Governors State University

OPUS Open Portal to University Scholarship

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ELEARNING

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ELEARNING

By

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GRADUATE CAPSTONE SEMINAR PROJECT

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ABSTRACT

Web based eLearning Management allow instructors and students to share instructional materials, make class announcements, submit and return course assignments, and communicate with each other online. Technology is evolving in every field, in which is one of the most important in the field of teaching is eLearning Management. We can monitor the individual performance of each student using eLearning Management because one person cannot accurately evaluate the performance of all students. eLearning Management will make it easier to increase individual competence using the student monitoring process. eLearning Management can easily bring in the best educated instructors in the world to teach everyone.

We give separate roles and responsibilities for each console and will use the following three consoles of eLearning Management. 1. Administrator, 2. Instructor and 3. Learners. Administrator can control user [i.e. instructor and learner] and courses information. Instructor can manage the content and monitoring the student progress. Learner can view the courses and learn everything.

To execute the eLearning Management Website data is stored through MSSQL and the front end is implemented through HTML5, CSS3, Bootstrap and jQuery. We are using the .Net core on Visual Studio using c# Language.

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1   Project Description

This Project is focusing on online-based Learning process control and management. In this we made three consoles are Admin, Educator, and Leaner. As an admin having the right to control the user, Category, Course, Section & Notification. Educator upload content like lessons with that they make the courses active. In content management, we provide four types of content like video, Embedded URLs like Youtube Embed URL, PDF. It makes the easy way of uploading content. It makes more flexibility for the educator on content management. And also we provide an easy environment for content list and edit functionality in the list itself we provide the option to view the content. Leaners console has the facility to show course lists in an initiative manner. And also the leaner has the facility of wish item, MyCourse, and direct Cart function that make easy access.

1.1   Competitive Information

eLearning is one of the best online learning platforms that provide many features related to eLearning. Several eLearning organizations seem to be the competitor of this Company like Udemy, edX, UPWORK, FutureLearn, and so on. In this competitive market, the "eLearn" Website should be more reliable for having its place to continue for an online Learning Function. The website is more secure and provides authentic service with reliability. Therefore, this organization has its loyal user and enhances its name in this competitive market

1.2   Relationship to Other Applications/Projects

This website is related to an online learning process. It holds a website that is connected to the database management system. As the data about the content of the courses are stored here and the users can register them with this webpage and select a course, if payment need for that course then pay the amount and start learning. The registered user data are stored successfully and securely in the application. The Instructor Course data are also stored on the website. The application is using the .NET CORE on visual studio. Web technology like HTML, CSS, Asp.net, LINQ, jQuery, AJAX, and JavaScript is used in this application.

1.3   Assumptions and Dependencies

- The website is appropriate for user utilization
- The website allows only authentic users for learning Course and Upload the content for the courses
- The learner can view the details of course & educator Details
- The Admin can control all process
- The courses are categorized according to the type of the course

1.4 Future Enhancements

The website can have future enhancement for improving their facilities. They can tie-up with a large no of instructors to provide many and quality content for the course. They can help the education system with quality content and low cost. The website will enhance its application and security purposes. More courses can be created through this website and a large database can store more user data as their authentic user.

1.5 Definitions and Acronyms

- HTML- Hyper Text Markup Language
- CSS- Cascading Style Sheets
- Asp- Active Server Pages
- AJAX - Asynchronous JavaScript And XML
- LINQ- Language-Integrated Query

2 Project Technical Description

The project is technically supporting the learning process through a website. The developers are using the .NET CORE on the visual studio. Also, they have technological access like HTML, CSS, AJAX, jQuery, LINQ, and JavaScript. The database is very strong and secure for the application. They use the MS-SQL database for storing a large number of users. The developer makes the website with multiple page options and the database structure is well designed (R. Felder and B. Soloman, 2018). The user must register them through the register page and log in to view the course for having a proper workflow of learning the course content. For user registration and authentication we use ASP.NET CORE Identity & Role. With the help of Identity, we manage the user details with advanced concepts like "password hashing", "token-based password rest". ASP Role provider used to Authorization of the web site. Using ASP Role we made the access of the page. If the learner role has a specific function and the educator has a specific function as well admin. We use LINQ Statement for Context-based tasks with Lambda Expression. It's more useful, short, and easily readable code. We also implemented the interface functionality for future expansion work, it's easier for the developer to expand the application.

ASP.NET Identity is the membership system for authentication and authorization of the users of an ASP.NET application / site. The ASP.NET Identity is a fresh look and advanced at what the membership system should be when you are building modern applications for the web, phone, or tablet using .NET Core / Framework. ASP.NET Identity allows you to add customized login/logout/Active Login status functionality and customized profile features that make it easy to customize the data about the logged-in user. Today there is a much broader array of data storage options for web applications (System/Phone/Tablet) and most of the developers want to enable their websites to use the social identity

providers for Authentication and Authorizations. Authentication is used by the server to determine who is accessing their website / application. Authentication is the process of a user / customer proving their identity on a web server by logging in with their email and username or by utilising other social media platforms. After successful authentication, a server checks if the client has permission to use the application / resource through authorization. The detailed page descriptions and the database description with the application workflow will be discussed below.

2.1 Application Architecture

The eLearning application is dedicated to learning the course online. The website is based on an application that includes three roles to make the architecture complete. The Admin is the first role that creates the category, course, section who is responsible for the other monitoring and security work of the application. The admin has the power to approve people for entering the respective console of the application. The learner and instructor can only enter the site if they registered themselves and get login permission approval from the admin panel. The admin can edit add and delete any information regarding the courses. The technical workflow is also maintained by the admin (P. Melville and V. Sindhwani, 2017).

The second role is instructor, who uploads the content of the course. Finally, the learner is the end-user of the application, who is learning the online course. In the application architecture, the database structure is the most important part of storing the data. The application utilizes the MS-SQL database structure for having a secure and safe data storage system. The data structure includes a table for storing the user details. User can be the Admin that creates course & related content and the Educator who add the content for the course and finally Learner who is learning the course. Another table is there for storing the course details shown to the Instructor and Learner.

It contains the course details. Another table is there for storing the content that's store course content. It stores the type of the content and details of the course etc., another table is there to store the category for easy access and filter the course based on the category. One table is used to store sections in the course it's used to dive the course for easy learn the course. (M. Kuzelj; K. Šamija, 2020). The application is more advanced and gathers customers' feedback for their future enhancement for that we use the comment section. This feedback is stored in the comments table for analysis and future improvement.
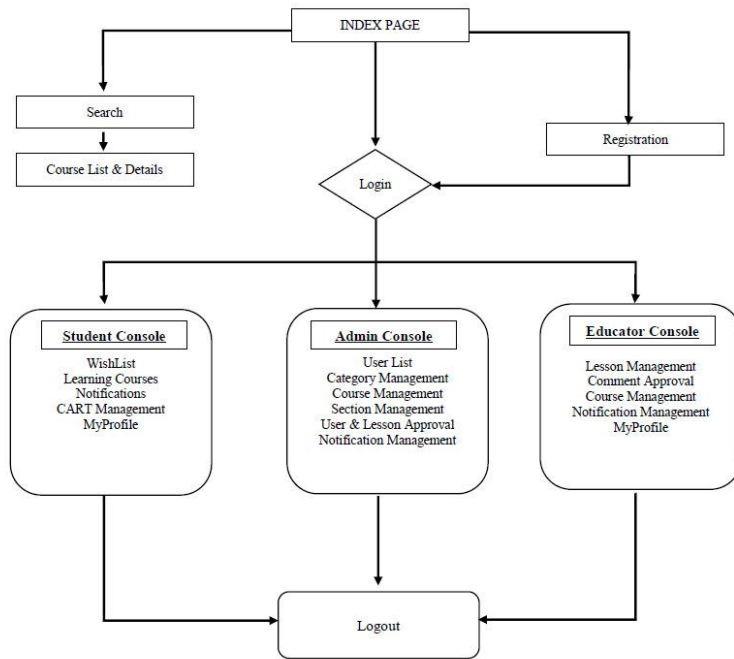
Fig1: Application Architecture diagram

2.2 Application Information flows
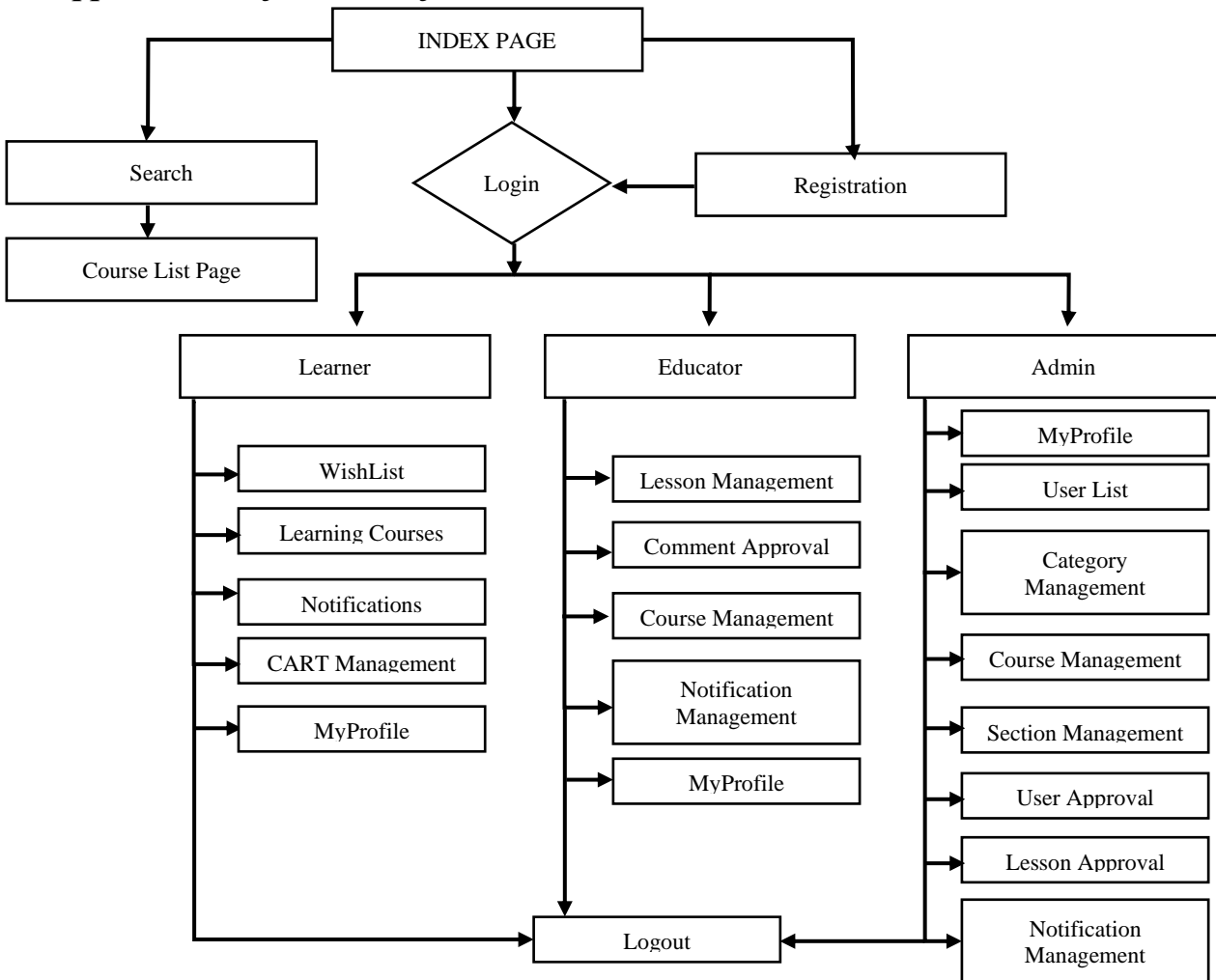
Fig2: Application workflow diagram

The application workflow is shown above. The information flow is the main workflow of the whole application. The user can have to lead the index page. In Index Page itself, we have the search option and featured course, all categories, and popular categories. If they click any option it leads to a course list page with respective results. On the index page if clicked signup, then they lead to the registration process. After registration, they will get admins' approval and lead to the login page. After login, the user and the donor lead to their respective console home page.

After login as a learner can access the wish list, cart, learning course, and notification. A wish list is used to store the interested course in a separate list. Users can add or delete the wish list items. Cart is used to buy the course, for that, we click the "Add to Cart" button in the course list. That items come on to cart page. Users can add and remove the cart courses. After giving payment details we place the order. All purchased courses are listed in learning courses. Notification is shown on the notification page.

As login as Educator can access lesson management, comment approval, learning course, notification. In the lesson, management can add the course content by selecting the section. It automatically selects the course. The educator can have add, edit, delete the lessons. Any comment was given by registered or non-registered user to the course it come to approval for the respective educator. After approval of the educator, the comment is shown in the respective course. Notification is shown on the notification page.

As login as Admin can access the user list, category management, course management, section management, user approval, lesson approval, notification management. user list provides the information about all available users in that they can update the information. In category management, the admin can add, update and delete the category. In course management, the admin can add, update and delete the courses.

In section management, the admin can add, update and delete the section of the course. Approval page leads to Non-Approved user list & lesson list in that admin can approve the users and lesson. On the notification page, the admin can send messages to educators and learners either all or specific groups.

All users, clicking the email address lead to my profile page in that they can edit and update the details and password. At the end of the process, all the users have to successfully log out of the website to keep secure their information.

2.3 *Interactions with other Applications*

The application or the website is connected with the other content management website also like YouTube, Vimeo. They are connected with the interactive mode with the application development management. The developer and the website management have to interact with the system database, User device database, etc. (B. Tucker, 2012)

2.4 Capabilities

- The website is reliable and user-friendly.
- The website only allows the registered and authentic users
- The users have to log in to view their console
- The application maintains the data security
- The website is optimized and shows relevant results
- Admin gives permission to the Learner and the Educator to view the website and do their activities
- The admin can have the access to the users' data and they can add delete the data
- The course contents is updated and modified for users benefits

2.5 Risk Assessment and Management

The risk assessment task is applied to have the proper idea about the upcoming risks for the eLearning Portal. The risk management process is needed to apply for the assessment of the risk register. The risk register will show the possible risk for the organization. These risks are coming with the risk probability and the potentiality. According to the risk probability and the risk potentiality, the risk priory will be decided and the risk will be reduced for future growth. The first step to having an idea about the risk assessment the risk identification process will be accessed and then the risks will be analyzed to have an idea about the severity of that particular risk. The risk will be allowed according to the risk priority and the essential risk-reducing applications need to be applied to reduce the risks. The risk management plan can be beneficial for the management and this plan should be applied for having better workflow without any hindrance (S. Loeb, 2020).

3 Project Requirements

3.1 Identification of Requirements

- <LEARNING _EL2021-1 User-Capability-000100> the project must be user friendly and simple architecture should be applied for the application
- <LEARNING _EL2021-1 User-Capability-000200>the admin can add/delete/modify the application for category, course, section
- <LEARNING _EL2021-1 User-Capability-000300> the registration process is a must for both the users(Instructor / Learner)
- <LEARNING _EL2021-1 User-Capability-000400> the educator can add/delete/modify the lesson of the course
- <LEARNING _EL2021-1 User-Capability-000500> the users can add/delete the wish list item
- <LEARNING _EL2021-1 User-Capability-000600> the users must have security and secure transaction for Payment of course with cart function

- <LEARNING _EL2021-1 User-Capability-000700> the admin can add/delete the notification and that can be viewed by other users

- <LEARNING _EL2021-1 User-Capability-000800>the application must be protected and the search process must be secure

- <LEARNING _EL2021-1 User-Capability-000900> the admin must have option to approve the user and lesson and educator approve the comment received from their course

3.2   Operations, Administration, Maintenance, and Provisioning (OAM&P)

Operations

- The operation of the website for learning courses should be easy and secure.

- The website should be user friendly and reliable

- The application allows the authentic and registered users and access secure transaction

- The registration and login should be a must for accessing the console. Non registered customers can view the categories and course details.

- The search operation should be fast and realistic

- The website should show the category list

- The website should show the Course list based on educator

- The website have a wish list

- The website should have complete cart functionality

- The data generated from the search option must be real (K. Gutierrez, 2016)

Administration

- Admin can approve the users to access the website

- Admin can edit, add or delete the data

- Admin can access the course, category and section details

- Admin can sent Notification to Users

- Educator can add, update or delete the course content / lesson

Maintenance

- The application must be maintained and secure

- The application must be updated and secure

- The website database includes the data security and backup process with the proper fault recovery process

Provisioning

- The application ensures the reliable configuration

- The system shows the user-guided workflow process to make the application user friendly

3.3   Security and Fraud Prevention

The security and fraud detection process can be established through security planning and fraud prevention planning. This planning process includes several steps. These are

- The management should include the verification process for authentic users
- The management should include the identification of fraud users during the registration process
- The admin only allow authentic user after verification
- They should include the fraud identification process and assessment process to ensure security
- The website should be updated regularly with a proper backup process
- The user details should be stored through the necessary registering process

3.4   Release and Transition Plan

The website development should be completed successfully and then the testing process should be done before launching it. After having no errors the website should be launched for the Learning process. After launching the data storage process will be activated and the maintenance process will be applied to maintain the continuous workflow of the application.

4   Project Design Description

The website is designed for the Learning process. The website includes several pages for having the overall structural design of the application. The website has the specific workflow that is mentioned above (Samir R. Thakkar, Hiren D. Joshi, 2015). According to its workflow process, the pages are internally connected. First, the index page is shown to the users as the starting page of the application. It is the welcome page of this application the company logo. Company name, design, and other fields are shown on this page. The new user can have the register option and be directed to the registration page to have access permission. The already registered person can log in through the login page and get to the Console home page (Jackson, 2020). If any user can forget their password they can go to forgot password page. The login users can enter the home page and get the options as mentioned in the workflow such as view a course list, Learning the already paid course, etc. The Educator has the page to upload the content for their course. All the users can update their profile through the updating My Profile page. The admin can manage the Category, Course, Section and the customer's details also.

5   *Internal/external Interface Impacts and Specification*

Internal Specification (MS-SQL Database)

MS SQL Server is a client-server architecture. In that Server process starts with the client application sending a request, that request accept by the server and process it then replay the request with processed data. MS SQL Process flow shown in below diagram with three major components in SQL Server Architecture:

- Protocol Layer
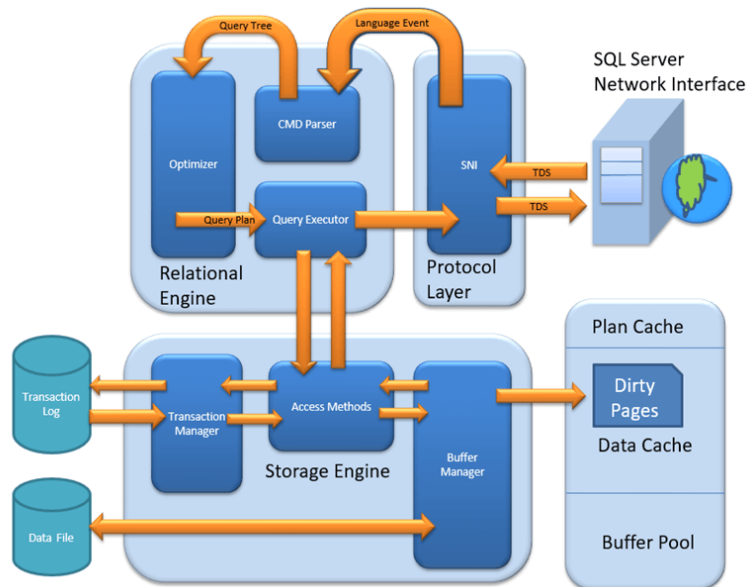- Relational Engine
- Storage Engine

Fig 3: MS-SQL Database Diagram

Source: https://www.guru99.com/sql-server-architecture.html
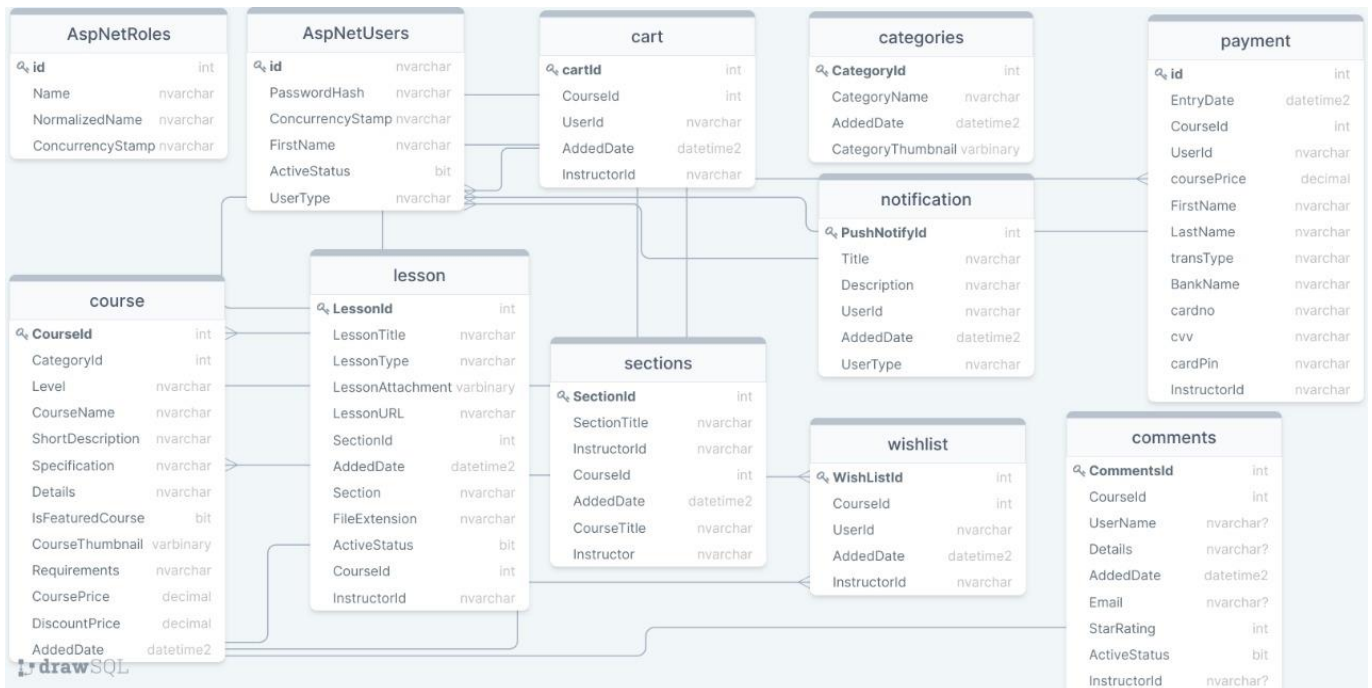
Software development cycle

Agile is a widely-known process for project management operation. The beauty of Agile is that it is made up of a series of small task, continuous cycles, with constant collaboration with stakeholders happening throughout the development process. Rather than planning for months of development, only to realize at the end of the development process that the product doesn't do what you need it to, the Agile cycle has teams to work in two-week increments, improving and iterating, and continually cycling through planning, executing, and evaluating the development cycle. With this approach, teams ensure that they end up with the most valuable product, get customer buy-in early on and throughout the process, and are continuously delivering state to customer.
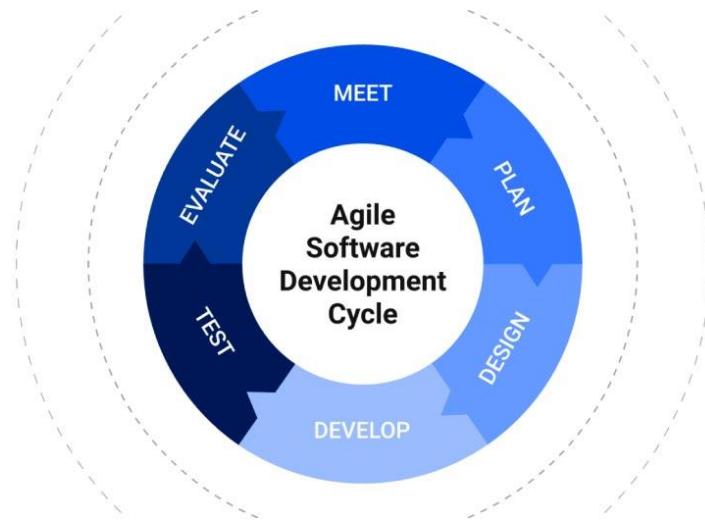
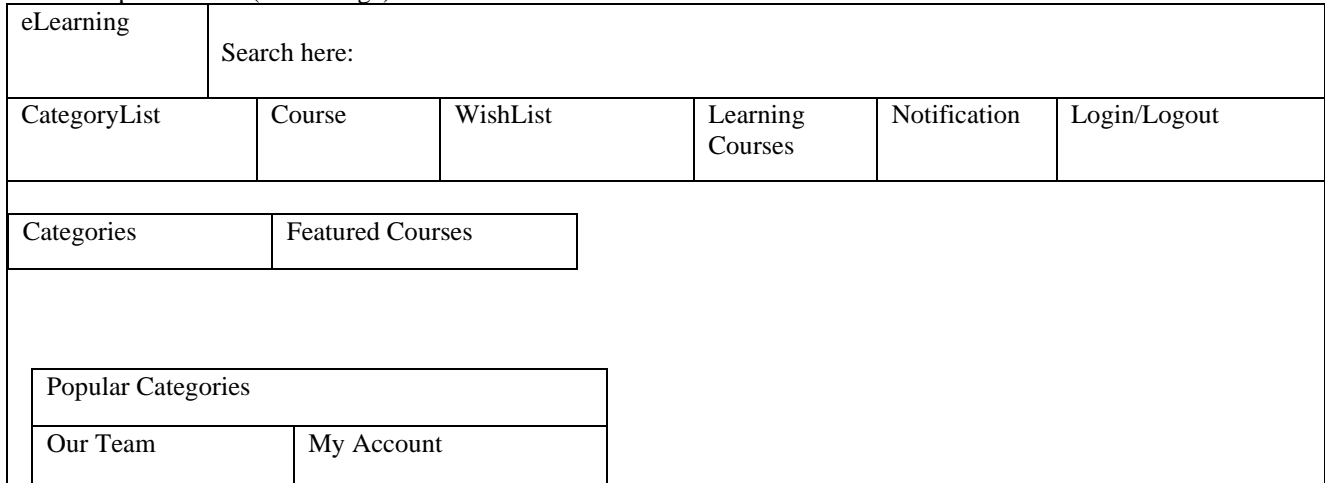**Fig4: Software development cycle of the Application**
Source: https://www.objectedge.com/blog/the-agile-development-life-cycle

Database Table Design

Fig5: Database Table Design

External Specification (Home Page)

eLearning	Search here:					
CategoryList	Course	WishList	Learning Courses	Notification	Login/Logout

Categories	Featured Courses

Popular Categories	
Our Team	My Account

Fig 6: External Diagram of the Application (Homepage Structure/Learner)

Design Features of the Application

Fig7: Layout of Registration Process

Fig8: Layout of Login Process

Fig9: Layout of Create Lesson by Educator

Pending Approval List

Comments

I liked this piano course

Approve

Fig10: Pending Approval List Of Comments By Educator

eLearning

Search Course / Category / Instructor

My Profile

First Name	Last Name	Date of birth	City	State	Phone	Email		
Soujanya	S	12/25/2003	Newyork	IL	928346021	admin@gmail.com	Edit Change Password	

Our Team

Gopathi Sailajaswini - 1206695
Soujanya Sabbineni - 1202228

Our Team

Lokesh Vibhudi - 1202758
Lakshmi Urjitha Dhadigam - 1223270

My Account

Shopping Cart
Wish List

Fig11: My Profile Page

Fig12: Course List

6 Design Units Impacts

Design units of the application or the website have huge impacts on the organization. This designing process helps the developers to identify the requirements of the organization. According to the organization's needs, the designing process will be accessed and the designing process can be modified to satisfy the customer's requirements. The design process should include the feedback process. The customers' feedback will be beneficial for the design of the software and it helps to maintain customers' data securely. The security maintenance and fraud detection process should be identified by the designing purpose.

6.1 Functional Area A/Design Unit A (Overall control function)

6.1.1 Functional Overview

This functional area will continue the process of the website workflow. This unit is necessary for having the proper functional process for Learning. The website work will be monitored by this unit process.

6.1.2 Impacts

This design unit and workflow process will help the system working functions to modify the system according to the functional requirements and customers' requirements. The work process will include the authentication, authorization, data update, user information update, backup and recovery, and the administration process.

6.1.3 Requirements

- Including the user authentication process with proper administration rules

- Including the administrative functions

- Including the Authentication & Authorization Process by registration

- Log in and registration is a must for all user to access the console, for checking course and category details checking is open for non-registered users too.

- External Interfaces and the internal interface should be properly structured and reliable

- The Data backup process should be added for having customers' data security

6.2 Functional Area B/Design Unit B (Updating and security)

6.2.1 Functional Overview

The database should be updated and the customer's data will be securely stored in the database. The database will be protected and only authentic users can access the console.

6.2.2 Impacts

It will provide the proper security for the users.

6.2.3 Requirements

- Proper backup process
- Proper data updating process
- Authentication process should be must for all add, update and delete process

- The data security applications must be used

7 Open Issues

The website is designed under some technical requirements. These are

- HTML5, CSS3, JavaScript's, jQuery, AJAX, LINQ, Bootstrap

- Responsive design with high security

- SQL database

- Used High programming language

- State management is included

- The application is user friendly and should not cause issue while opening or performing the workflow

8 Acknowledgments

I would like to give thanks to Dr. Xin Chen and the head of the department who granted me the outstanding opportunities to prepare this excellent plan on the subject. This project supported me in

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10   Appendices

10.1 Sample Code
User Activate by Admin

```
public void ActivateUser(string Userid, bool isactive)
        {
            var user = _context.Users.FirstOrDefault(x => x.Id == Userid);
            user.ActiveStatus = isactive;
            _context.Users.Update(user);
            _context.SaveChanges();
        }
```
Insert Lesson by Educator

```
[HttpPost]
        [ValidateAntiForgeryToken]
        public async Task<IActionResult> Lesson(courseViewModel courseView)
        {
```

```
            if (ModelState.IsValid)
            {
                string[] extension;
                try
                {

                    if (Request.Form.Files != null)
                    {
                        extension = Request.Form.Files[0].FileName.Split('.');
                        courseView.Lesson.FileExtension = extension[extension.Length - 1];
                    }
                }
                catch (Exception)
                {
                }
                string userid = this.User.FindFirstValue(ClaimTypes.NameIdentifier);
                ISection iSection = new Course(_context);
               var sec= iSection.GetSectionById(courseView.Lesson.SectionId);
                courseView.Lesson.InstructorId = userid;
                courseView.Lesson.CourseId = sec.CourseId;
                foreach (var file in Request.Form.Files)
                {
                    lesson lcourse = new lesson();
                    MemoryStream ms = new MemoryStream();
                    file.CopyTo(ms);
                    lcourse.LessonAttachment = ms.ToArray();
                    courseView.Lesson.LessonAttachment = lcourse.LessonAttachment;
                    ms.Close();
                    ms.Dispose();
                }
                ILesson iLesson = new Course(_context);

                if (courseView.Lesson.LessonId > 0)
                {
                    courseView.Lesson.AddedDate = DateTime.Now;
                    iLesson.UpdateLesson(courseView.Lesson);
                    Message = "Lesson Updated Successfully";

                }
                else
                {
                    courseView.Lesson.AddedDate = DateTime.Now;
                    iLesson.InsertLesson(courseView.Lesson);
                    Message = "Lesson Inserted Successfully";

                }
                return RedirectToAction(nameof(Index));
            }
            return View(courseView.Lesson);
        }
```

Insert Category by Admin

```
public async Task<IActionResult> AddCategories(categories categories)
        {
            foreach (var file in Request.Form.Files)
            {
                categories img = new categories();
                MemoryStream ms = new MemoryStream();
                file.CopyTo(ms);
                img.CategoryThumbnail = ms.ToArray();
                categories.CategoryThumbnail = img.CategoryThumbnail;
                ms.Close();
                ms.Dispose();
```

```csharp
            }
            ICategory iCategory = new Category(_context);

            if (categories.CategoryId > 0)
            {
                if (categories.CategoryThumbnail == null)
                {
                    categories.CategoryThumbnail =
_context.categories.AsNoTracking().FirstOrDefault(x => x.CategoryId ==
categories.CategoryId).CategoryThumbnail;
                }
                categories.AddedDate = DateTime.Now;
                iCategory.UpdateCategory(categories);
                TempData["Message"] = "Category Updated Successfully";
            }
            else
            {
                categories.AddedDate = DateTime.Now;
                iCategory.InsertCategory(categories);
                TempData["Message"] = "Category Added Successfully";
            }

            return RedirectToAction(nameof(Index));

        }
```