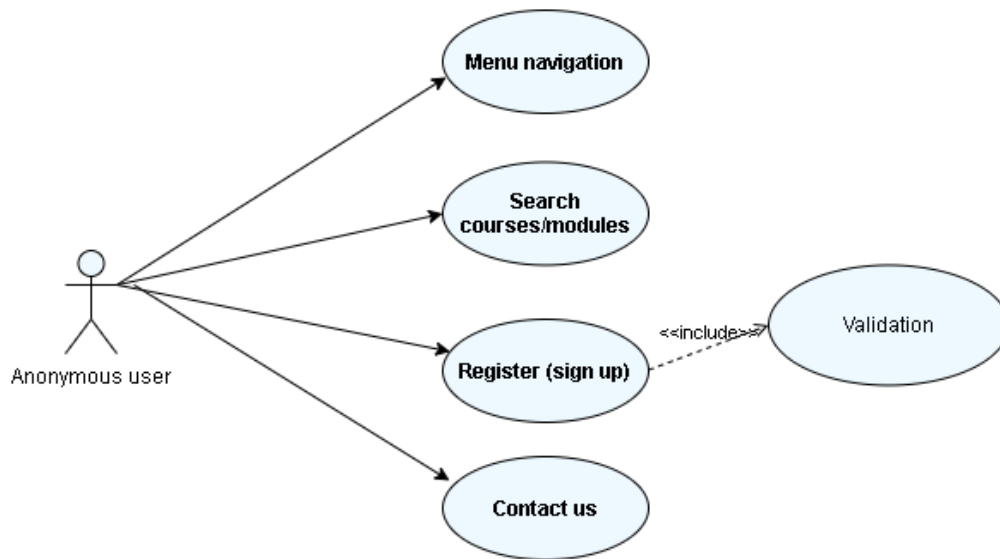


Figure 3: Use Cases for anonymous users - UML diagram

- An administrator user can login in the system, can navigate in the system, can contact university, can search and view courses/modules details, can manage courses and modules (add, edit, delete courses/modules), can validate applications of students



Figure 4: Use Cases for administrator user - UML diagram

- A student user can login in the system, can navigate in the system, can search and view courses/modules details, can contact university, can amend personal details, can register to a course and view registered courses

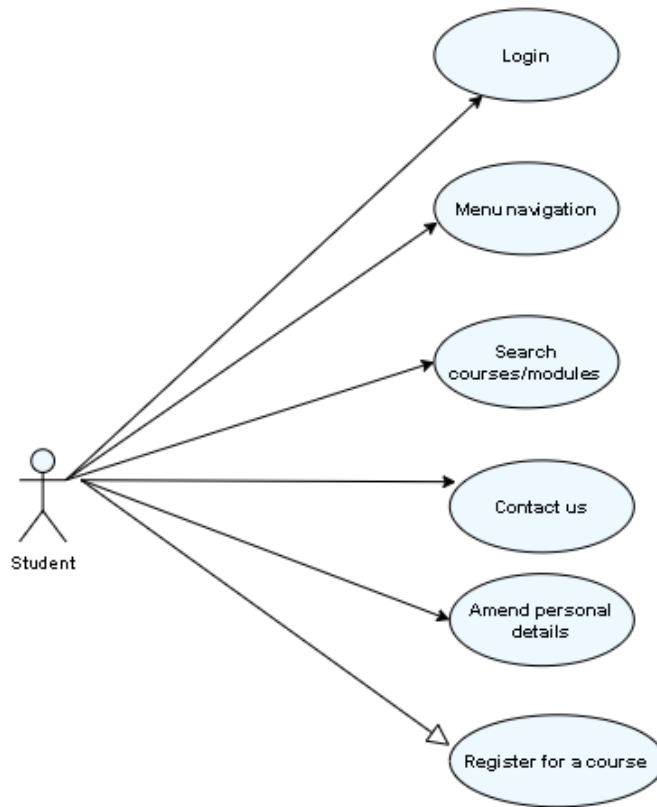


Figure 5: Use Cases for student user - UML diagram

Testing

Testing documentation applies to manual testing and a list of assumptions is necessary in order to define the testing plan:

- CertHELearning application is running using port 80
- Application is configured into htdocs directory using application directory root name: certhe-learning-app
 - Application is accessible in browser by URL: <http://localhost/certhe-learning-app/>
- A user with 'administrator' (admin) role cannot be created using the system
 - An admin user can be created directly in the database
 - Admin user with the following credentials is already created:
 - username: admin / password: admin

For each use case, a set of test cases has been defined:

Use case

Anonymous user -> User registration (sign up)

Test Case

Id	Name	Short description
1	User registration	Test the user registration functionality

Description and Acceptance Criteria

As an anonymous user, I should be able to create an account

Steps

No.	Action	Expected result
1	Open a browser and access http://localhost/certhe-learning-app/	Home page is displayed. User can see university details. Home menu item is selected
2	Click Login menu item	Login page is displayed. 'Not yet a member? Sign up' option is visible
3	Click Sign up link button	Register page is displayed
4	Click Register button	Error messages are displayed: Username is required! Missing or invalid email. Please insert a valid email! Password is required. Please insert at least 8 characters!
5	Fill all fields: Username: usertest Email: usertest@gmail.com Password: usertest123 Confirm password: usertest123 And click Register button	A user with student role is created in the database. The user is redirected to student dashboard. A menu item 'Welcome usertest' is displayed

Test output:

Not yet a member? [Sign up](#)

Register

Username is required!
Missing or invalid email. Please insert a valid email!
Password is required. Please insert at least 8 characters!

Username

Email

Password

Confirm password

Register

Already a member? [Sign in](#)

Username

usertest

Email

usertest@gmail.com

Password

.....

Confirm password

.....

Register

Already a member? [Sign in](#)

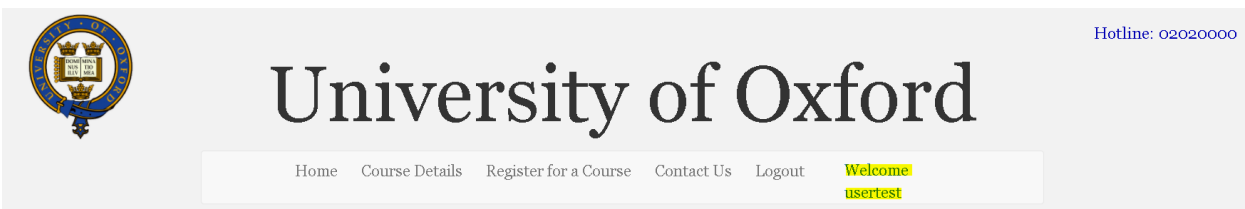


Figure 6: Test Case #1 - output

<u>Use case</u>		
Anonymous administrator student user -> Menu navigation		
<u>Test Case</u>		
Id	Name	Short description
2	Menu navigation	Test the menu items and navigation throw web application
<u>Description and Acceptance Criteria</u>		
As an anonymous user or administrator user or student user, I should be able to access: Home Course Details Register for a Course Contact us Login Register page		
<u>Steps</u>		

No.	Action	Expected result
1	Open a browser and access http://localhost/certhe-learning-app/	Home page is displayed. User can see university details. Home menu item is selected
2	Click Course Details menu item	Course Details menu item is selected. Courses page is displayed
3	Click Register for a Course menu item	Register for a Course menu item is selected. Courses registration page is displayed
4	Click Contact Us menu item	Contact Us menu item is selected. Contact us page is displayed
5	Click Login menu item	Login menu item is selected. Login page is displayed. Sing up link is available on Login page
6	On Login Page click Sign Up	Login menu item is renamed to Register, and Register menu item is selected. Register page is displayed
7	Click on Login menu item. Fill login form using username: admin, password: admin and click Login button. Re-take the steps 1- 4	
8	Click Logout menu item. Click Login menu item. Fill login form using username: sandra, password; sandra123 Re-take the steps 1- 4	

Test output:

Home	Course Details	Register for a Course	Contact Us	Login
Home	Course Details	Register for a Course	Contact Us	Login
Home	Course Details	Register for a Course	Contact Us	Login
Home	Course Details	Register for a Course	Contact Us	Login

[Home](#)
[Course Details](#)
[Register for a Course](#)
[Contact Us](#)
[Login](#)

Login

Username

Password

[Login](#)

Not yet a member? [Sign up](#)

[Home](#)
[Course Details](#)
[Register for a Course](#)
[Contact Us](#)
[Register](#)

Figure 7: Test Case #2 - output

<u>Use case</u>		
Anonymous administrator student user -> Search courses/modules		
<u>Test Case</u>		
Id	Name	Short description
3	Search courses/modules	Test the courses/modules search bar
<u>Description and Acceptance Criteria</u>		
As an anonymous user or administrator user or student user, I should be able to search courses/modules details		
<u>Steps</u>		
No.	Action	Expected result
1	Open a browser and access http://localhost/certhe-learning-app/	Home page is displayed.
2	Click Course Details menu item	Courses are displayed and search bar is visible

3	Type 'CertHE Skills for the Workplace' in the search bar and press Enter	Courses should be filtered. Only course with name <i>CertHE Skills for the Workplace</i> is displayed
4	Remove search bar content and press Enter	All courses are displayed
5	Type 'what do we mean by' in the search bar and press Enter	Only course with name <i>CertHE Health and Social Care</i> is displayed as its module 'An introduction to Knowledge and Inquiry in Health & Social Care' contains searched term
6	Click on Login. Fill login form using username: admin, password: admin and click Login button. Re-take the steps 1- 5	
7	Click Logout menu item. Click Login menu item. Fill login form using username: sandra, password; sandra123 Re-take the steps 1- 5	

Test output:

[Overview](#)
[Modules](#)

CertHE Skills for the Workplace

This program will equip students for various job opportunities in the public and private health and social care environment with a focus on adult and child care.

[Overview](#)
[Modules](#)

CertHE Health and Social Care

Our Health and Social Care BSc (Hons) degree will equip you with skills to analyse important public health and social care issues.

[Overview](#)
[Modules](#)

CertHE Skills for the Workplace

This program will equip students for various job opportunities in the public and private health and social care environment with a focus on adult and child care.

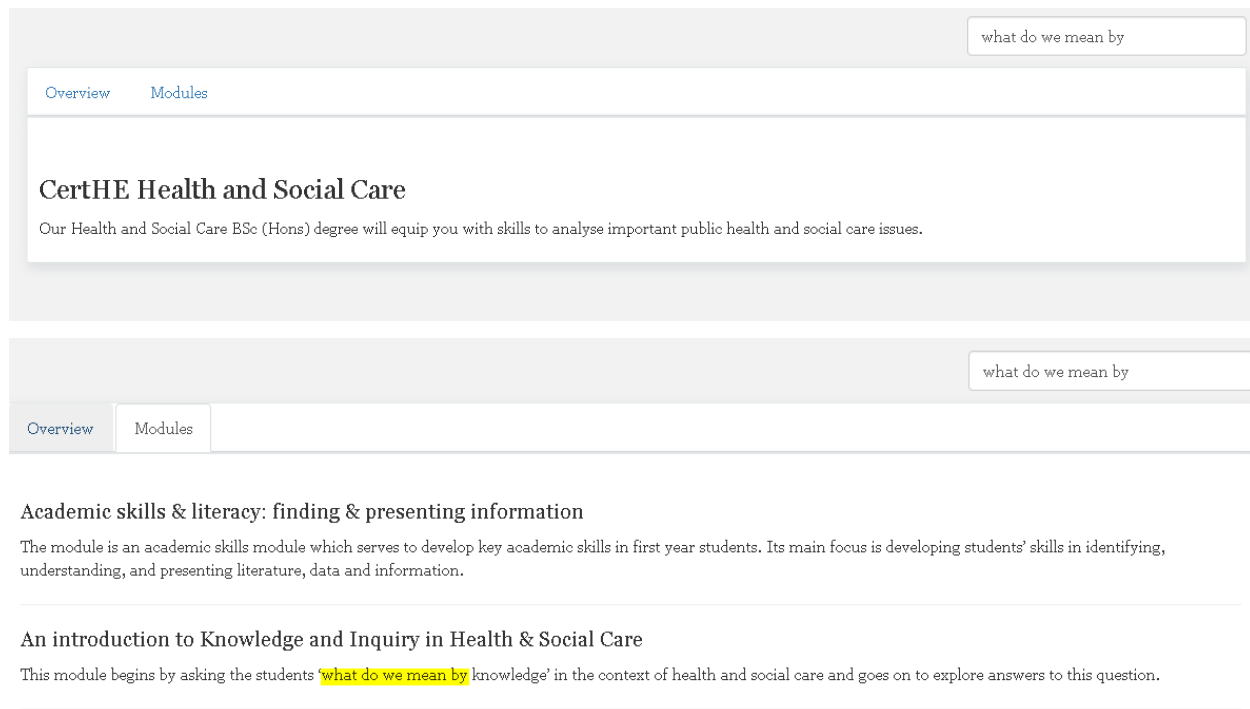


Figure 8: Test Case #3 - output

<u>Use case</u>		
Anonymous administrator student user -> Contact Us		
<u>Test Case</u>		
Id	Name	Short description
4	Contact Us	Test the contact form
<u>Description and Acceptance Criteria</u>		
As an anonymous user or administrator user or student user, I should be able to contact the university		
<u>Steps</u>		
No.	Action	Expected result
1	Open a browser and access http://localhost/certhe-learning-app/	Home page is displayed.
2	Click Contact Us menu item	Contact page is displayed
3	Click Send button	A validation is displayed: <i>All fields are required!</i>

4	Fill all fields: Name: tester Email: tester@gmail.com Subject: test contact Message: This is a test message And click send button	Message is sent and a confirmation is displayed: <i>Your contact request has been submitted successfully!</i> Form fields are clean-up
5	Click on Login menu item. Fill login form using username: admin, password: admin and click Login button. Re-take the steps 1- 4	
6	Click Logout menu item. Click Login menu item. Fill login form using username: sandra, password: sandra123 Re-take the steps 1- 4.	

Test output:

The figure consists of three screenshots of a web form used for submitting contact requests. Each form has four input fields: Name, Email, Subject, and Message, followed by a 'Send' button.

- Top-left screenshot:** Shows the form in its initial state. All fields are empty. A red error message at the top states 'All fields are required!'.
- Top-right screenshot:** Shows the form after a successful submission. The fields contain the test data: Name: 'tester', Email: 'tester@gmail.com', Subject: 'test contact', and Message: 'This is a test message'. The data remains in the fields after clicking 'Send'.
- Bottom-left screenshot:** Shows the form after a successful submission. A green success message at the top states 'Your contact request has been submitted successfully!'. The fields still contain the previous test data ('tester', 'tester@gmail.com', 'test contact', and an empty message box).

Bug: The contact request is successfully sent but the fields partially keep the previous data.

Expected: All fields must be clean-up after a successful sent of the contact request.

Figure 9: Test Case #4 - output

Use case

Administrator user -> Courses management (add)

Test Case

Id	Name	Short description
5	Courses management	Test the courses management functionalities

Description and Acceptance Criteria

As administrator user, I should be able to add a new course

Steps

No.	Action	Expected result
1	Open a browser and access http://localhost/certhe-learning-app/	Home page is displayed.
2	Click on Login menu item. Fill login form using username: admin, password: admin and click Login button	Admin dashboard page should be displayed. Courses management tab should be selected and Add course button is visible
3	Click on Add course button	A form for course details is displayed
4	Click on Create button	A validation message is displayed: Course name is required! Course level is required!
5	Fill all fields: Course name: test Course level: Level 4 Course description: This is a test course And click Create button	The course is saved in the database and displayed into courses list

Test output:

Course name is required!
Course level is required!

Course name

Course level

Course description

Create

Cancel

Course name

test

Course level

Level 4

Course description

This is a test course

Create

Cancel

Figure 10: Test Case #5 - output

Bug: Course validation is working, but the messages are displayed without keeping the create form container opened.

Expected: Keep the create course form opened if there is an error.

Use case

Administrator user -> Courses management (edit)

Test Case

Id	Name	Short description
6	Courses management	Test the courses management functionalities

Description and Acceptance Criteria

As administrator user, I should be able to edit a course

Steps

No.	Action	Expected result
1	Open a browser and access http://localhost/certhe-learning-app/	Home page is displayed.
2	Click on Login menu item. Fill login form using username: admin, password: admin and click Login button	Admin dashboard page should be displayed. Courses management tab should be selected and Add course button is visible
3	Click on Edit course button for course name: test	A form for course details is displayed with all data filled
4	Change course name from test to Test Edited and click Save button	Course changes are saved.

Test output:

Course name

Test Edited

Course level

Level 4

Course description

This is a test course

Save

Cancel

Course name	Course level	Course Description		
CertHE Skills for the Workplace	Level 4	This program will equip students for various job o...	Edit	Delete
CertHE Health and Social Care	Level 4	Our Health and Social Care BSc (Hons) degree will ...	Edit	Delete
Test Edited	Level 4	This is a test course	Edit	Delete

Figure 11: Test Case #6 – output

<u>Use case</u>		
Administrator user -> Modules management (add)		
<u>Test Case</u>		
Id	Name	Short description
7	Modules management	Test the modules management functionalities
<u>Description and Acceptance Criteria</u>		
As administrator user, I should be able to add a new module for a selected course		
<u>Steps</u>		
No.	Action	Expected result
1	Open a browser and access http://localhost/certhe-learning-app/	Home page is displayed
2	Click on Login menu item. Fill login form using username: admin, password: admin and click Login button	Admin dashboard page should be displayed
3	Click on Modules management tab	Modules tab content should be displayed and Add module button should be disabled
4	Select Test Edited course from courses list	Add module button should be enable
5	Click on Add module button	A form for module details is displayed
6	Fill all fields: Module name: test module 1 Module description: This is a test module And click Create button	The module is saved in the database and displayed into modules list

Test output:

[Courses management](#) [Modules management](#) [Students management](#)

Course: Test Edited

[Add module](#)

Module name is required!

Module name

Module description

[Create](#) [Cancel](#)

Module name	Module Description	
test module 1	This is a test module	Edit Delete

Figure 12: Test Case #7 - output

Use case
Student user -> Register for a course

Test Case

Id	Name	Short description
8	Course registration	Test the course registration functionality

Description and Acceptance Criteria

As student user, I should be able to register for a course

Steps

No.	Action	Expected result
1	Open a browser and access http://localhost/certhe-learning-app/	Home page is displayed
2	Click on Register for a Course menu item	Courses list should be displayed. A warning message should be displayed: <i>You need to be logged in as student in order to register for a course!</i> Register buttons are disabled
2	Click on Login menu item. Fill login form using username: sandra, password: sandra123 and click Login button	Student dashboard page should be displayed
3	Click on Register for a Course menu item	Warning message is hidden. Register buttons are enabled
4	Click on Register button for Test Edited course	A registration successful! Message is displayed Registration request was sent!
5	Click again on Register button for Test Edited course	An error message is displayed You are already enrolled to a course. Please check your STUDENT DASHBOARD for status!

Test output:

You need to be logged in as student in order to register for a course!

Course name	Course level	Course Description	
CertHE Skills for the Workplace	Level 4	This program will equip students for various job o...	Register
CertHE Health and Social Care	Level 4	Our Health and Social Care BSc (Hons) degree will ...	Register
Test Edited	Level 4	This is a test course	Register

Registration request was sent!

Course name	Course level	Course Description	
CertHE Skills for the Workplace	Level 4	This program will equip students for various job o...	Register
CertHE Health and Social Care	Level 4	Our Health and Social Care BSc (Hons) degree will ...	Register
Test Edited	Level 4	This is a test course	Register

You are already enrolled to a course. Please check your [STUDENT DASHBOARD](#) for status!

Course name	Course level	Course Description	
CertHE Skills for the Workplace	Level 4	This program will equip students for various job o...	Register
CertHE Health and Social Care	Level 4	Our Health and Social Care BSc (Hons) degree will ...	Register
Test Edited	Level 4	This is a test course	Register

Figure 13: Test Case #8 - output

Use case

Student user -> View personal details and courses status

Test Case

Id	Name	Short description
9	Student dashboard	Test the student dashboard functionalities

Description and Acceptance Criteria

As student user, I should be able to access my dashboard page and view personal details and courses' status

Steps

No.	Action	Expected result
1	Open a browser and access http://localhost/certhe-learning-app/	Home page is displayed

2	Click on Login menu item. Fill login form using username: sandra, password: sandra123 and click Login button	Student dashboard page should be displayed
3	Click on Personal Details tab	Student personal details should be displayed. All fields must be read-only
4	Click on Edit button	Personal details fields are editable
5	Fill fields: First name: Sandra Last name: Anghel And click Save button	Personal details changes are saved in the database.
6	Click on Courses Status tab	A list of courses and their status is displayed

Test output:

Personal Details

Courses Status

Personal Details

Edit

First name

Last name

Email

sandra.anghel@gmail.com

Personal Details

First name

Sandra

Last name

Anghel

Email

sandra.anghel@gmail.com

Save

Cancel

Courses Status

Course name	Course level	Status
Test Edited	Level 4	Registration Requested

Figure 14: Test Case #9 - output

Use case

Administrator user -> Validate applications of students

Test Case

Id	Name	Short description
10	Validate applications	Test the Validate applications functionality

Description and Acceptance Criteria

As administrator user, I should be able to approve or reject a registration request

Steps

No.	Action	Expected result
1	Open a browser and access http://localhost/certhe-learning-app/	Home page is displayed.

2	Click on Login menu item. Fill login form using username: admin, password: admin and click Login button	Admin dashboard page should be displayed.
3	Click on Students management tab	A list of students and their courses is displayed
4	Click on Reject button for a course with status Registration Requested	Course registration is rejected
5	Fill all fields: Course name: test Course level: Level 4 Course description: This is a test course And click Create button	The course is saved in the database and displayed into courses list

Test output:

[Courses management](#)
[Modules management](#)
[Students management](#)

First name: Sandra

Last name: Anghel

Email: sandra.anghel@gmail.com

Course name	Course level	Status	Request Date	
Test Edited	Level 4	Registration Requested	2021-01-04 17:44:27	Approve Reject

First name: John

Last name: Smith

Email: Smith@gmail.com

Course name	Course level	Status	Request Date	
CertHE Skills for the Workplace	Level 4	Registration Requested	2021-01-04 17:53:17	Approve Reject

First name: John

Last name: Smith

Email: Smith@gmail.com

Course name	Course level	Status	Request Date
CertHE Skills for the Workplace	Level 4	Rejected	2021-01-04 17:53:17

First name: Sandra			
Last name: Anghel			
Email: sandra.anghel@gmail.com			
Course name	Course level	Status	Request Date
Test Edited	Level 4	Approved	2021-01-04 17:44:27

Figure 15: Test Case #10 - output

Bug: Validate applications is working, but when a course request is rejected/approved the page is refresh and the selected tab is Courses management.

Expected: Keep the selected tab on Students management after a reject/approve action.

Evaluation

The current implementation of the application covers most of the requirements. During the testing stage, several bugs were discovered and specified into testing documentation. These are not critical bugs, but they must be patched as a first enhancement of the application, as an important concern is user experience and user interface consistency. As it was mentioned, testing documentation includes manual testing process. It must be extended, and the coverage percentage must be increased by adding unit tests.

Another improvement of the application is related to refactoring the source code. Currently, the application connects to a MySQL database. The connection's credentials are hardcoded. They must be extracted into a specific configuration file and allow in this way a flexible connection to different database name, port, username or password.

In terms of system functionality, a future development will involve the implementation of student grades management and the generation of completion certificates.

For development, XAMPP server is responsible for acting as a web server installed on a local machine. For deploying the application as a real-world application, a deployment strategy is required. The source code of the application can be stored in GitHub repository and a continuous integration and continuous delivery (CI/CD) pipeline can be added in order to simplify the build

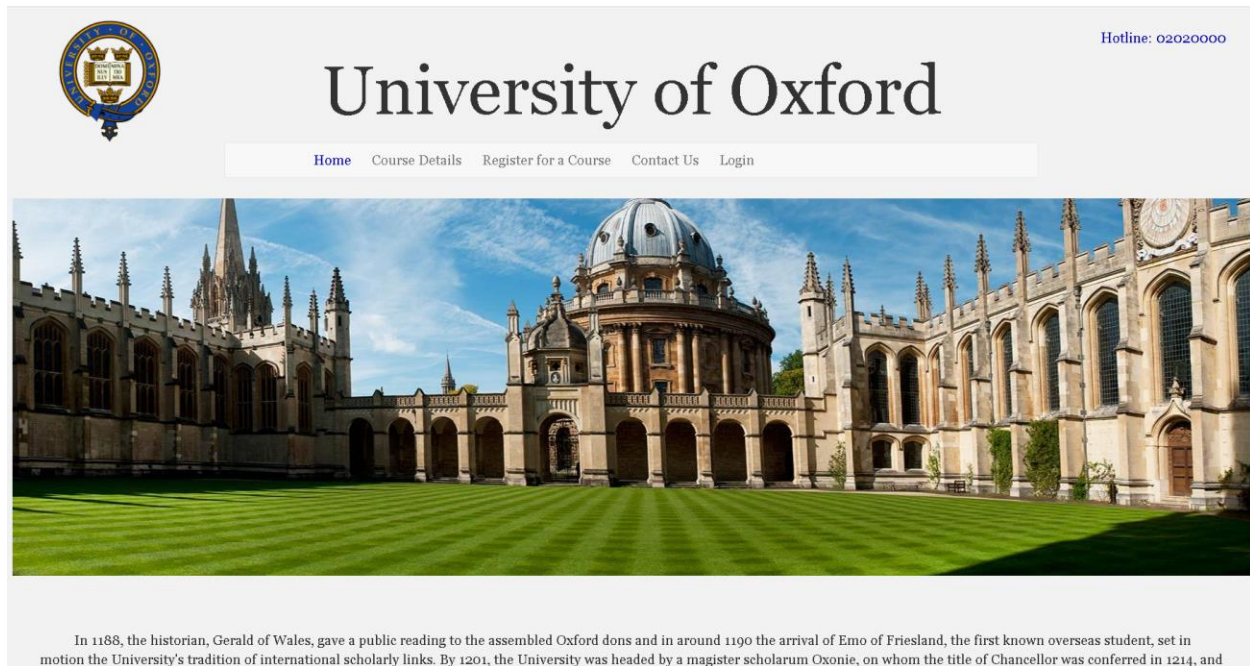
and deployment processes. A server machine with XAMPP installed can be used to deploy the application. On the other hand, a modern approach would be the usage of a cloud provider for hosting the application and covering all security aspects. For example, Azure exposes Virtual Machines resources, and the CD pipeline can be configured to deploy the application from GitHub directly into a virtual machine created in Azure. This approach has the advantage of publishing versions of the applications on real time automatically without effort.

References

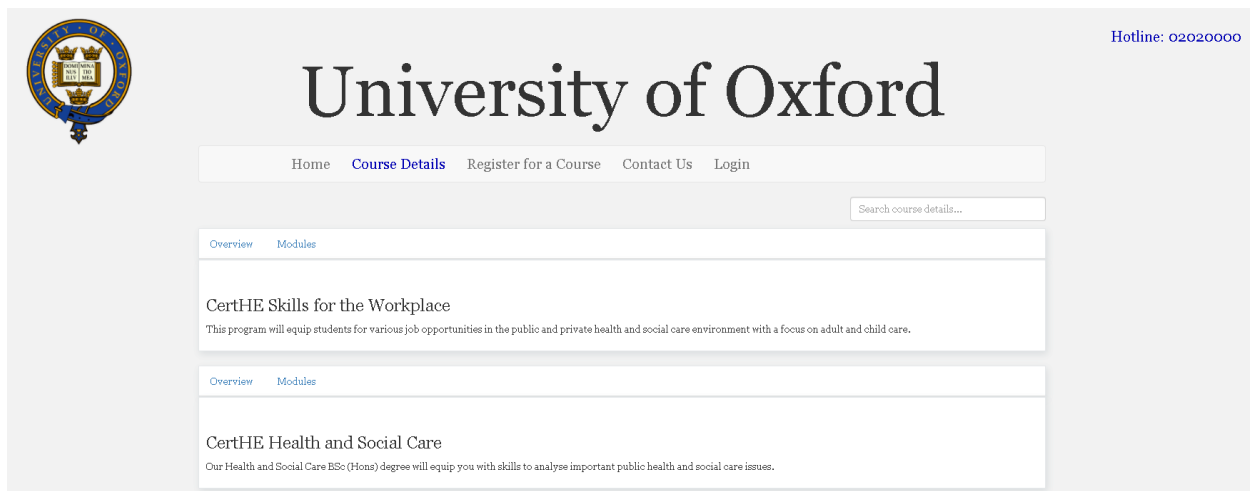
- [1] The PHP Group, "History of PHP," The PHP Group, [Online]. Available: <https://www.php.net/manual/en/history.php.php>.
- [2] A. Clyde, PHP: A Step By Step Guide from Beginner to Expert, Independently published, 2019.
- [3] R. Lerdorf, K. Tatroe and P. MacIntyre, Programming PHP ,3rd Edition, O'Reilly Media, 2013.
- [4] WishDesk Official, "The main advantages of Laravel for your website," Medium, 28 02 2018. [Online]. Available: <https://medium.com/@wishdesk.com/the-main-advantages-of-laravel-for-your-website-1a9f478e8645>.
- [5] S. Thattil, "Advantages and Disadvantages of Laravel," Medium, 30 05 2018. [Online]. Available: <https://saschathattil.medium.com/advantages-and-disadvantages-of-laravel-224ecc09021a>.
- [6] A. Solutions, "Laravel vs Codeigniter Advantages, Difference," Medium, 25 03 2019. [Online]. Available: <https://medium.com/@Artoonsolutions/laravel-vs-codeigniter-advantages-difference-ad0bbc15133c>.
- [7] British Columbia Institute of Technology, "CodeIgniter Features," 09 2019. [Online]. Available: <https://codeigniter.com/userguide3/overview/features.html>.
- [8] NetiApps, "9 Best Features of Symfony," Medium, 25 02 2019. [Online]. Available: <https://medium.com/@NetiApps/9-best-features-of-symfony-2d32d638f8c0>.
- [9] A. Njenga, "10 Popular PHP frameworks to consider," 01 2020. [Online]. Available: <https://raygun.com/blog/top-php-frameworks/>.
- [10] C. Lyne, "Intro to CakePHP for Bug Hunters," Medium, 12 06 2019. [Online]. Available: <https://medium.com/tenable-techblog/intro-to-cakephp-for-bug-hunters-97b89f8876bd>.
- [11] M. Shah, "What is CakePHP Framework and Why You Should Use It," Medium, 10 02 2017. [Online]. Available: <https://biztechcs.medium.com/what-is-cakephp-framework-and-why-you-should-use-it-e3cc3b29afa5>.
- [12] A. John, "Top 4 Reasons to Prefer PHP Zend Framework," Medium, 24 05 2018. [Online]. Available: <https://medium.com/@amyjohn9917/top-4-reasons-to-prefer-php-zend-framework-40348d1ed7fc>.
- [13] G. Employees, "PHP Zend Framework — Reasons to use and Pros & Cons," Medium, 05 02 2020. [Online]. Available: <https://medium.com/@globalemployees116/php-zend-framework-reasons-to-use-and-pros-cons-155028e2c49b>.
- [14] M. Lambert, M. Timpledon and S. Marseken, Xampp, Betascript Publishing, 2010.

Appendix

➤ Home page



➤ Course Details page



➤ Register for a Course page



Hotline: 02020000

University of Oxford

[Home](#)
[Course Details](#)
[Register for a Course](#)
[Contact Us](#)
[Login](#)

You need to be logged in as student in order to register for a course!

Course name	Course level	Course Description	
CerTHE Skills for the Workplace	Level 4	This program will equip students for various job o...	Register
CerTHE Health and Social Care	Level 4	Our Health and Social Care BSc (Hons) degree will ...	Register
Test Edited	Level 4	This is a test course	Register

➤ Register for a Course page – student user authenticated



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[Register for a Course](#)
[Contact Us](#)
[Logout](#)
Welcome sandra

Course name	Course level	Course Description	
CerTHE Skills for the Workplace	Level 4	This program will equip students for various job o...	Register
CerTHE Health and Social Care	Level 4	Our Health and Social Care BSc (Hons) degree will ...	Register
Test Edited	Level 4	This is a test course	Register

➤ Contact Us page



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[Login](#)

Name

Email

Subject

Message

[Send](#)

➤ Login page



Hotline: 02020000

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Home Course Details Register for a Course Contact Us [Login](#)

Login

Username

Password

[Login](#)

Not yet a member? [Sign up](#)

➤ Register page



Hotline: 02020000

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Home Course Details Register for a Course Contact Us [Register](#)

Register

Username

Email

Password

Confirm password

[Register](#)

Already a member? [Sign in](#)

➤ Student dashboard



Hotline: 02020000

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[Personal Details](#)

[Courses Status](#)

➤ Student dashboard – personal details



Hotline: 02020000

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Home Course Details Register for a Course Contact Us Logout Welcome [sandra](#)

Personal Details

First name

Sandra

Last name

Anghel

Email

sandra.anghel@gmail.com

Edit

➤ Student dashboard – courses status



Hotline: 02020000

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Home Course Details Register for a Course Contact Us Logout Welcome [sandra](#)

Personal Details

Courses Status

Course name	Course level	Status
Test Edited	Level 4	Approved

➤ Administrator dashboard



Hotline: 02020000

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Courses management Modules management Students management

➤ Administrator dashboard – courses management



Hotline: 02020000

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[Courses management](#)
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[Students management](#)

[Add course](#)

Course name	Course level	Course Description		
CerTHE Skills for the Workplace	Level 4	This program will equip students for various job o...	Edit	Delete
CerTHE Health and Social Care	Level 4	Our Health and Social Care BSc (Hons) degree will ...	Edit	Delete
Test Edited	Level 4	This is a test course	Edit	Delete

➤ Administrator dashboard – modules management



Hotline: 02020000

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Course: CerTHE Skills for the Workplace ▼

[Add module](#)

Module name	Module Description		
Academic and Employability Skills	Upon the successful completion of the Academic & E...	Edit	Delete
Effective Team Working and Communication	Upon the successful completion of the Effective Te...	Edit	Delete
Digital Skills and Research Methods	Upon the successful completion of the Digital Skil...	Edit	Delete
Psychology for Health and Social Care	Upon the successful completion of the Psychology f...	Edit	Delete
Problem Solving and Decision Making	Upon the successful completion of the Problem Solv...	Edit	Delete
Professional Career Development	Upon the successful completion of the Professional...	Edit	Delete
Workplace Culture and Organisational Efficiency	Organisational culture defines the way employees c...	Edit	Delete
Understanding and Engaging in the Customer Experience	Customer Experience is both the fastest growing bu...	Edit	Delete

➤ Administrator dashboard – students management



Hotline: 02020000

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[Courses management](#) [Modules management](#) [Students management](#)

First name: Sandra
Last name: Anghel
Email: sandra.anghel@gmail.com

Course name	Course level	Status	Request Date
Test Edited	Level 4	Approved	2021-01-04 17:44:27

First name: John
Last name: Smith
Email: Smith@gmail.com

Course name	Course level	Status	Request Date
CerthE Skills for the Workplace	Level 4	Rejected	2021-01-04 17:53:17