

WEB-BASED COMMUNITY SYSTEM FOR ONLINE LEARNING



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PROJECT CERTIFICATE

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TITLE : WEB-BASED COMMUNITY SYSTEM FOR ONLINE
LEARNING

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หัวข้อโครงการ	ระบบเว็บไซต์สื่อสังคมเพื่อการเรียนรู้ออนไลน์
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บทคัดย่อ

ในปัจจุบันเทคโนโลยีมีการพัฒนามากขึ้น และเริ่มเข้ามามีบทบาทและความสำคัญต่อกระบวนการเรียนรู้ของเด็กนักเรียน เนื่องจากสภาวะโลกที่มีการเปลี่ยนแปลงไปอย่างรวดเร็ว และด้วยบุคลากรทางการศึกษาภายในประเทศไทยในปัจจุบันมีไม่เพียงพอ และขาดความชำนาญในความรู้ของสาขาวิชาที่ตนได้สอน ทำให้นักเรียนจะต้องแสวงหาความรู้นอกห้องเรียน จากการเรียนพิเศษตามสถาบันกวดวิชาต่างๆ ดังนั้นถ้ามีช่องทางในปัจจุบันที่จะเข้าถึงเนื้อหาในการเรียนรู้ที่ถูกจัดทำจากอาสาสมัครที่มีความรู้ความสามารถในแต่ละสาขาที่ตนถนัดผ่านทางเครือข่ายอินเทอร์เน็ต จะเป็นหนึ่งในทางเลือกที่ดีสำหรับนักเรียนในยุคศตวรรษที่ 21 ในการแสวงหาความรู้ใหม่ๆ โดยการบูรณาการเทคโนโลยีมาเป็นส่วนหนึ่งในช่องทางการเรียนรู้

ระบบเว็บไซต์สื่อสังคมเพื่อการเรียนรู้ออนไลน์นั้นจึงเข้ามามีบทบาท สำหรับการเป็นช่องทางการเรียนรู้ของเด็กนักเรียนในปัจจุบันอีกช่องทางหนึ่ง สำหรับการเข้ามาสืบค้นและเรียนรู้ผ่านสื่อการเรียนรู้ออนไลน์ที่ได้ถูกจัดทำขึ้นโดยกลุ่มคนที่มีความประสงค์ และเจตนาที่อยากสร้างสรรค์สื่อการเรียนรู้ให้กับนักเรียนในปัจจุบัน โดยสื่อการเรียนรู้จะอยู่ในรูปแบบของบทเรียน วิดิทัศน์ และแบบ ทดสอบ เพื่อให้ผู้ที่มีความรู้ความสามารถในแต่ละสาขาวิชาได้มีช่องทางในการถ่ายทอดความรู้ให้กับเด็กนักเรียนผ่านสื่อที่มีความนิยมในปัจจุบัน นั่นคือ เครือข่ายอินเทอร์เน็ต รวมทั้งส่งเสริมให้เกิดการเรียนรู้นอกห้องเรียนในหมู่เด็กนักเรียน อันจะก่อให้เกิดการเรียนรู้ที่ยั่งยืนในอนาคต

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ABSTRACT

Today technology has more developed than former and it's become important thing to student learning, because of the world changing dynamically. Educators in Thailand was facing insufficient staff issue and lacking of expertise in each discipline that their teaching. Its affect students need to find the way to learn beyond classroom by take extra tutorial class with the tutor academy. If students had a channel to access online course that provide and develop from volunteers who has expertise in each discipline, it will be a good choice for students in 21st century of the education. Therefore, now students are able to seek new knowledge by integrating technology as part of the learning channel.

“Web-Based Community System for Online Learning” will take a role as a part of learning channel for the students. Students can access to learn and study online courses that develop from a group of people who want to share their knowledge. The online course and learning material are in a form of lesson, video and quiz. The volunteers who has expertise in each disciplines can use this channel to sharing their knowledge to the students through Internet, the popular channel for students today, including learn beyond classroom will encourage, assist and support students to develop their sustainable learning in the future.

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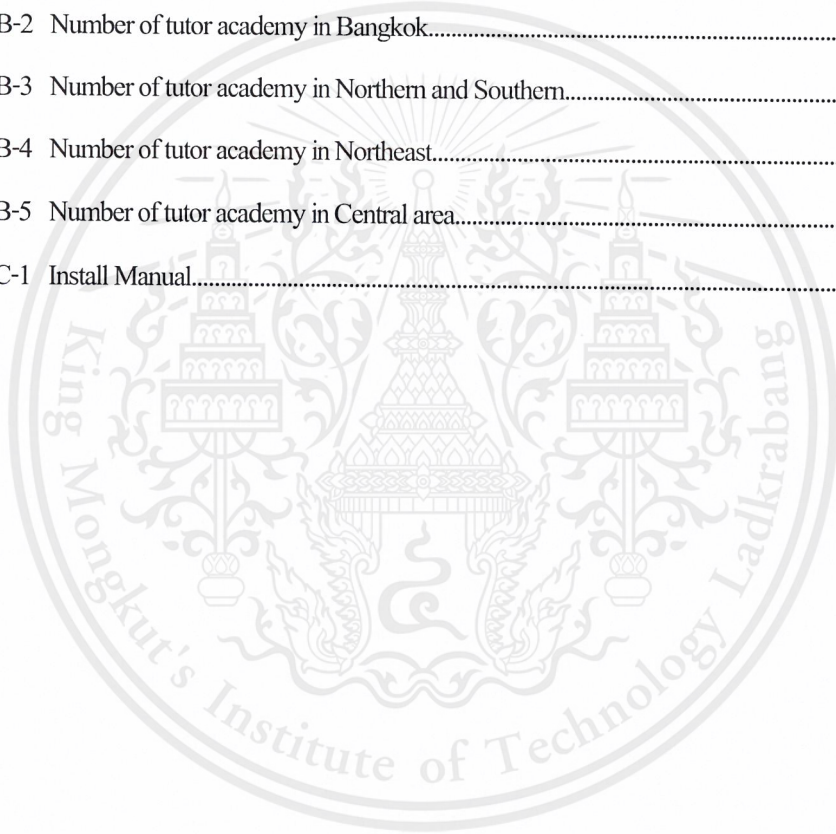
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Chapter 1

INTRODUCTION

First chapter, it concerns about discussion and explanation background of problem. The purpose and objection of developing this system with methodologies display the outcome of scopes and expectation of this project.

1.1 Background

Nowadays, the advancement of modern technology is higher than the past, students have many channels to learn them. Due to the environment change rapidly, technology has become an important role to daily life. It makes the world become more competitive in businesses, included working life and education as well. Educators in Thailand have been facing insufficient staff issue and lacking of expertise in each discipline of their teaching. Students start to find the channels to learn beyond classroom. They use the Internet to find the information, literatures and knowledge. The majority of students in Thailand decided to choose extra tutorial class with the tutor academy as an alternative channel to learn beyond classroom that make extra cost to their parents. Even though a great deal of educational content and useful knowledge are on the Internet, but these are spreading on the Internet disorderly. This issue makes it more difficult to students who want to find the alternative way for learning beyond classroom and volunteers with whoever has passion to create and share free online courses and educational contents.

1.2 Objectives

1. To develop a system for online learning in a pattern of community on the Internet.
2. Create alternative channels for student to access for learning online courses by themselves on the Internet.
3. To assist parents to reduce cost on unnecessarily tutor classes.
4. Give an opportunity to volunteers to be a part in the creation of educational contents for young people and students to learn online courses.

1.3 Scope

Web-based community system for online learning project is developed on PHP based website and work on Cloud Services of Microsoft Azure Cloud platform to support system scaling

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with high availability. The system is designed to increase self-learning of students through the Internet and open for all people who has expertise in 8 learning groups included Thai Language, Mathematics, Science, Social-Study Religion and Culture, Health and Physical Education, Arts, Career and Technology and Foreign Language for Mattayom can take part as content creator and use this system to share and distribute their knowledge to the students through Internet that us the popular channel for students today.

Project 1

- Study on web development by using PHP, HTML 5, CSS 3 and JavaScript technologies that run on open-source operating system.
- Study on cloud services platform for web development and system scalability techniques.
- Study on cloud storage services and MySQL on cloud based system structure.
- Develop the first part of core system functions and deploy on cloud platform.
- Configure high availability and scalability of Cloud Service on Microsoft Azure with Autoscaling on system performance.

Project 2

- Continue develop the second part of core system function and deploy on cloud platform.
- Improve usability and responsiveness of the system user interface.
- Improve overall performance of the system.
- Testing with real environment.

1.4 Methodology

1. Study about web development and PHP, HTML 5, CSS 3 and JavaScript technologies.
2. Study about cloud technologies and platform components, principles, fundamentals and web development on cloud computing.
3. Study about database development and database management on cloud storage platform.
4. Analyze system requirement and design system based on cloud platform.
5. Develop the system on Microsoft Azure cloud platform according to the system design.
6. Deploy the system on Microsoft Azure cloud platform
7. System testing and system verification and validation.

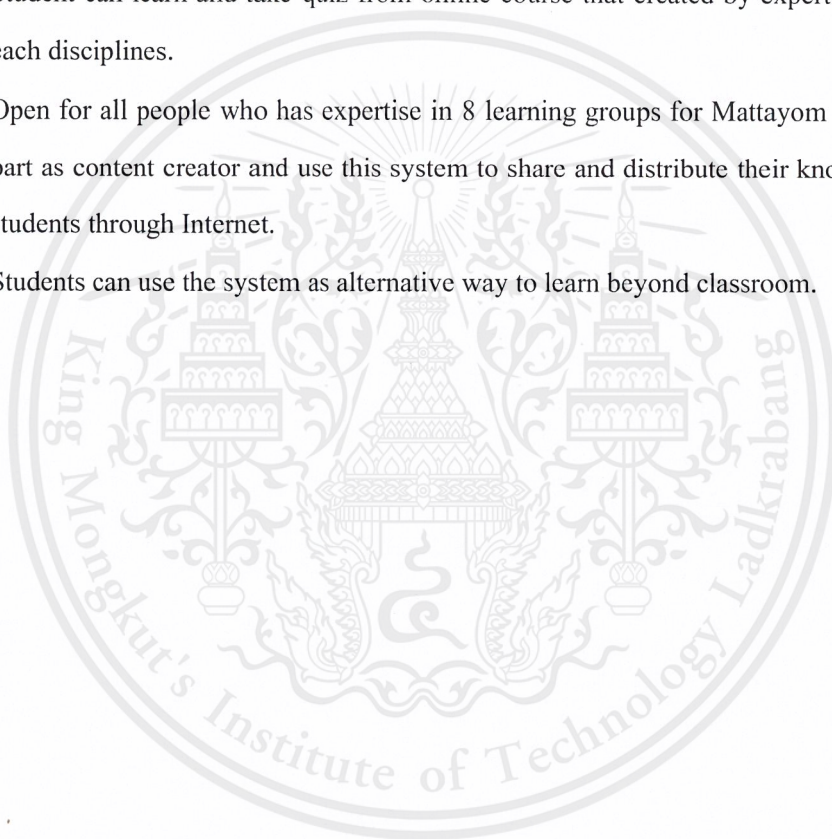
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8. Summarize the conclusion of the system development and implementation.

1.5 Expected outcome

1. Understand how to develop website on cloud services platform.
2. Understand web development by using PHP, HTML 5, CSS 3 and JavaScript.
3. Understand how to create and manage database on cloud storage platform.
4. Student can access and learn interest subject and education online contents through the Internet.
5. Student can learn and take quiz from online course that created by expert volunteers on each disciplines.
6. Open for all people who has expertise in 8 learning groups for Mattayom level can take part as content creator and use this system to share and distribute their knowledge to the students through Internet.
7. Students can use the system as alternative way to learn beyond classroom.



Chapter 2

BACKGROUND THEORY

The second chapter is the review of literature and information about technologies and theories that similar to system development of the project.

2.1 New Era of Learning

Due to the changing in society today was changed expeditiously, including the progress of High technological increased dramatically in the past made the present of teaching and learning has changed to Global Learning New Era or we can call it is "Learning in the 21st Century" [1]. The Development Bureau of Ministry of Information and Communications Technology promotes and organizes activities about training and learning in the new era. The education is in the 21st century that students have a comprehension of the tools and methods of learning in the 21st century to understand the changing of processes and patterns of social changing today. By learning in the 21st century, dramatic changes have occurred in the present study. Society changing made a new media developed to be the development of advanced technology that made social changing happens quickly and the learning a more diverse, including social changing happens quickly. In modern times, the students take an interest in matters less and shorter because of the changing and adjustments are rapidly. So the learning process in the present needs modify to suit the changing society. This will require the creation of content and learning materials are merging their technology close to the students in the new era. For the novelty and interest in learning, it has to combine with the traditional learning process to achieve a more specific and new things to promote sustainable learning in the 21st century.

2.2 Microsoft Azure Cloud Platform

Microsoft Azure is a cloud platform from Microsoft that provides a wide range of different services. Microsoft Azure lets you build, deploy, and manage solutions for almost any purpose you can imagine. In other words, Microsoft Azure is a world of unlimited possibilities. Whether you're a large enterprise spanning several continents that needs to run server workloads, or a small business that wants a website that has a global presence, Microsoft Azure can provide a platform for building applications that can leverage the cloud to meet the needs of your business [3].

Cloud Services is the service model on Microsoft Azure Cloud Platform that allow user can easily create, deploy and manage multitier application role, worker role and website role in the cloud. This model provides flexible configuration of web system with load balancing for hosting front-end web applications called Web Role and virtual machine with cloud storage for back-end process called worker role. Cloud services supported web application based on .NET, Node.js, PHP, Java, Python, and Ruby. With Cloud Services, this platform provides hardware failure protection, you don't need to worried about the system infrastructure and focus on develop, manage and maintain your web application and the system.

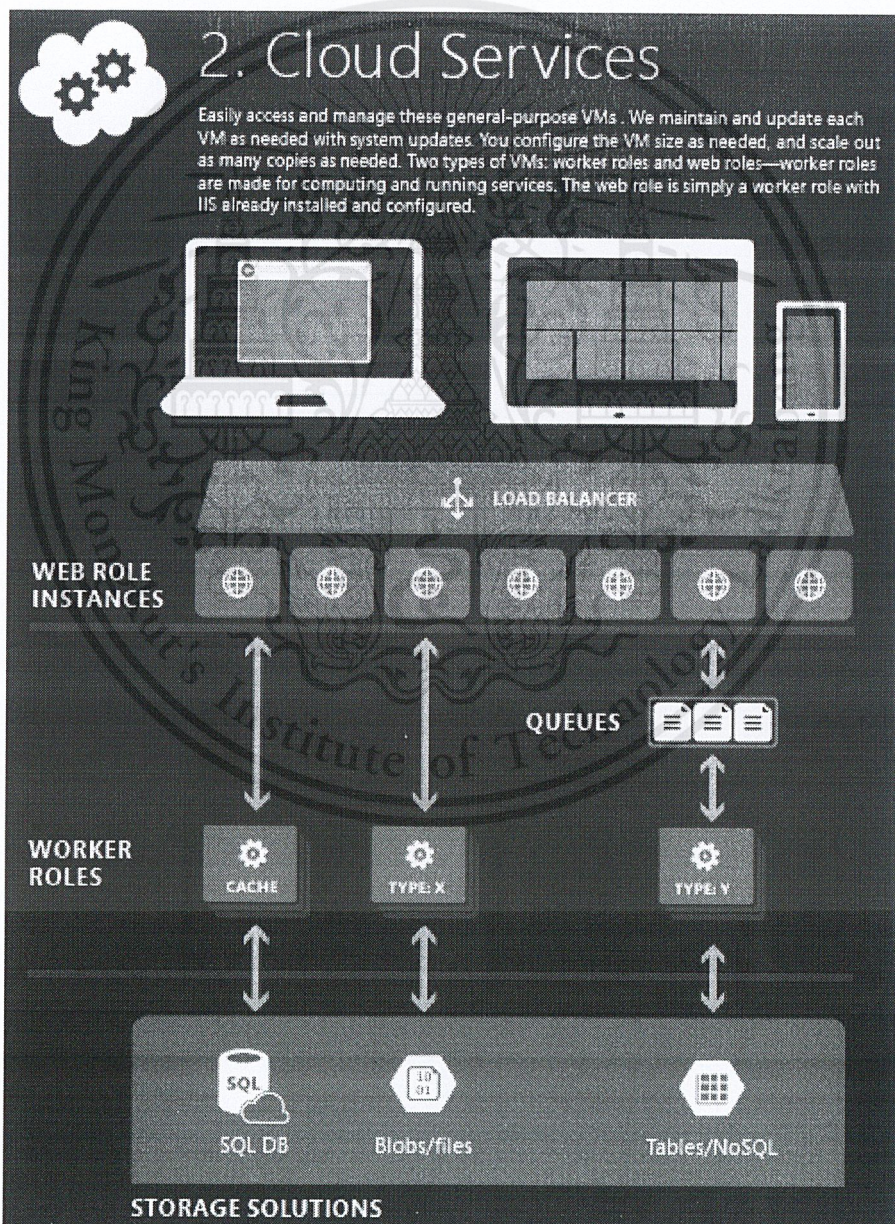


Figure 2.1 Blueprint of Microsoft Azure Cloud Services

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Besides, Cloud Services of Microsoft Azure has automatic scaling function for scaling up the system to meet system's demand and adjust system performance based on real usage of the system. Scalability of Microsoft Azure assist customers save cost of their businesses.

2.3 PHP

PHP is a server-side scripting language designed specifically for the Web. Within an HTML page, developer can embed PHP code that will be executed each time the page is visited. PHP code is interpreted at the web server and generates HTML or other output that the visitor will see on client [5]. Today PHP is the most popular favorite web development language. PHP is open source script language that can develop with object-oriented programming concept. Syntax and code structure of PHP is easy to understand. To use PHP by insert PHP code inside the HTML that makes up your website, the script write in `<?php ... ?>` tag.

```
<?php
    echo "Web-based Community System for Online Learning"
?>
```

Figure 2.2 Example of PHP script language

2.4 HTML 5

HTML (Hypertext Markup Language) is the markup language for create and develop web page [6]. Syntax and structure of HTML is write in the form of HTML elements consisting of tags enclosed in angle brackets (`<>`) that can render into web page by web browser. For the HTML 5 version, it's expand the capabilities of HTML and has new elements and attributes for develop modern website with interactive features and modern tools for web 2.0. Today modern and popular web browsers are supported HTML 5.

The elements of HTML 5 are likely to the building block for create website. Developer write text between `<html> ... </html>` tag to describe the web page and text that write between `<body> ... </body>` is content appear on web page. The Attributes of an element are the name value and attribute, separated by "=" and write in element tag.

```

<!DOCTYPE html>

<html>

  <head>

    <title> Web-based Community System for Online Learning </title>

  </head>

  <body>

    <p> <a href=" http://just-learn.cloudapp.net/ ">This is a link of our project.</a>

  </p>

</body>

```

Figure 2.3 Example of HTML language

2.5 JavaScript

JavaScript is a client-side scripting language run on client web browser to interact, control and manage web browser and content that display on the web page [7]. From the structure and features of JavaScript, it can modify output of the original HTML into interactive website, verify input format from users and create cookie to collect user information. The advantage of the client-side script are assist developer create modern website with interactive features to users.

Syntax of JavaScript consist of statement that write text within <script> ... </script> tag on everywhere in the web page, but JavaScript isn't competed without 2 importance attributes, language and type. Value in language attribute should be set to "JavaScript" and value in type should be set to "text/javascript".

```

<html>

<body>

<script language="javascript" type="text/javascript">

  document.write("Web-based Community System for Online Learning")

</script>

</body>

</html>

```

Figure 2.4 Example of JavaScript

Besides, developer can create external JavaScript file, and then refer to it using the src attribute in the <script> tag.

```
<html>
<body>
<script src="myscripts.js"></script>
</body>
</html>
```

Figure 2.5 Example of JavaScript in external file

2.6 CSS 3

CSS 3 (Cascading Style Sheets 3) is a style sheet language used for describing the look and formatting of a document written in a markup language [8]. The main value and attribute that use for control your website look and design of the color, font, pattern, format, size, style etc. New version of CCS or CSS 3 contain with new features to increase creativity of older version, now CSS 3 split old function into the module. The latest version, CSS3, can use to control design of text, selector, background, image, 2D/3D transformation, animation, layout and interface. Its mean new version of CSS can use to create interactive content like animation or web object transformation.

CSS 3 has 3 ways to use and apply to the web page, but today popular way to use is create external CSS file and link to HTML by using href attribute.

```
<html>
<head>
    <link rel="stylesheet" href="mystyle.css" type="text/css" />
</head>
</html>
```

Figure 2.6 Example of reference link to external CSS file

2.7 MySQL

MySQL is most popular Open Source SQL database management system that developed by Oracle. MySQL is relational database that stores data in separate tables. Each table has 1 or more unique value attribute called “primary key” and the attribute use for link between table call “foreign key”. The logical model of MySQL, with objects such as databases, tables, views, rows, and columns, offers a flexible programming environment to access data in the database by using “Structured Query Language”. SQL is the most common standardized language used to access databases.

```

Enter password: *****
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 3
Server version: 5.0.51b-community-nt MySQL Community Edition (GPL)

Type 'help;' or '\h' for help. Type '\c' to clear the buffer.

mysql>

```

Figure 2.7 Example of MySQL command line

2.7 phpMyAdmin

phpMyAdmin is a free software tool written in PHP, intended to handle the administration of MySQL over the Web. This tools provide easily accessing and managing data in MySQL database via portal with user interface on the website. Developer and system administrator can perform operation direct to database via user interface in website.

2.8 Laravel

Laravel is an open source PHP web application framework, designed for the development of model–view–controller (MVC) web applications. Laravel is released under the MIT license. Laravel handles everything from web serving to database management right down to HTML generation. A vertically integrated web development environment can provide superior experiences and easy for developer.

This project selected Eloquent ORM features from Laravel to apply and use with Web-based community system for online learning project. Eloquent ORM create corresponding "Model" which is used to interact with that table. From this reason, its enable developer to interact with table in database by access name of table that Laravel created into a model form and this model form has behavior like class in object-oriented concept. Laravel make incredibly easy way to interact with a

database in programming environment to developer. Before using Laravel tool, developer need to set up and configure database in `app/config/database.php` directory, and then defining An Eloquent Model. After finished set up and configure system, developer can querying data in database by using Eloquent Models.

2.9 BitBucket

BitBucket is web-based hosting service for code revision control. BitBucket is free and give unlimited private repositories for up to 5 developers to collaborating work with teams with flexibility to grow and code without restrictions. Main purpose of BitBucket is designed for management of changes to document, information, computer program, and website. For code and website, changes are usually identified by timestamp that person make a change to the file. Revisions can be compared, restored and merged.

Benefit of having version control system is the log that developer can back to recover, check and review differentiate of the documents and name with time that person change the file.

2.10 jQuery

jQuery is a cross-platform JavaScript library designed to simplify the client-side scripting of HTML. Syntax of jQuery designed for assist developer to navigate, create, select and handle document, DOM, animation, events and develop Ajax application easier. Developer can create low-level interaction and animation, advanced effects and high-level, theme-able widgets and dynamic website.

Developer can be included jQuery library within a web page by linking to a local file or files in public servers. jQuery has two usage styles for the code. First, via the `$` function or commands that act directly to jQuery objects. Second, via `$.` prefixed functions or utility functions, which do not act upon the jQuery object directly.

```
<script src="http://just-learn.cloudapp.net/js/jquery-2.1.1.min.js"></script>
```

Figure 2.8 Example of including jQuery library file

Chapter 3

SYSTEM ANALYSIS AND DESIGN

The third chapter is a review of system analysis and design. The system analysis is the expectation and requirement from the users in this system. The system design is the detail of system architecture, component, function and interface.

3.1 User Requirement

Web-based community system for online learning was designed for students and people who want to learn education courses through the Internet. The major characteristics and functions of the system are:

- Login system
- Edit user profile
- Create, edit and delete the course
- Share Content via public social media
- Leaderboard ranking
- Learn course and take exam
- Statistic of the course view
- Set published or unpublished status for the course
- Manage all course in the system
- Manage all user in the system
- Manage all system function

3.2 System Requirement Analysis

3.2.1 Functional Requirement (Module)

- Login system (user, contributor and admin)
- Course Management System (user, contributor and admin)
- Examination Management (user, contributor and admin)
- Course Administration (admin)

- User Profile View/Edit (user, contributor and admin)
- User Management (global and user admin)

3.3 System Design

3.3.1 Architecture Overview

According to figure 3.1, this system consists of web role and worker role.

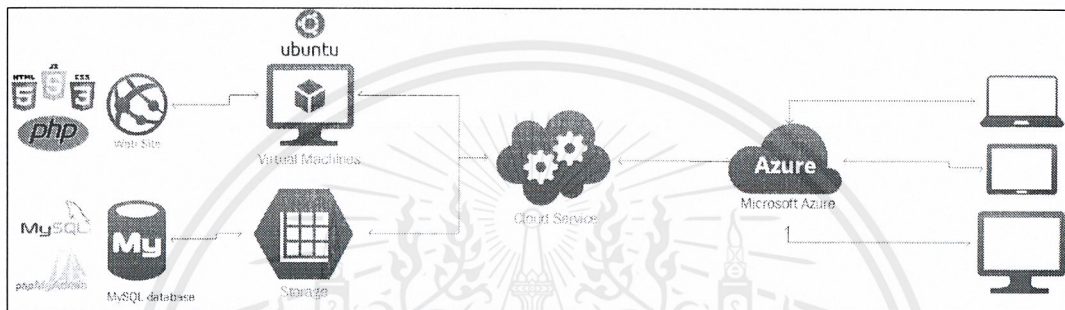


Figure 3.1 System Architecture

Web-based community system runs on Cloud Services in Microsoft Azure cloud platform. Cloud Services provided 2 parts of the system, the first part is a web role and second part is a worker role. Web role is a front-end of the system feature apache web server on Ubuntu Server for hosting website of the system, MySQL database with phpMyAdmin for store data and information. Worker is a back-end of the system that provides infrastructure such as virtual machine, cloud storage and load balancing to the system.

When users access website of this system, Microsoft Azure DNS route request to Cloud Services of the project. After that worker role manage to request as load balancing and send request to web server unit. Web role get and process request with sever-side application and connecting to database for query data to serve request from users, and then send output back to client of user who access the system. Logical performance of the system was allocated with Microsoft Azure Cloud Services A2 plan.

The A2 plan provides virtual machine with 2 cores of CPU, 3.5 GB of ram and maximum 262 GB (127 GB for OS and 135 for temporary space).

3.3.2 Use Case Diagram

In this system has 6 major modules that design for respond user request and interact with 3 different user types.

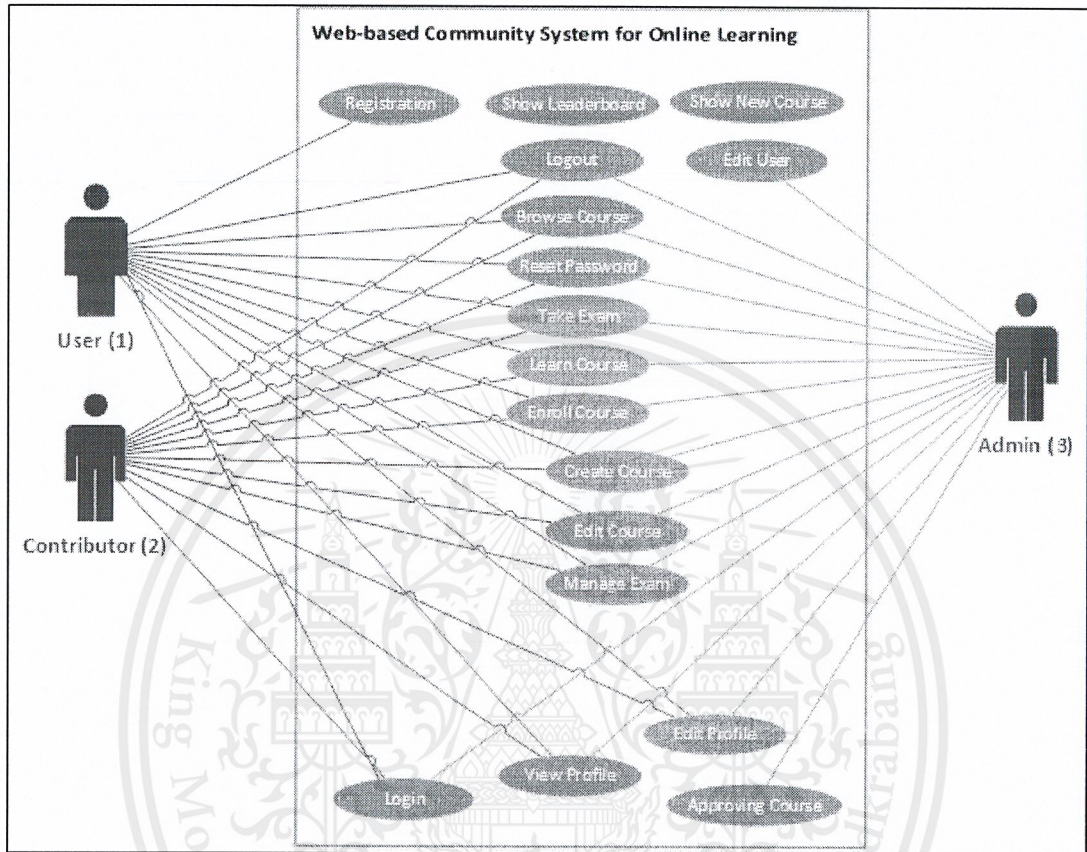


Figure 3.2 Use Case Diagram

3.3.3 Activity Diagram

3.3.3.1 Registration activity

For the user who want to learn course or create course, they need to register and create an account to be a member of the website. In registration activity on register page, user need to fill out account information that required and input it in a pattern was given by website. The system will checked input from user. If the input matched with system pattern, the system will process it and create an account save into database. If the input not matches with system pattern, system will show alert to notice user to re-enter account information with collect pattern.

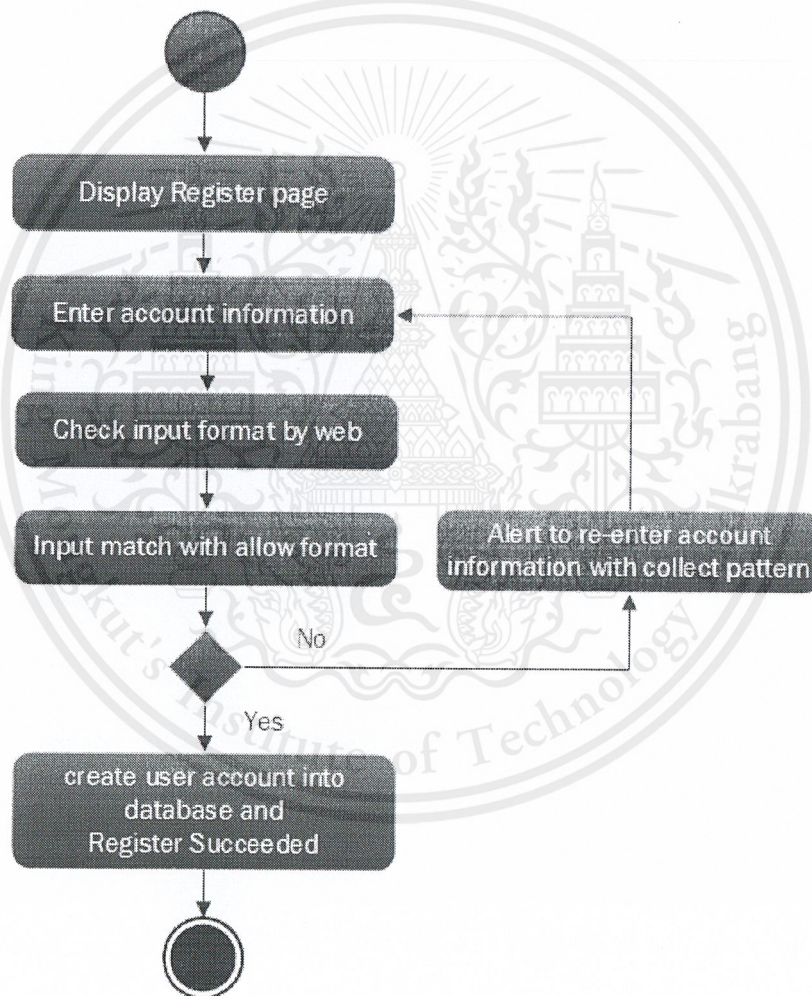


Figure 3.3 Registration Activity

3.3.3.2 Login activity

Before user access to use services or learn educational course in the website, user must log on the system. User needs to click Log in button on the top-right of the webpage. After clicked, login pop-up would display on the screen. User needs to enter email and password. The system will check user credential that user enter to the system. If the credential matches with user information in database, user will log on to the system. If the credential not matches with user information in database, the system will notice user by show alert message for re-enter account credential again.

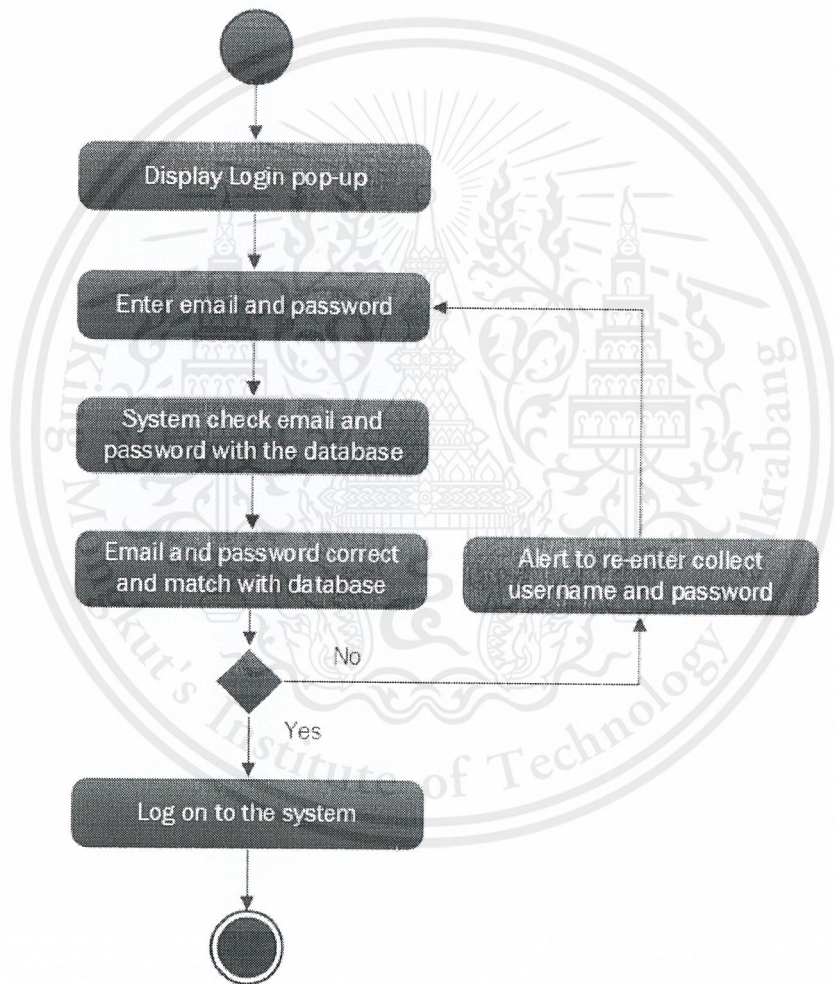


Figure 3.4 Login Activity

3.3.3.3 View Profile activity

This activity happened when user want to see their profile. After user clicked View Profile, the system will display user page, and then load user information from database and show it in user page.

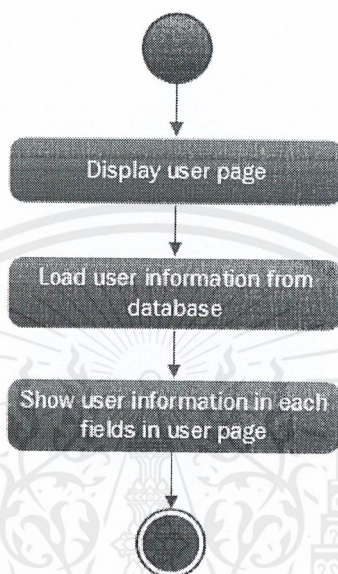


Figure 3.5 View Profile Activity

3.3.3.4 Edit Profile activity

This activity will use when user want to edit or change their account information and/or change password. User need to choose what their want to edit profile or change password.

For edit user information, user need to enter or edit account information. After user finished edit their information and clicked to submit, the system would check new user information that entered to the system. If new information matched with the collect format, system would save new information into the system database. If new information not match with collect format, the system will notice user to re-enter their user information with collect pattern.

For changing new password, user needs to enter the old password that their use and the new password that their want to change. If the old password matched with data in database and the new password is in collect format, the system will save new password into database. If old password or new password are wrong pattern or not match, system will notice user to re-enter again.

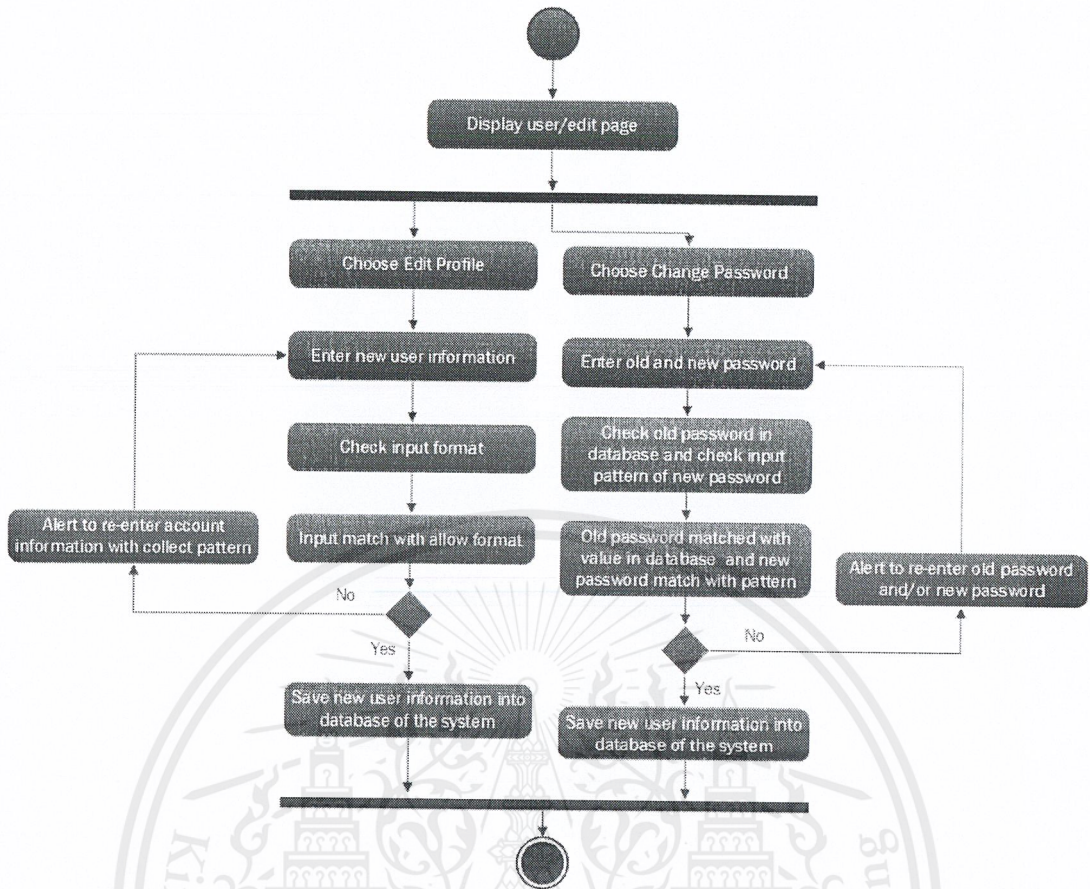


Figure 3.6 Edit Profile Activity

3.3.3.5 Log out activity

For user who want to log out from Log on status. After user clicked log out button, the system terminated log in session and cookies from client and log out from the system.

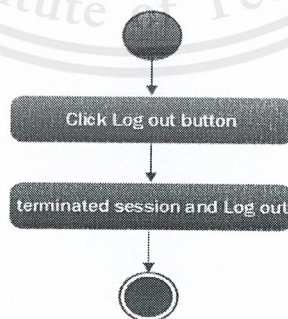


Figure 3.7 Log out Activity

3.3.3.6 Create course activity

This activity happened when user want to create the new course to the system. User needs to fill out the course information and creates 1 chapter in this course. After user entered course information and content, the system would check format and constraint. If course information and content collect with format and constraint that allow for the system, system will save course and content into database and set Approved attribute for state that match with user type. If format and constraint not collect, it will alert to notice user to re-enter course information to the system.

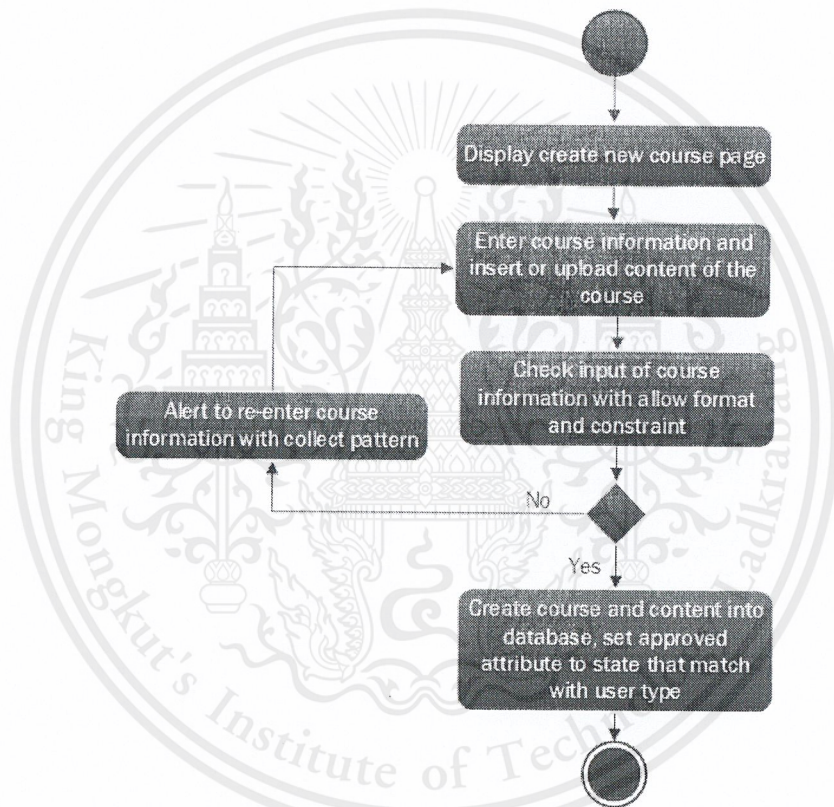


Figure 3.8 Create Course Activity

3.3.3.7 Approving course activity

After user created and submitted their course first time, the course would set Approved attribute to wait it. This mechanism was designed for admin who can review quality qualification of the content before approved the course to approve the state. Admin can review content of the course and decide that activity that will approve or reject it. If content pass the review process, the

system will be set course to approved state. If content not pass the review process, the system will send notification to user to review content of the course and submit again.

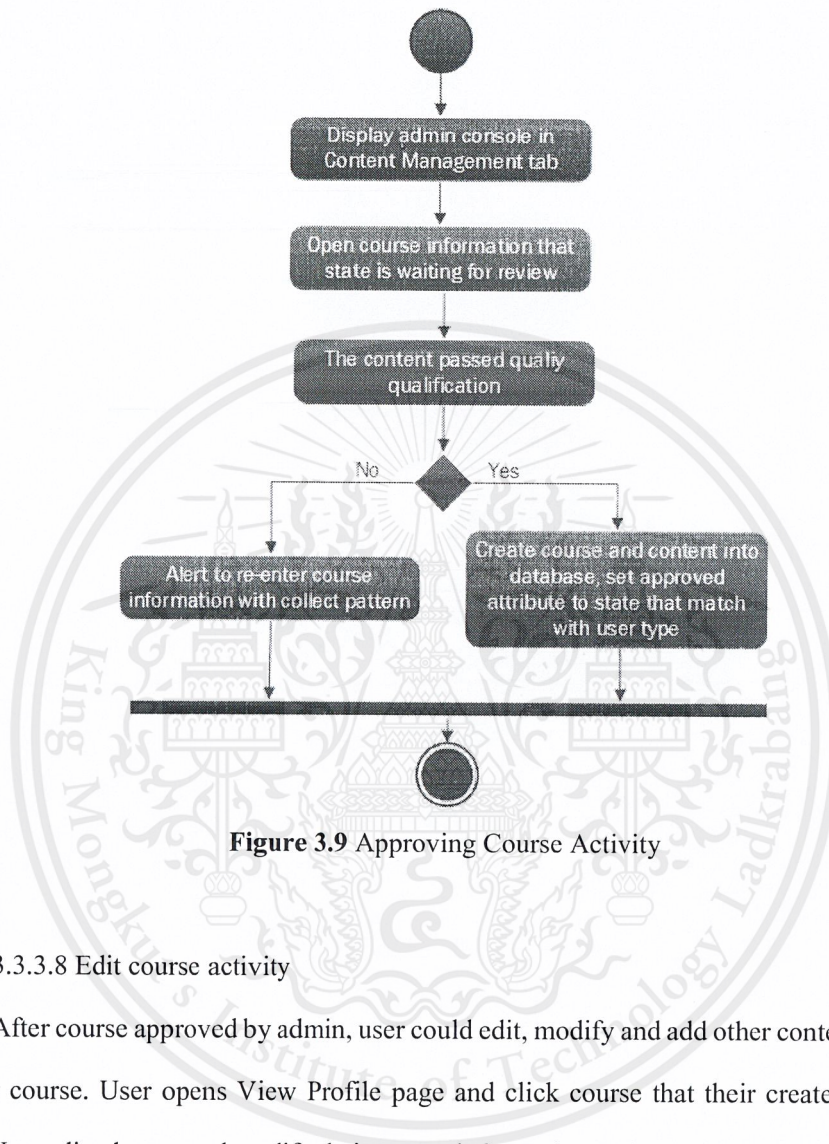


Figure 3.9 Approving Course Activity

3.3.3.8 Edit course activity

After course approved by admin, user could edit, modify and add other contents and exams into their course. User opens View Profile page and click course that their created and want to change. User edit, change and modify their course information and exams, the system would check new course information and exams with format and constraint. If new information matches with pattern and constraint, system save new information into database. If new information not matches with pattern and constraint, the system will notice user to re-edit and submit again.

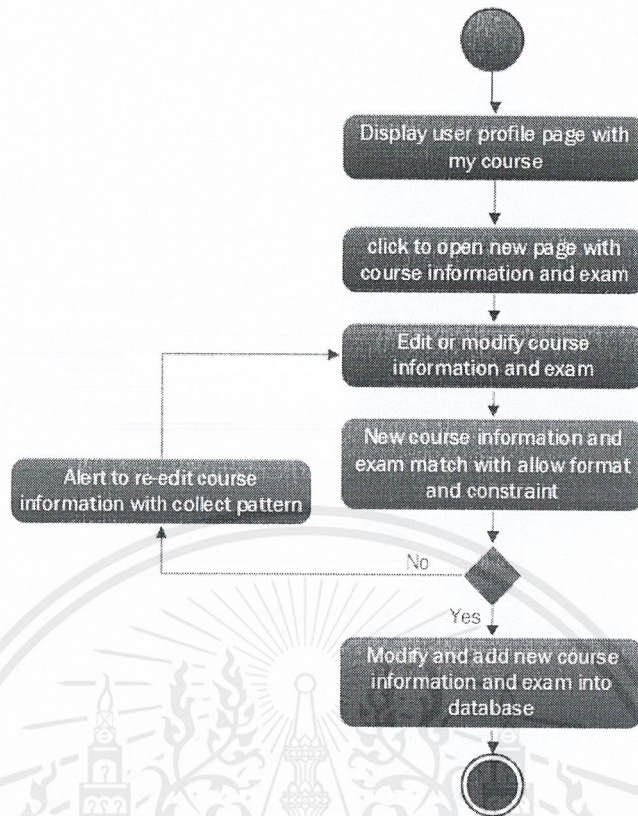


Figure 3.10 Edit Course Activity

3.3.3.9 Enroll course activity

User can enroll course by click to the course, and then enroll the course that they are interested. The system will

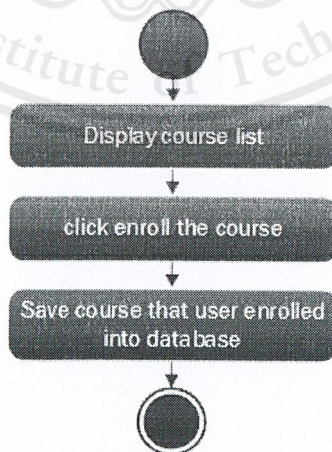


Figure 3.11 Enroll course Activity

3.3.3.10 Learn course activity

After enrolled course, user could access course to learn educational content and take exam in each chapter. The system will update latest value that you completed learning the course to database.

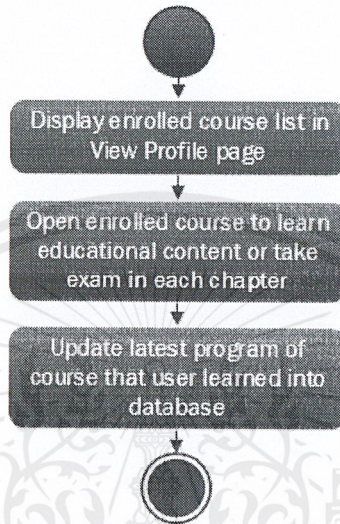


Figure 3.12 Learn course Activity

3.3.3.11 Show new course activity

For the New Course area of the home page, its used to show new 10 courses that created by contributor or lecturer user. The system will show 10 latest updated courses from COURSE_LIST database.

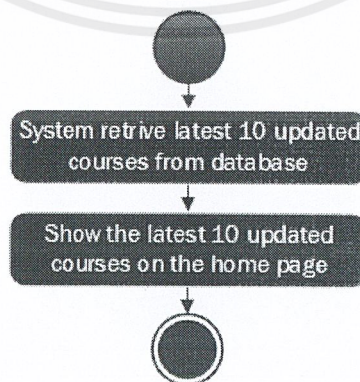


Figure 3.13 Show New Course Activity

3.3.3.12 Show leaderboard activity

For the Leaderboard session of the home page, its use to show top 5 users who has highest score in USER_DETAIL database.

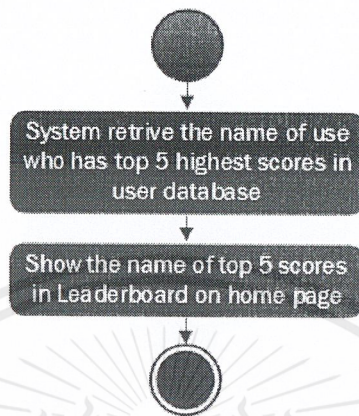


Figure 3.14 Show Leaderboard Activity

3.3.3.13 Browse course activity

User can browse course to see list of course available to enroll in the system by click browse course in top menu in the webpage to see full list of courses and user can filter to see course list that divide into categories by click filter on the webpage or browse course page. Data retrieve from database.

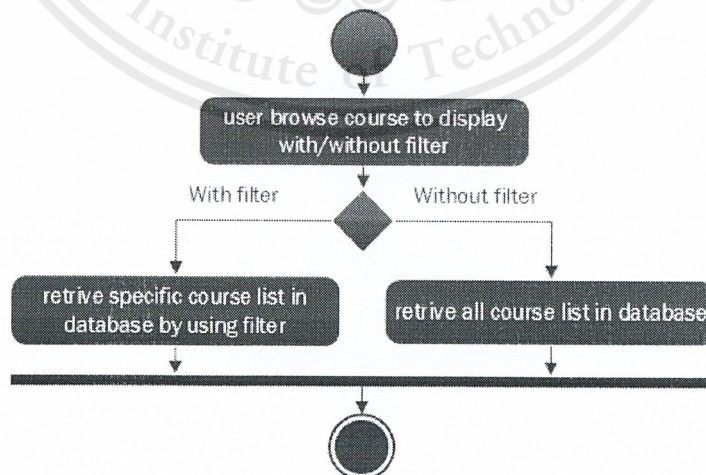


Figure 3.15 Browse Course Activity

3.3.3.14 Reset password activity

In case user forget their password, user can reset their password by using “forget password” function. User needs to enter their email to the system and click “Send”, the system will check with the database, If email matches with the database, the system will generate reset email and send to user. If email not matches with database, the system will show error message to user.

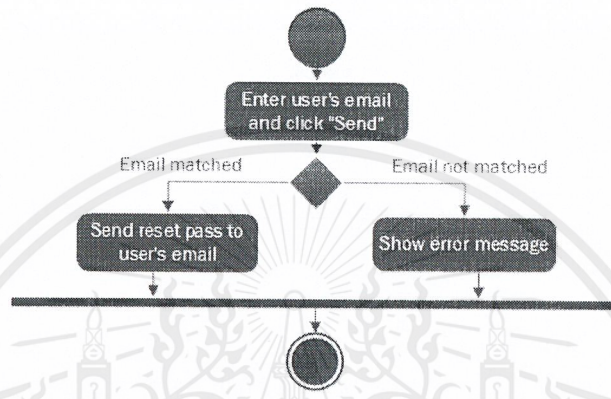


Figure 3.16 Reset Password Activity

3.3.3.15 Edit user activity

Admin has permission to edit user detail in case user request and can change user type from normal user to contributor, if the user will have obviously contribution to the community by report from the system in user management page, as a part of admin console.

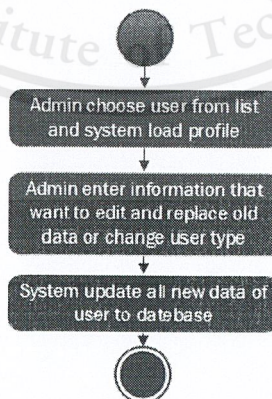


Figure 3.17 Edit User Activity

3.3.3.16 Manage exam activity

User can create, edit and delete their post-test exam for each chapter in the course. This activity is in examination management console. After student learned chapter in the course, they could take a post-test exam of this chapter. If they passed 60%, they would earn the score of this course to their profile. Each course has difference score length, 10 is easiest, 20, 30, 40 and 50 is hardest level.

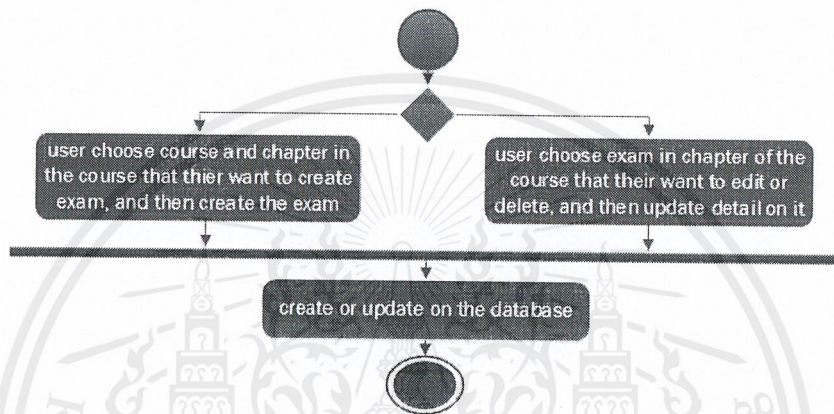


Figure 3.18 Manage Exam Activity

3.3.3.16 Take exam activity

User can take exam in each chapter in the course. The exam has difference 5 types included multiple choice (1 answer), multiple choice (multi answer), true of false, fill out answer and correct order of answer. After user took an exam for each chapter in the course, the system checked the answers and calculated the score to update in the user profile on database.

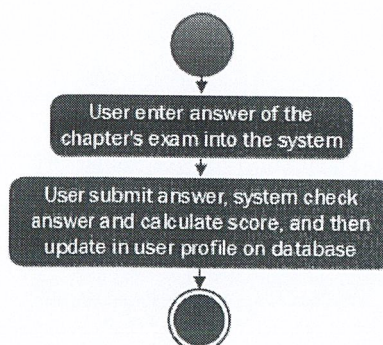


Figure 3.19 Take Exam Activity

3.4 Database Design

3.4.1 ER Diagram

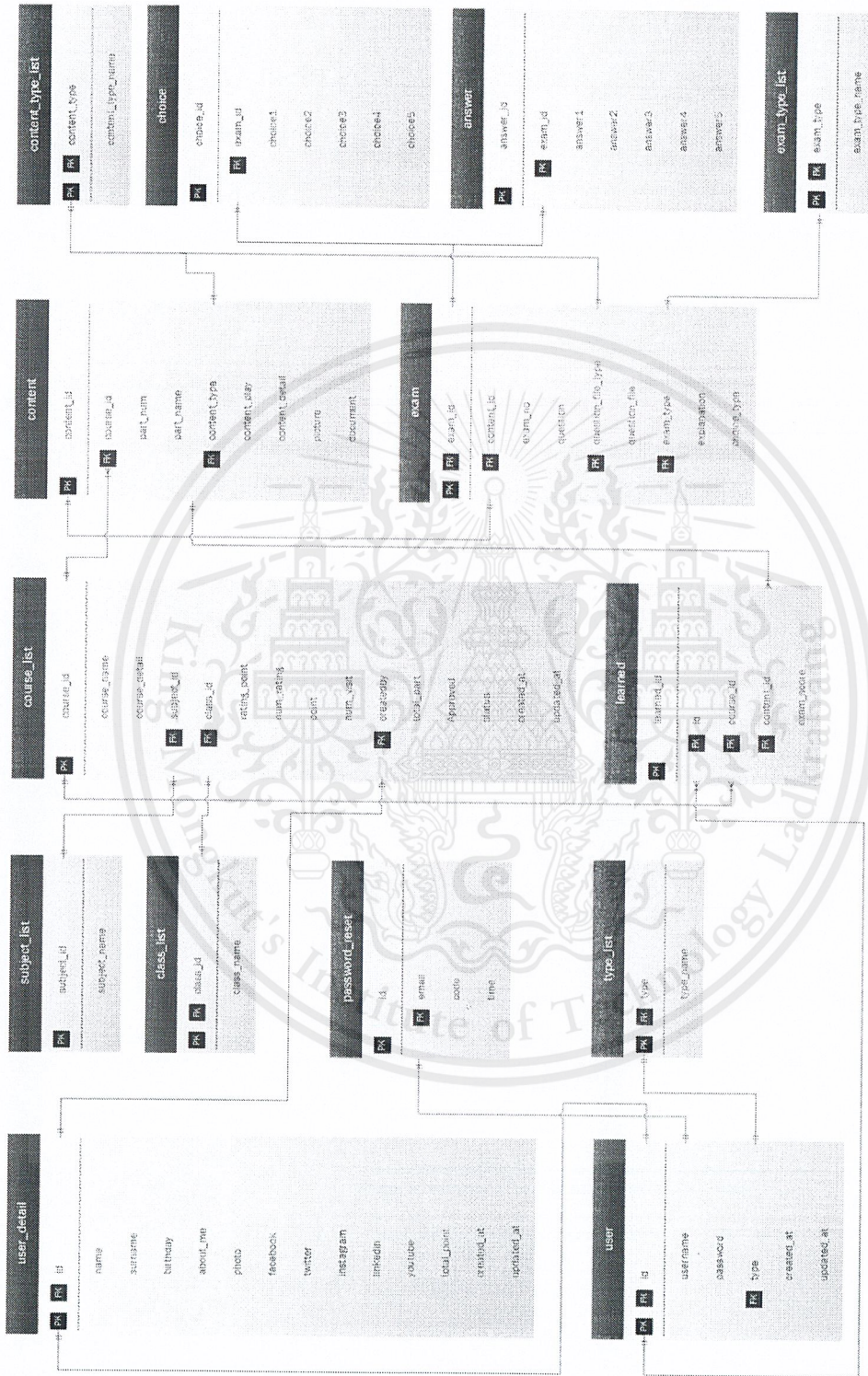


Figure 3.20 ER Diagram

3.4.2 Data Dictionary

Data dictionary describes details of tables in database.

3.4.2.1 In table 3.1 present all tables and descriptions in the database.

Table 3.1 Data Dictionary

Table Name	Description
USER	Table for store important data of user (username, password, etc.)
USER_DETAIL	Table for store description data of user
TYPE_LIST	Table for store type and class of user
SUBJECT_LIST	Table for store list of subject
CLASS_LIST	Table for store list of class
COURSE_LIST	Table for store description data of course
CONTENT_TYPE_LIST	Table for store list of content type
CONTENT	Table for store contents of course
EXAM	Table for store exam for each course
CHOICE	Table for store choice of each exam
ANSWER	Table for store answer of each exam
EXAM_TYPE_LIST	Table for store type of exam
LEARNED	Table for store course and score from the exam that user taken
PASSWORD_RESET	Table for store temporary credential data require to reset password

3.4.2.2 Table 3.2 describes USER table which used for store credential data of the user.

Table 3.2 Data Dictionary of Table USER

Attribute	Description	Data Type	Length	Key	FK
id	user id	INT	10	PK, FK	USER_DETAIL
username	email (username)	VARCHAR	60		
password	user password	VARCHAR	60		
type	user type	INT	1		TYPE_LIST

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Table 3.2 (continued) Data Dictionary of Table USER

Attribute	Description	Data Type	Length	Key	FK
created_at	created time	DATETIME			
updated_at	updated time	DATETIME			

3.4.2.3 Table 3.3 describes USER_DETAIL table which used for store personal information of user.

Table 3.3 Data Dictionary of Table USER_DETAIL

Attribute	Description	Data Type	Length	Key	FK
id	user id	INT	10	PK, FK	USER
name	first name of user	VARCHAR	40		
surname	last name of user	VARCHAR	40		
birthday	birthday of user	DATETIME			
about_me	short description and detail about the user	TEXT			
photo	photo of user	MEDIUM BLOB			
facebook	facebook address of the user	VARCHAR	60		
twitter	twitter address of the user	VARCHAR	60		
instagram	instagram address of the user	VARCHAR	60		
linkedin	linkedin address of the user	VARCHAR	60		
youtube	youtube channel address of the user	VARCHAR	60		

Table 3.3 (continued) Data Dictionary of Table USER_DETAIL

total_point	total point of user from learned course	INT	10		
Attribute	Description	Data Type	Length	Key	FK
created_by	created time	DATETIME			
updated_by	updated time	DATETIME			

3.4.2.4 Table 3.4 describes TYPE_LIST table which used for store type of the user.

Table 3.4 Data Dictionary of Table TYPE_LIST

Attribute	Description	Data Type	Length	Key	FK
type	type id	INT	10	PK, FK	USER
type_name	name of the user type	VARCHAR	15		

3.4.2.5 Table 3.5 describes SUBJECT_LIST table which used for store list of subjects category.

Table 3.5 Data Dictionary of SUBJECT_LIST

Attribute	Description	Data Type	Length	Key	FK
subject_id	subject id	INT	10	PK, FK	COURSE_LIST
subject_name	name of the subject	VARCHAR	30		

3.4.2.6 Table 3.6 describes CLASS_LIST table which used for store list of class category.

Table 3.6 Data Dictionary of CLASS_LIST

Attribute	Description	Data Type	Length	Key	FK
class_id	class id	INT	10	PK, FK	COURSE_LIST

Table 3.6 (continued) Data Dictionary of CLASS_LIST

Attribute	Description	Data Type	Length	Key	FK
class_name	name of the class	VARCHAR	20		

3.4.2.7 Table 3.7 describes COURSE_LIST table which used for store description and information about course list.

Table 3.7 Data Dictionary of COURSE_LIST

Attribute	Description	Data Type	Length	Key	FK
course_id	class id	INT	10	PK, FK	COURSE_LIST
course_name	name of the class	VARCHAR	20		
course_detail	detail of the class	TEXT			
subject_id	subject id	INT	10	FK	
class_id	class id	INT	10	FK	
rating_point	point of user rating	INT	10		
num_rating	number of user who rating the course	INT	10		
point	point from learn this course	INT	10		
num_visit	number of user who visited this course	INT	10		
createdby	name of user who created this course	INT	10	FK	USER_DETAIL
total_part	total number of chapter in course	INT	10		
approved	approved status	TINYINT	1		
status	published status	INT	10		
created_at	date created course	DATETIME			
updated_at	date updated course	DATETIME			

3.4.2.8 Table 3.8 describes COTENT_TYPE_LIST table which used for store type of the content.

Table 3.8 Data Dictionary of CONTENT_TYPE_LIST

Attribute	Description	Data Type	Length	Key	FK
content_type	content type id	INT	10	PK, FK	CONTENT EXAM
content_type_name	content type name	VARCHAR	15		

3.4.2.9 Table 3.9 describes EXAM_TYPE_LIST table which used for store type of the exam.

Table 3.9 Data Dictionary of EXAM_TYPE_LIST

Attribute	Description	Data Type	Length	Key	FK
exam_type	exam type id	INT	10	PK, FK	EXAM
exam_type_name	exam type name	VARCHAR	35		

3.4.2.10 Table 3.10 describes CONTENT table which used for store content of the course.

Table 3.10 Data Dictionary of CONTENT

Attribute	Description	Data Type	Length	Key	FK
Content_id	Content id	INT	10	PK, FK	EXAM
Course_id	Course id	INT	10	FK	COURSE_LIST
Part_num	No of content chapter in the course	INT	10		
Content_type	Type of the content	INT	10	FK	CONTENT_TYPE_LIST
Content_play	Source of the content	MEDIUM BLOB			

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Table 3.10 (continued) Data Dictionary of CONTENT

Attribute	Description	Data Type	Length	Key	FK
Course_detail	Content description	TEXT			
Picture	Picture relate to content	MEDIUM BLOB			
document	Document relate to content	MEDIUM BLOB			

3.4.2.11 Table 3.11 describes EXAM table which used for store exam that match with content.

Table 3.11 Data Dictionary of EXAM

Attribute	Description	Data Type	Length	Key	FK
Exam_id	Exam id	INT	10	PK, FK	CONTENT
Content_id	Content id	INT	10	FK	COURSE_LIST
Exam_no	No of exam in chapter	INT	10		
Question	Question of exam	TEXT			
Question_file_type	Type of the question file	INT	10	FK	CONTENT_TYPE_LIST
Question_file	Source of the question file	MEDIUM BLOB			
Exam_type	Type of the exam	INT	10	FK	EXAM_TYPE_LIST
explanation	Explanation of the answer	MEDIUM BLOB			
Choice_type	Type of choice	eNUM(TEXT, IMAGE)			

3.4.2.12 Table 3.12 describes CHOICE table which used for store choice for each exam.

Table 3.12 Data Dictionary of CHOICE

Attribute	Description	Data Type	Length	Key	FK
choice_id	choice id	INT	10	PK	
exam_id	exam id	INT	10	FK	EXAM
choice1	choice1	MEDIUM BLOB			
choice2	choice2	MEDIUM BLOB			
choice3	choice3	MEDIUM BLOB			
choice4	choice4	MEDIUM BLOB			
exam_type	choice5	MEDIUM BLOB			

3.4.2.13 Table 3.13 describes ANSWER table which used for store answer for each exam.

Table 3.13 Data Dictionary of ANSWER

Attribute	Description	Data Type	Length	Key	FK
answer_id	answer id	INT	10	PK	
exam_id	exam_id	INT	10	FK	EXAM
answer1	answer1	TEXT			
answer2	answer2	TEXT			
answer3	answer3	TEXT			
answer4	answer4	TEXT			
answer5	answer5	TEXT			

3.4.2.14 Table 3.14 describes LEARNED table which used for store details of course that user enrolled and exam score from each part in the course.

Table 3.14 Data Dictionary of LEARNED

Attribute	Description	Data Type	Length	Key	FK
learned_id	learned id	INT	10	PK	
id	user id	INT	10	FK	USER_DETAIL
course_id	course id	INT	10	FK	COURSE_LIST
content_id	content id	INT	10	FK	CONTENT
exam score	score of the exam in each part	INT	10		

Table 3.15 Data Dictionary of PASSWORD_RESET

Attribute	Description	Data Type	Length	Key	FK
id	id	INT	10	PK	
email	user email	INT	10	FK	USER
code	reset code	INT	10		
time	time stamp	INT	10		

3.5 Infrastructure Design

The logical infrastructure of the system runs on Cloud Services of Microsoft Azure Cloud Platform. Cloud Services with worker role provides high availability to the system by configure and implement multiple virtual machines in an Availability Set for redundancy. Auto scaling module combines with load balancer inside Cloud Service designed to manage and control virtual machine performance and availability by automatic turn on or turn off instances and distributes traffic between multiple virtual machines.

Infrastructure of the system has 2 identity virtual machines that run website role environment and both of virtual machines connect with the single storage.

In the peak-load period that CPU usage is more than 60%, the system is automatic scaling performance of 1 instance with 2 core processors and 3.5 GB of ram up to 2 identity instances, with the same performance in A2 plan. After CPU usage was less than 60%, the system is automatic scaling 2 instances down to only 1 instance. Autoscaling module in Cloud Services is the controller of this mechanism and this module also control load balancer for distributes traffic of the system.

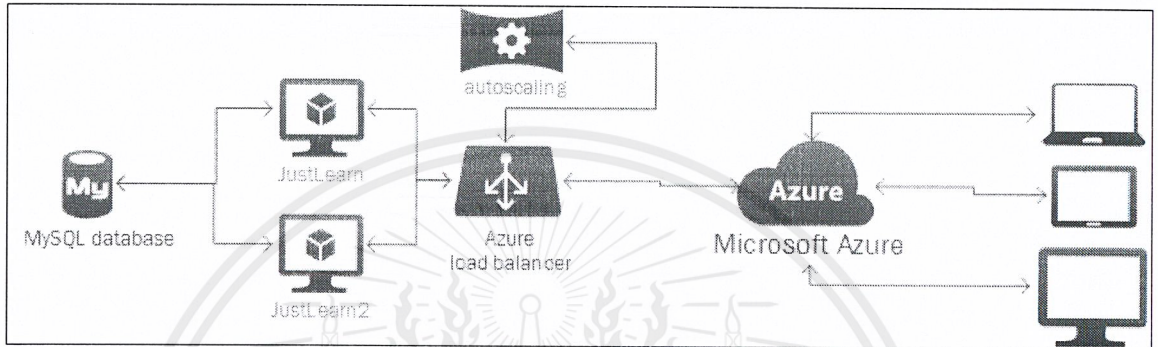


Figure 3.21 Infrastructure Diagram with worker role

3.6 MVC

MVC (Model – View – Controller) is design pattern that separate the application, especially web application, into 3 parts by roles.

- A Model part is a module that is used to store data that is received by the controller.
- A View part is a module that is used to represent output data to user.
- A Controller part is a module that is used to control user request and application response.

Web-based Community System for Online Learning use Laravel Framework that provide MVC pattern for PHP web application.

- A Model is operated by Laravel Eloquent ORM that present database tables as classes.
- A View is operated by Laravel View that is able to passing data to view. Additionally, generating template with Blade Template.
- A Controller is operated by Laravel Controller that using controllers as part of route declarations.

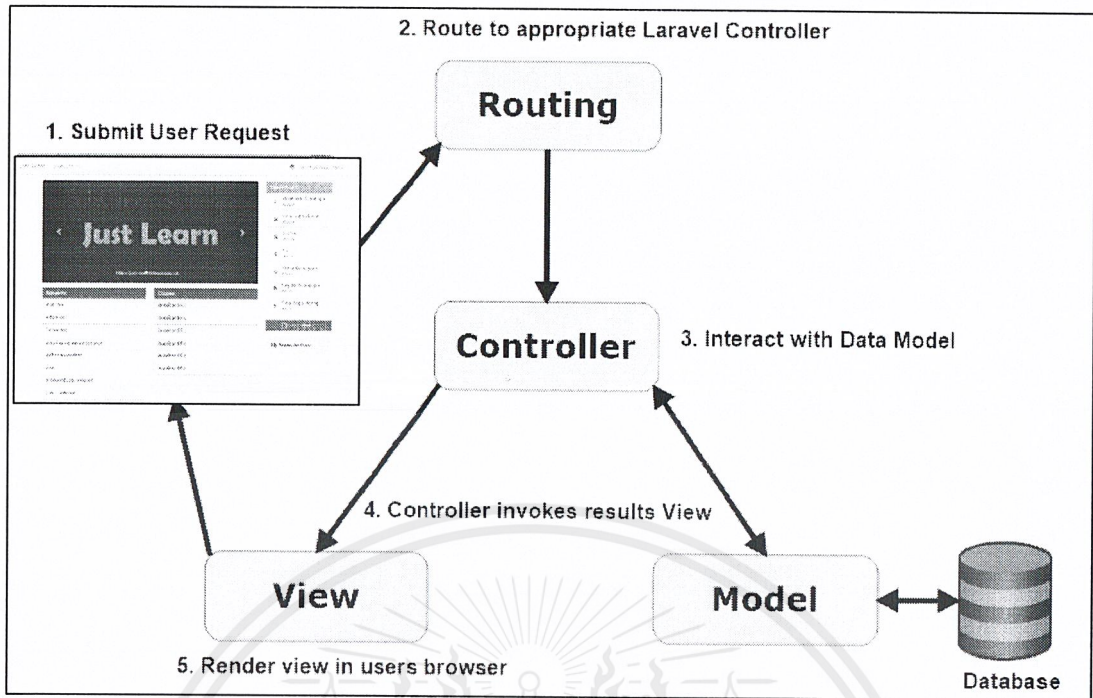


Figure 3.22 MVC model

Chapter 4

RESULT

The fourth chapter is review of the result from system implementation included Graphic User Interface Design and features of the system.

4.1 Home Page

First time users access the website name “Just Learn”, the home page appear with banner, Login button, register button, browse course button, leader board, new course column and course category by subjects and by class.

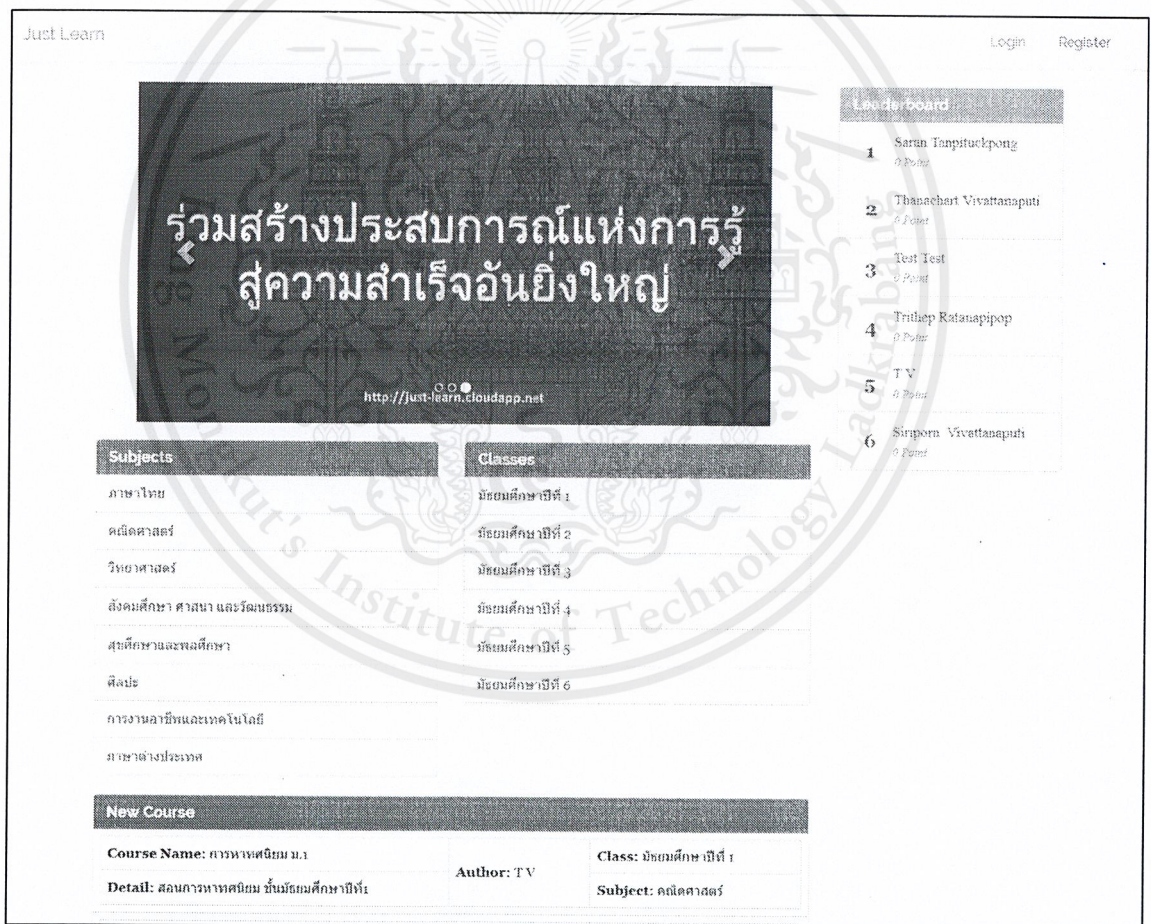


Figure 4.1 Home Page

4.2 Create Account Page

Before user can access to learn and take exam in the educational course, user must register to create an account of the website by fill out required information such as email address, password, name, surname, and birthday, and other fields are not required. After finished, user click register to process.

Just Learn Language ▾

Register

Email address *
Email address

Password *
Password

Confirm password *
Confirm password

Name *
Name

Surname *
Surname

Birthday *
Birthday

About me
About me

Photo
Browse... No file selected.
Maximum 2 MB

Facebook
Facebook

Twitter
Twitter

Instagram
Instagram

LinkedIn
LinkedIn

YouTube
YouTube

* Required information.

Register

Figure 4.2 Register Page

4.3 User Login

User clicks Login button, login dialog appears on the screen for user enter email address and password. The next is to click login for log on to the system.

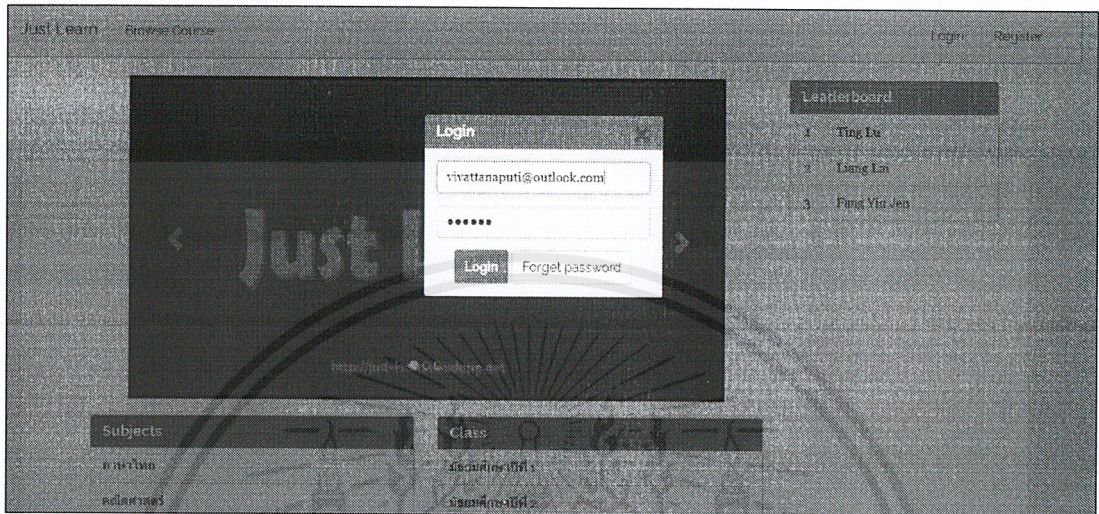


Figure 4.3 Login Dialog

4.4 Browse Course page

User can see and access the list of all course by click Browse Course button on top of the screen in navigate bar. The course appears in the list with course name, class, subject and author.

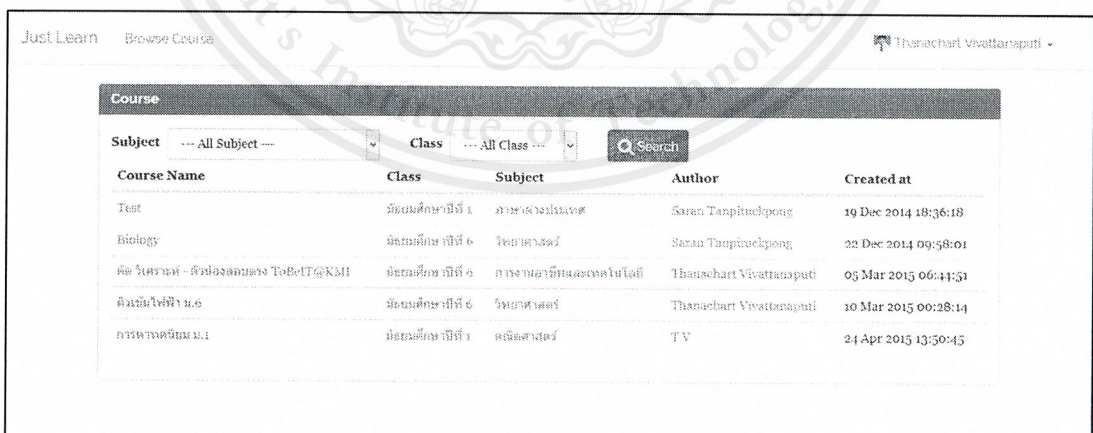


Figure 4.4 Browse Course Page

4.5 View Profile Page

User can view their profile information from this page.



Figure 4.5 View Profile Page

4.6 Course Administration Page

For Global Admin and Content Admin can access to course administration page. On this page, both of Global Admin and Content Admin can edit and set value of course approve, course availability and delete course. This action requires the permission from 2 types of the admin to perform an action that affects the course and the content. For the course management console, you can modify and manage courses that are created by users.

<input type="checkbox"/>	Course Name	Class	Subject	Author	Created at	Approved	Published
<input type="checkbox"/>	Test	ชั้นมัธยมศึกษาปีที่ 2	วิทยาศาสตร์	Saran Tanpituckpong	19 Dec 2014 18:36:18	✓	✓
<input type="checkbox"/>	OMG	ชั้นมัธยมศึกษาปีที่ 2	สังคมศึกษา ศาสนา และวัฒนธรรม	Saran Tanpituckpong	19 Dec 2014 18:37:48	✗	✓
<input type="checkbox"/>	LOL	ชั้นมัธยมศึกษาปีที่ 2	ศิลปะ	Saran Tanpituckpong	19 Dec 2014 18:38:34	✗	✓
<input type="checkbox"/>	Biology	ชั้นมัธยมศึกษาปีที่ 6	วิทยาศาสตร์	Saran Tanpituckpong	22 Dec 2014 09:58:01	✓	✓
<input type="checkbox"/>	ฝึก ทักษะ - กิจกรรมการเรียนรู้ T@KMI	ชั้นมัธยมศึกษาปีที่ 6	ภาษาอังกฤษ	Thanachart Vivattanaputi	05 Mar 2015 06:44:51	✓	✓
<input type="checkbox"/>	ฝึกทักษะการเรียนรู้	ชั้นมัธยมศึกษาปีที่ 6	วิทยาศาสตร์	Thanachart Vivattanaputi	10 Mar 2015 00:28:14	✓	✓
<input type="checkbox"/>	การพหุวัฒนธรรม	ชั้นมัธยมศึกษาปีที่ 1	วิทยาศาสตร์	T.T	24 Apr 2015 13:50:45	✓	✓

Figure 4.6 Course Administration Page

4.7 Change Password Page

User can change their password by go to edit profile and select Change Password tab, and then enter old password and new password with confirm password. Next click change, the system will process continue to process it and change user password, if the old password collect and the new password is in collect format.

Figure 4.7 Change Password Page

4.8 Edit Profile Page

User can edit their profile by go to Edi Profile page. After user entered and click edit it, new user information checked with acceptable pattern. If it pass, it will update user information and profile into database.

Just Learn Browse Course Thanachart Vivattanaputi

Edit Profile Change Password

Edit Profile

Email address
vivat.anaputi@outlook.com

Name *
Thanachart

Surname *
Vivattanaputi

Birthday *
01/01/1970

About me
My name is Thanachart Vivattanaputi.

Photo

No file selected.
Maximum 2 MB
 Remove photo

Facebook
<http://www.facebook.com/IT.MIKE>

Twitter
http://twitter.com/ITy_MIKE

Instagram
[Instagram](#)

LinkedIn
[LinkedIn](#)

YouTube
[YouTube](#)

* Required information.

Figure 4.8 Edit Profile Page

4.9 Create Course Page

All user type can create new educational course by click new course on home page. The system redirect to new course page. User fill out required fields and upload chapter 1 of the course with 1 content multimedia file. Picture and document are optional upload options for users. After click create, the system will set status of this course into waiting for approve, but all Admin types and Lecturer type can create course without approving process.

The screenshot shows the 'New Course' form in the 'Just Learn' system. The form is titled 'New Course' and is located on the 'Browse Course' page. The form includes the following fields and options:

- Course Name ***: A text input field with a placeholder 'Course Name'.
- Course Detail ***: A text input field with a placeholder 'Course Description'.
- Subject ***: A dropdown menu with the option '--- Select subject ---'.
- Class ***: A dropdown menu with the option '--- Select class ---'.
- Chapters**: A section header for the chapter details.
- Chapter Sequence**: A text input field with the value '1'.
- Chapter Name ***: A text input field with a placeholder 'Chapter Name'.
- Chapter Detail ***: A text input field with a placeholder 'Chapter Detail'.
- Chapter Media Type ***: A dropdown menu with the option '--- Select Media Type ---'.
- Chapter Media ***: A text input field with the placeholder 'Please choose media type.'.
- Point/Difficulty ***: A dropdown menu with the option '10 (*)'.
- Picture**: A text input field with the placeholder 'No file selected.' and a 'Browse...' button.
- Document**: A text input field with the placeholder 'No file selected.' and a 'Browse...' button.
- * Required information.**: A note indicating that the fields marked with an asterisk are required.
- Create**: A button at the bottom of the form to submit the course creation.

Figure 4.9 Create Course Page

4.10 Learn Course Page

After enrolled the course, user could access to learn course by click course name or Browse Course page or View Profile page. User can watch educational content such as VDO clip, photo, voice or document. In Learn Course page, user can select chapter in the course that they want to learn.

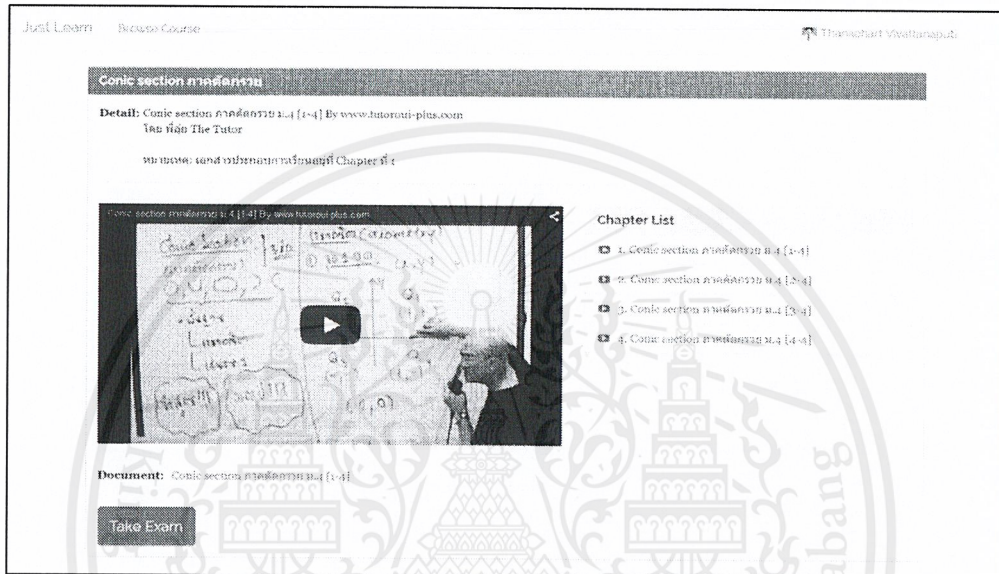


Figure 4.10 Learn Course Page

4.11 Course Management Page

For the courses that user created, users can edit and manage their courses by using Course Management page to manage their created courses.

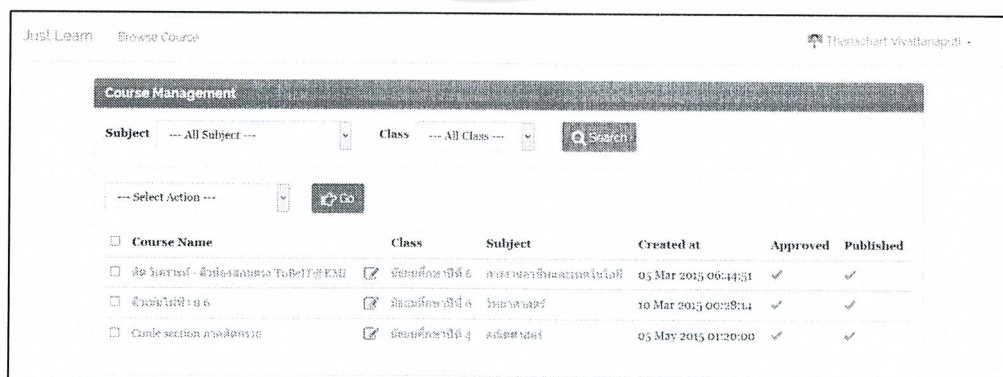
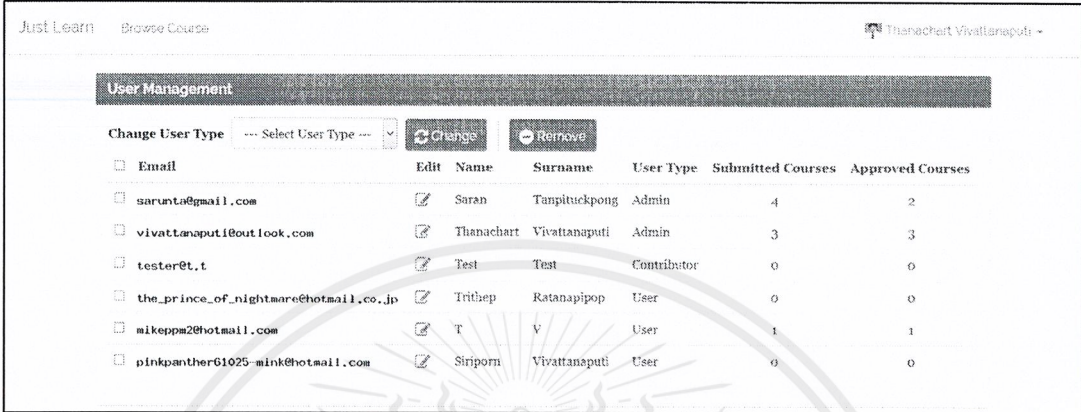


Figure 4.11 Course Management Page

4.12 User Management Page

This page designed for admin to manage user details and permission. In additional, this page provides information about usage and summary details of each users.



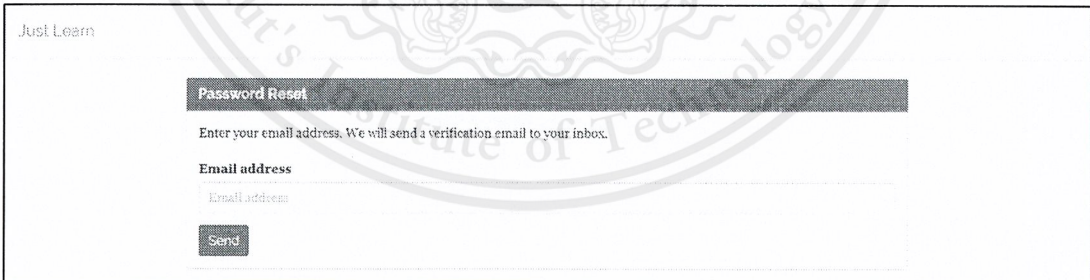
The screenshot shows the 'User Management' page. At the top, there are navigation links 'Just Learn' and 'Browse Course', and a user profile 'Thanachart Vivattanaputi'. Below the title bar, there are controls for 'Change User Type' (a dropdown menu), 'Change' (a button), and 'Remove' (a button). The main content is a table with the following data:

<input type="checkbox"/> Email	<input type="checkbox"/> Edit	Name	Surname	User Type	Submitted Courses	Approved Courses
<input type="checkbox"/> sarunta@gmail.com	<input type="checkbox"/>	Saran	Tanpituckpong	Admin	4	2
<input type="checkbox"/> vivattanaputi@outlook.com	<input type="checkbox"/>	Thanachart	Vivattanaputi	Admin	3	3
<input type="checkbox"/> tester@t.t	<input type="checkbox"/>	Test	Test	Contributor	0	0
<input type="checkbox"/> the_prince_of_nightmare@hotmail.co.jp	<input type="checkbox"/>	Trithep	Ratanapipop	User	0	0
<input type="checkbox"/> mikeppm2@hotmail.com	<input type="checkbox"/>	T	V	User	1	1
<input type="checkbox"/> pinkpanther61025-mink@hotmail.com	<input type="checkbox"/>	Siriporn	Vivattanaputi	User	0	0

Figure 4.12 User Management Page

4.13 Reset Password Page

For users who forget their password, they can use password reset function on Login popup for reset password. User needs to enter their email and click “Send”, the system will email to user for reset their password.



The screenshot shows the 'Password Reset' page. It features a title bar 'Password Reset' and a message: 'Enter your email address. We will send a verification email to your inbox.' Below this is a form with the label 'Email address' and an input field containing the placeholder text 'Email address'. A 'Send' button is located below the input field.

Figure 4.13 Reset Password Page

4.14 Examination Management Page

User can create and edit their post-test exam in each chapter of the course by using Exam Management console. User can choose course they want to add or edit exam, and then choose chapter for add the exam, edit the exam and delete the exam in this chapter.

Just Learn Browse Course Thanaschart Vivattanaputi

Step 1 - Choose Course Step 2 - Choose Chapter Step 3 - Create Examination

Choose Course

Course Name	Class	Subject	Author	Created at
คณิตศาสตร์ - คณิตศาสตร์ชั้น ม.1 [1-4]	มัธยมศึกษาปีที่ 6	การงานอาชีพและเทคโนโลยี	Thanaschart Vivattanaputi	05 Mar 2015 06:44:51
คณิตศาสตร์ ม.6	มัธยมศึกษาปีที่ 6	วิทยาศาสตร์	Thanaschart Vivattanaputi	10 Mar 2015 00:28:11
Conic section ม.1คณิตฯ	มัธยมศึกษาปีที่ 4	คณิตศาสตร์	Thanaschart Vivattanaputi	05 May 2015 01:20:00

Figure 4.14 Exam Management Page (1)

Just Learn Browse Course Thanaschart Vivattanaputi

Step 1 - Choose Course Step 2 - Choose Chapter Step 3 - Create Examination

Choose Chapter

Chapter Sequence	Chapter Name	Point/Difficulty	Chapter Media Type
1	Conic section ม.1คณิตฯ [1-4]	30 (***)	YouTube
2	Conic section ม.1คณิตฯ [1-4]	30 (***)	YouTube
3	Conic section ม.1คณิตฯ [1-4]	30 (***)	YouTube
4	Conic section ม.1คณิตฯ [1-4]	30 (***)	YouTube

Figure 4.15 Exam Management Page (2)

Just Learn Browse Course Thanaschart Vivattanaputi

Step 1 - Choose Course Step 2 - Choose Chapter Step 3 - Create Examination

Create Examination

Course: Conic section ม.1คณิตฯ
Chapter: Conic section ม.1คณิตฯ [1-4]

--- Select Exam Type --- Add Remove

Sequence	Question	Question File
		No Examination

Figure 4.16 Exam Management Page (3)

Chapter 5

CONCLUSION

The fifth chapter is conclusion, discussion and suggestion of the system development and implementation included long-term development plan in the future.

5.1 Project Discussion and Conclusion

“Web-Based Community System for Online Learning” is a website that designed for students can access to study and learn online courses in 8 learning groups included Thai Language, Mathematics, Science, Social-Study Religion and Culture, Health and Physical Education, Arts, Career and Technology and Foreign Language for Mattayom. All online courses in these website were created from volunteers that has expertise in each disciplines. Students can enroll courses that they are interested in the system to study and learn online course in form of multimedia content, such as YouTube, video and voice file. After finished the course, student could take post-test exam in each chapter of the course. If the exam result is more than 60%, students will receive the score based on the course. This is a part of strategy to encourage students to have more involvement on studying online courses in the system by creating competitive environment with score on the leaderboard system.

The system has 3 types of users. The first is “user” role, this type of user can enroll and access the courses in the website for study, learn and take post-test exam to gain the scores, beside user role can create their own course, but it needs admin of the system approving their course before their can publish. The second is “contributor” role, user who has approved courses explicitly from other users, admin can nominate them to contributor role. The contributor role can create and publish their course without approving process from the admin of the system. The third is “admin” role, this type of user has every permission that user and contributor had, moreover admin has special console called “admin console” for using to manage every aspect about course administration and user management.

The website open for everyone can contribute knowledge to online society by creating the online courses with multimedia content that divided into chapter and each chapter has post-test exam. Students can enroll and study courses, after students took the exam in the chapter and passed

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60%, student will get the score that set by course creator based on difficulty of the course. The score from all courses that user gained will show on the profile. Leaderboard system will show top 10 users who has the highest scores in the website. From this strategy will build competitive environment to encourage student to have more involvement on study online courses.

5.2 Benefit from Project Development

Benefit which developer received from implementation of development “Web-Based Community System for Online Learning” are:

1. Developer has more understanding in web development and database design for the system run on cloud environment.
2. Understand process of the website development, software engineering and cloud architecture more clearly.
3. Study about Model View Controller (MVC) concept and applied with the system by using modern framework.
4. Study and understand about system integration concept of website and web application on cloud platform.
5. Study on high availability and scalability of the system on cloud with Autoscaling technique.
6. As a part of the society, we realize the situation of education issue in Thailand and we want to do something that we can do by applying the knowledge to make the positive change and different to Thailand.

5.3 Benefit for students and society

Benefit that students and volunteers received from using “Web-Based Community System for Online Learning” are:

1. Students can use Web-Based Community System for Online Learning as an alternative channel for learning beyond classroom and self-learning through Internet, the modern and popular communication network today.
2. This project can help students and their parents reduce unnecessary tutorial cost from tutor academy.

3. Students can study online course in form of multimedia content. After finished course, student could take exam like post-test for each chapter in the course with variety type of the exam.
4. Students will have motivation to get more involvement to learn online courses by using competitive environment from score on leaderboard system.

5.4 Guideline of future development

“Web-Based Community System for Online Learning” focuses on develop the web-based system that opens for everyone who can access to learn and study online courses. The system runs on cloud platform for deliver scalability and availability services to the users. Scope of this project was created website to encourage people who has expertise in each disciplines to contribute the great things like sharing their knowledge by create online courses that relate to 8 learning group to the society.

In the future development, developer can integrate social network, as a part of the channel to promote and connect the system and social media, popular communication and community on the Internet today. The integration can help to make the system viral and quickly spread on the Internet and increase number of the users and contributors to the system. This strategy can create sustainable community and ecosystem of digital knowledge society by building strong user based to the system and adopt the system to student’s daily life.

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Available : http://www.tutorialspoint.com/html5/html5_tutorial.pdf. 2014
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Available : http://www.tutorialspoint.com/javascript/javascript_tutorial.pdf. 2014
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Available : <http://thaipublica.org/2013/03/tutorial-critical-study-of-thailand/>

APPENDIX



APPENDIX A

Microsoft Azure Availability with Autoscaling Technique

Autoscaling is the function of Microsoft Azure that give availability and Scalability to cloud application and cloud website. With Autoscaling, developer and administrator of the system can configure the system performance scaling to automatic mode that control by Azure Autoscaling module. This feature allow developer and administrator can configure scale behavior by set value and scaling metrics into Azure Autoscaling console. The automatic scaling mechanism monitoring system performance information from system usage real time. If system usage of Cloud Services that developer or Administrator set, the system will automatic scale processing performance from normal stage to peak load stage by turn-on others instances (Virtual Machine) to work together with main instances. The limit of scaling up power is up to number and performance of the virtual machines that you provide to availability set of the system. Traffic of users request will distribute to each virtual machines by consider to load of the virtual machine at this time. Load balancing of Azure will control and balance traffics that distribute to each virtual machines.

How to configure Availability of Microsoft Cloud Services platform

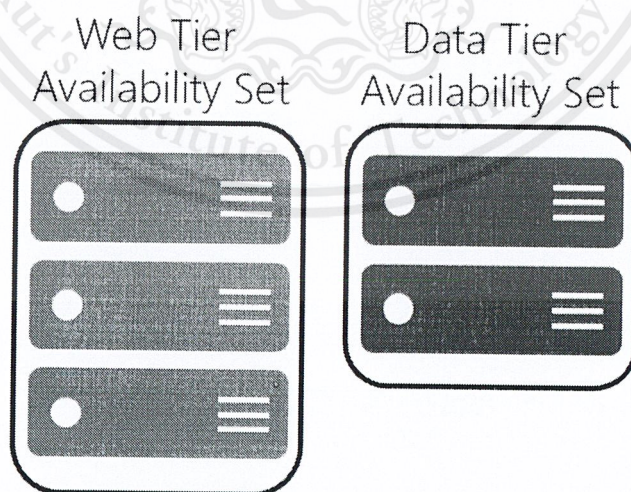


Figure A-1 Availability Set of Microsoft Azure Cloud Services

A1: First, administrators need to create virtual machines more than 1 machines and all virtual machines has same OS and web tier environment.

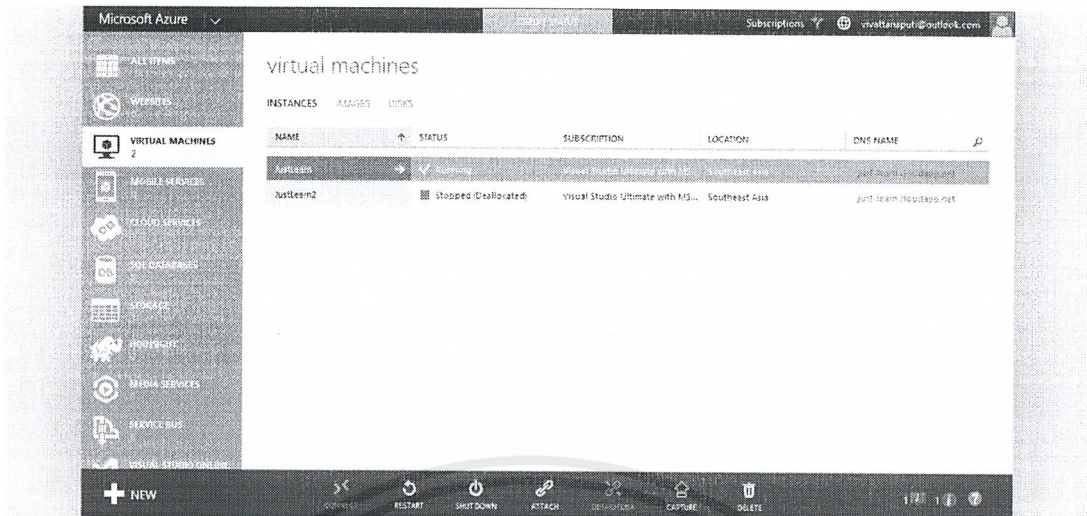


Figure A-2 Virtual Machine page

A2: Click to each virtual machine to open setting, and then open configure menu and create availability set at the first time, next do this process to all virtual machines that you plan to implement into availability set of your cloud services.

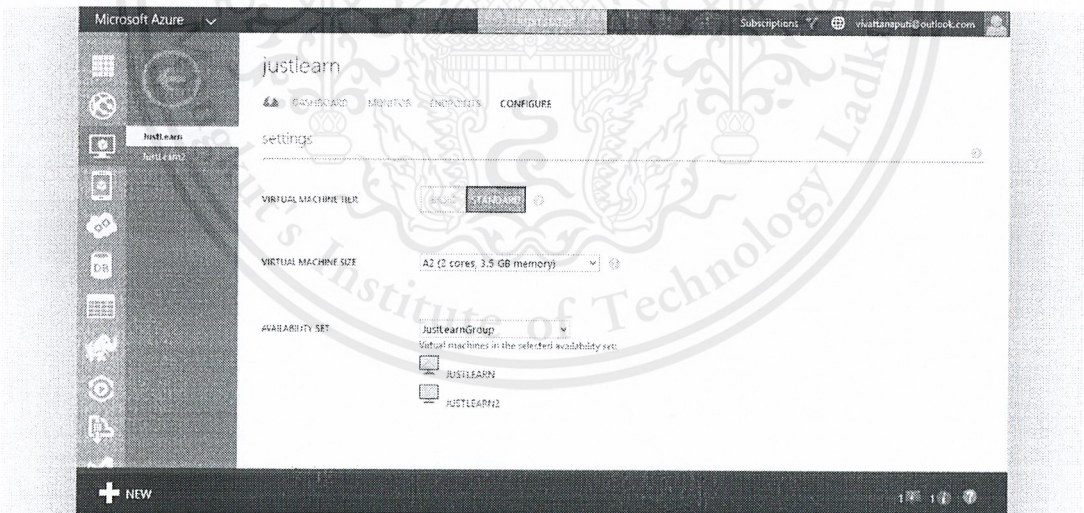


Figure A-3 Set Availability set in VM setting

A3: Back to Cloud Services category open your cloud services that you want to configure availability.

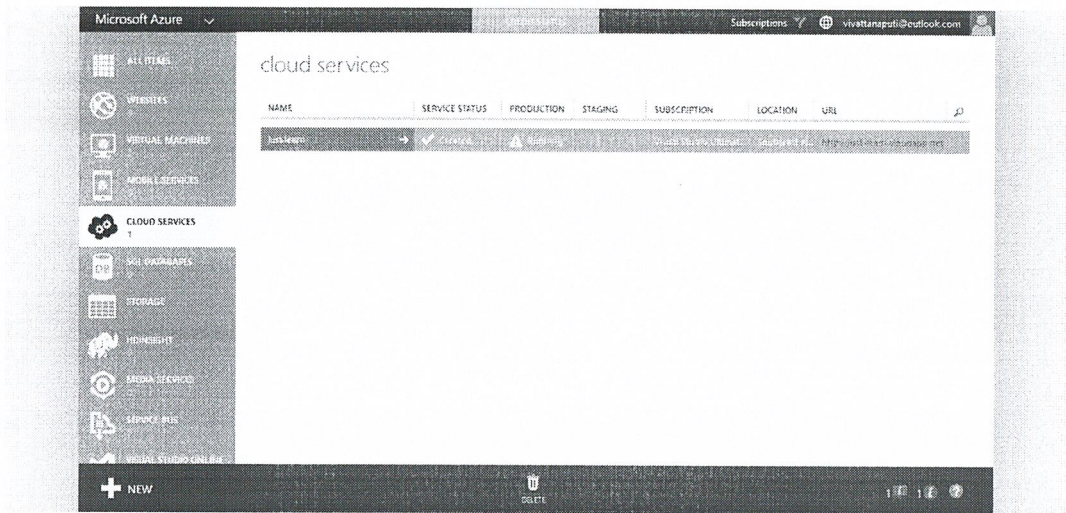


Figure A-4 Cloud Services page

A4: Go to SCALE menu in Cloud Services console and choose list of availability set to match with Cloud Services.

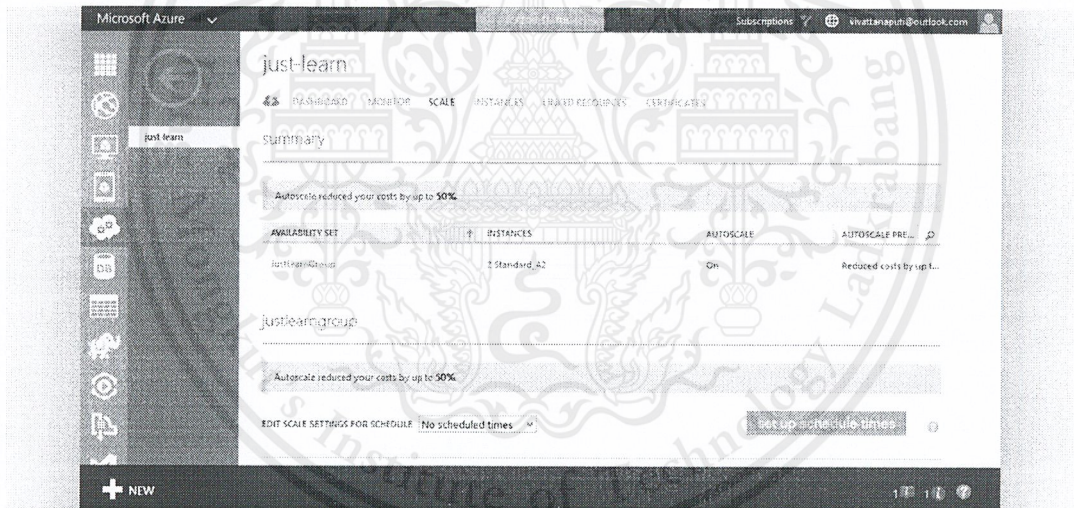


Figure A-5 SCALE menu in Cloud Service setting

A5: Set up your scale metrics included:

- Which type of Scale Metric
- Instances range (Set the minimum and maximum role instance count for scaling. Windows Azure will never go above or below these limits.)
- Target CPU range (This range represents average CPU usage for the entire role. Windows Azure will add or remove virtual machines to keep you in this range.)
- Scale Up and Scale Down (set to automatic)

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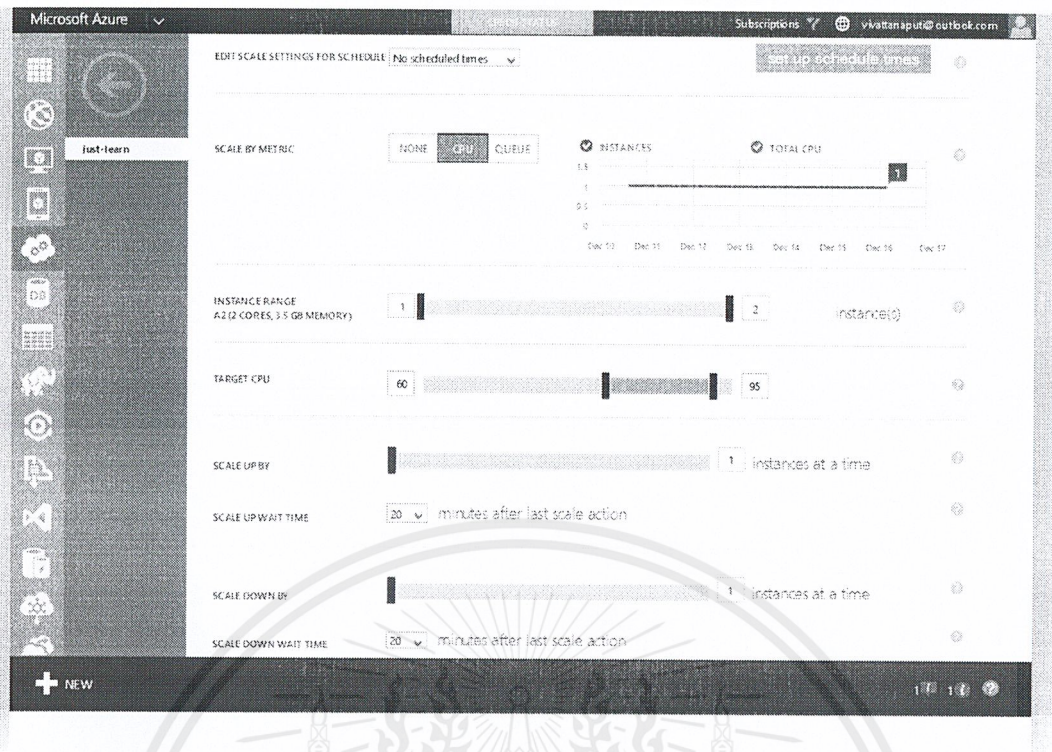


Figure A-6 SCALE configure in Cloud Services setting

A7: Visit Cloud Services Dashboard to see what going on with Availability and Scalability setting. You also see the system performance, information and usage from this dashboard.

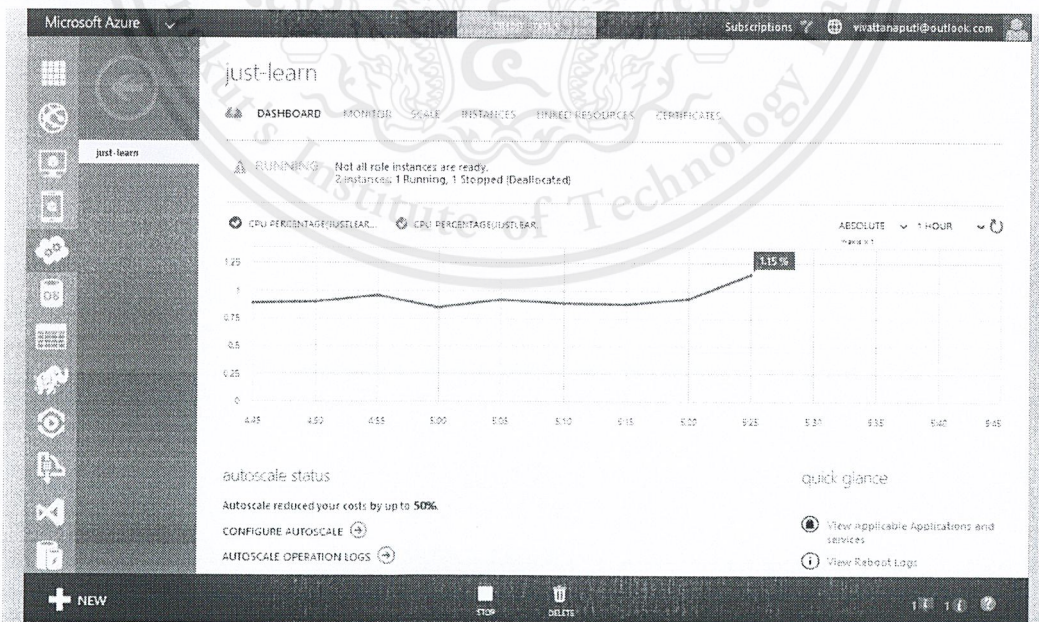


Figure A-7 Cloud Services Dashboard

APPENDIX B

Education Situation in Thailand represent by Infographic and Chart

News from Thairath show the result of the statistic of Ministry of Education, Thailand about Thailand will facing insufficient educator for 10 years from present. Cause of this situation began from the huge number of educators and teachers in Thailand education system will retire, more than 200,000 position.

The number of educator retire from education system has more than number of new educator enter to the system, main purpose from salary of educator in Thailand has the big gap between educator who has strong experiences and new educator. The minimum salary for educator in Thailand is lower than other career.

This is a factor that has impact to educators who has very strong experiences jump out from normal education system and open tutor academy that make more income. Today Thailand has tutor academy spread in each areas of Thailand.

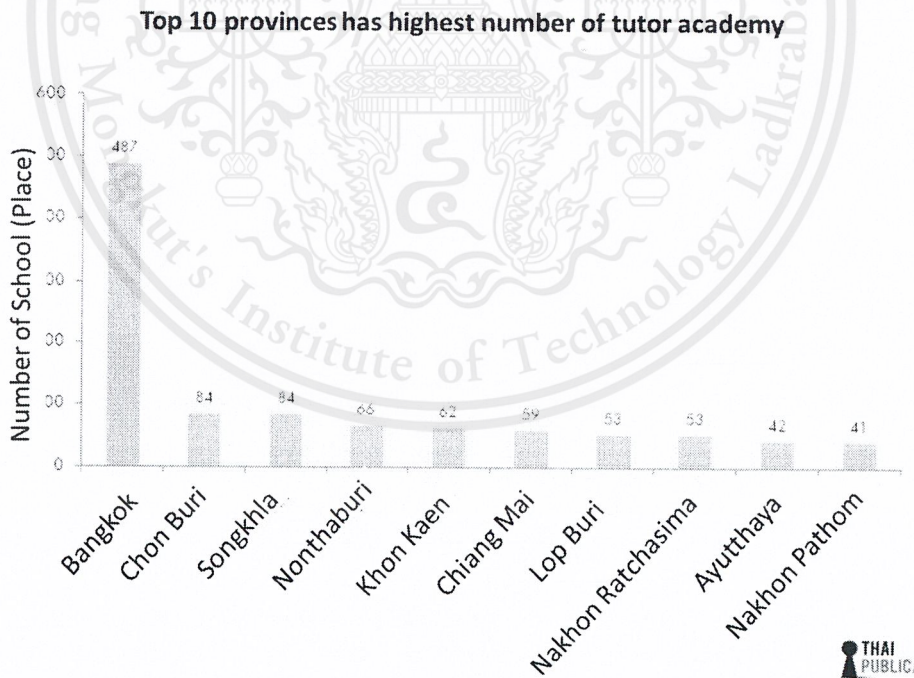


Figure B-1 Top 10 provinces has highest number of tutor academy

Number of Tutor Academy
In Bangkok

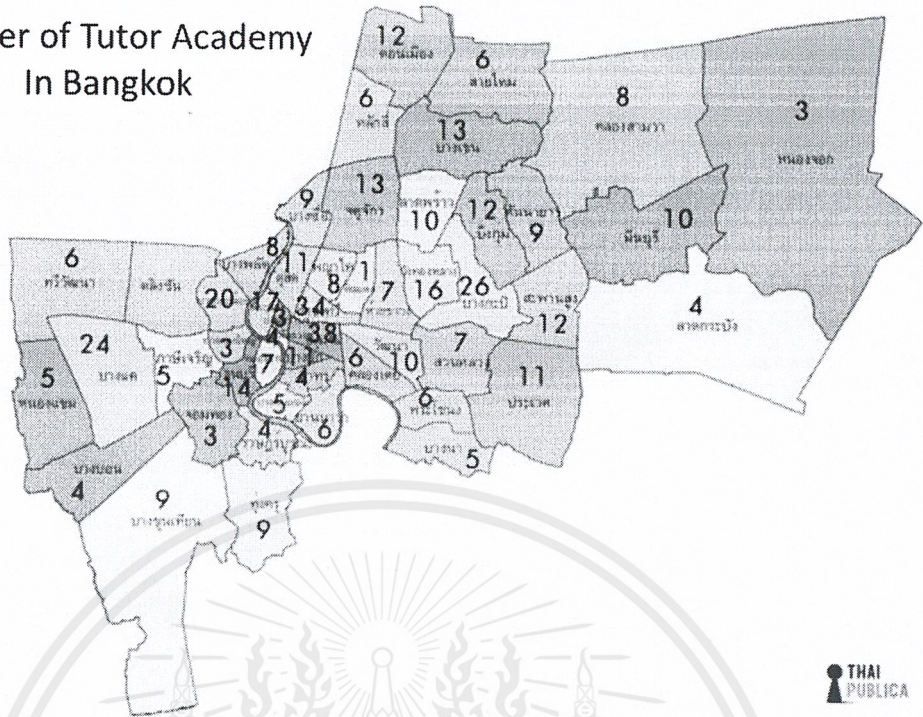


Figure B-2 Number of Tutor Academy in Bangkok

Number of Tutor Academy
In Northern and Southern



Figure B-3 Number of Tutor Academy in Northern and Southern

Number of Tutor Academy In Northeast

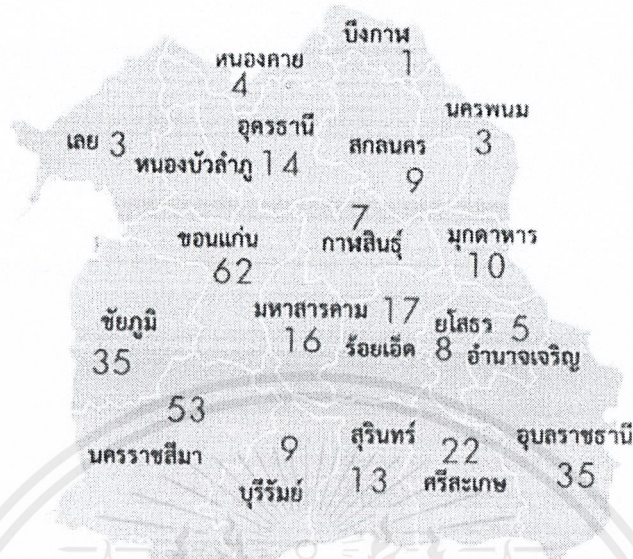


Figure B-4 Number of Tutor Academy in Northeast

Number of Tutor Academy in central area



Figure B-5 Number of Tutor Academy in central area

APPENDIX C

Install Manual

1. Update system file to up-to-date version by “sudo apt-get dist-upgrade”
2. Update Package Index “sudo apt-get update”
3. Install Apache “sudo apt-get install apache2”
4. Go to “/etc/apache2/sites-available”, and create “just-learn.conf”, and then add configure setting below.

```
<VirtualHost *:80>
  ServerAdmin <Admin email address>
  DocumentRoot /home/<username>/public_html
  <Directory /home/<username>/public_html>
    Options Indexes FollowSymLinks
    AllowOverride All
    Require all granted
  </Directory>

  ErrorLog ${APACHE_LOG_DIR}/error-
justlearn.log
  CustomLog ${APACHE_LOG_DIR}/access-
justlearn.log combined
</VirtualHost>
```

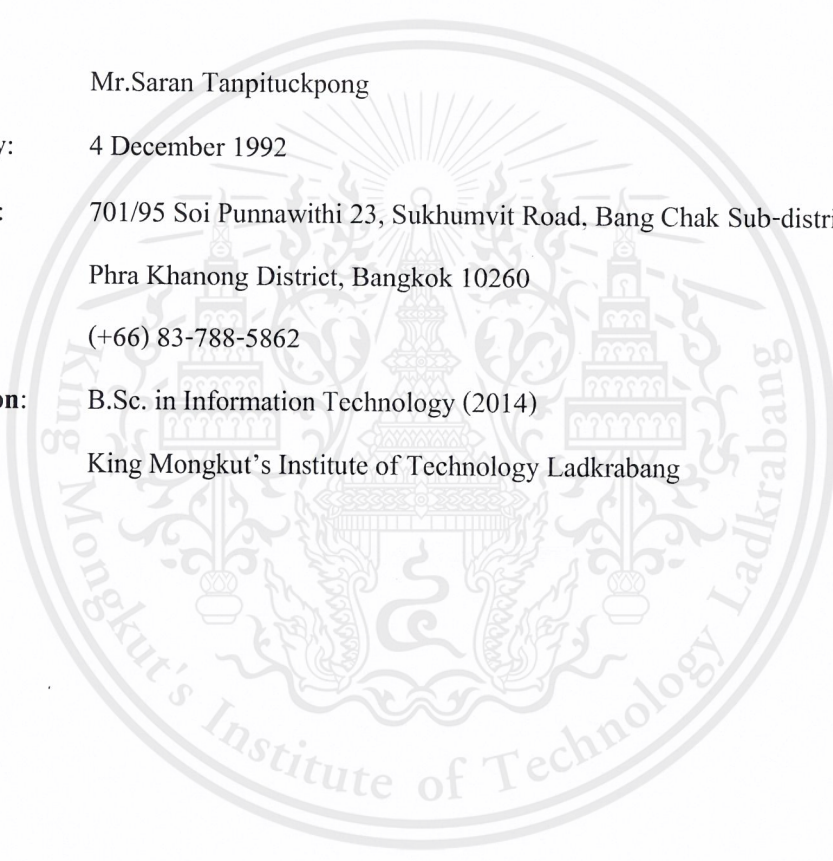
Figure C-1 just-learn.conf

5. Open “just-learn.conf sudo a2ensite just-learn”
6. Create “fqdn.conf” in “/etc/apache2/conf-available”, and set “ServerName just-learn.cloudapp.net “
7. Open “fqdn.conf sudo a2enconf fqdn”
8. Install PHP and essential PHP extension by “sudo apt-get install php5 sudo apt-get install php5-mcrypt sudo apt-get install php5-json”
9. Install MySQL and open the program by “sudo apt-get install mysql-server sudo apt-get install php5-mysql sudo service mysql start”

BIOGRAPHY

Name: Mr.Thanachart Vivattanaputi
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Phone: (+66) 83-788-5862
Education: B.Sc. in Information Technology (2014)
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The background of the second biography section features a large, faint watermark of the King Mongkut's Institute of Technology Ladkrabang logo. The logo is circular and contains a central emblem with a sunburst at the top, flanked by two traditional Thai structures. The text 'King Mongkut's Institute of Technology Ladkrabang' is written around the perimeter of the circle.

WEB-BASED COMMUNITY SYSTEM FOR ONLINE LEARNING

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ABSTRACT

Today technology has more developed than former and it's become important thing to student learning, because of the world changing dynamically. Educators in Thailand was facing insufficient staff issue and lacking of expertise in each discipline that their teaching. Its affect students need to find the way to learn beyond classroom by take extra tutorial class with the tutor academy. If students had a channel to access online course that provide and develop from volunteers who has expertise in each discipline, it will be a good choice for students in 21st century of the education. Therefore, now students are able to seek new knowledge by integrating technology as part of the learning channel.

"Web-Based Community System for Online Learning" will take a role as a part of learning channel for the students. Students can access to learn and study online courses that develop from a group of people who want to share their knowledge. The online course and learning material are in a form of lesson, video and quiz. The volunteers who has expertise in each disciplines can use this channel to sharing their knowledge to the students through Internet, the popular channel for students today, including learn beyond classroom will encourage, assist and support students to develop their sustainable learning in the future.

Index Terms - Web; Online Learning; Exam; Self-Learning; Cloud Services

1. PROJECT BACKGROUND

Nowadays, students has more channels to learn because the advancement of modern technology is higher than in the past. From rapidly changing of the environment, technology has become an important role to daily life and make the world become more competitive in businesses, including working life and education as well. Educators in Thailand has been facing insufficient staff issue and lacking of expertise in each discipline of their teaching. Students are starting to find the channels to learn beyond classroom. They use the Internet to find the information, literatures and knowledge. The majority of students in Thailand decided to choose extra tutorial class with the tutor academy as an alternative channel to learn beyond classroom and make extra cost to their parents. In addition, a great deal of educational content and useful knowledge are on the Internet, but these are spreading on the Internet disorderly. This issue make it more difficult to students

who want to find the alternative way for learning beyond classroom and volunteers with whoever has passion to create and share free online courses and educational contents.

2. DEVELOPMENT TECHNOLOGY

2.1. Microsoft Azure Cloud Services

Microsoft Azure is a cloud platform from Microsoft that provides a wide range of different services. Microsoft Azure lets you build, deploy, and manage solutions for almost any purpose you can imagine. In other words, Microsoft Azure is a world of unlimited possibilities. Whether you're a large enterprise spanning several continents that needs to run server workloads, or a small business that wants a website that has a global presence, Microsoft Azure can provide a platform for building applications that can leverage the cloud to meet the needs of your business [3].

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2.2. PHP

PHP is a server-side scripting language designed specifically for the Web. Within an HTML page, developer can embed PHP code that will be executed each time the page is visited. PHP code is interpreted at the web server and generates HTML or other output that the visitor will see on client [5].

2.3. HTML 5

HTML (Hypertext Markup Language) is the markup language for create and develop web page [6]. Syntax and structure of HTML is write in the form of HTML elements consisting of tags enclosed in angle brackets (< >) that can render into web page by web browser.

2.4. JavaScript

JavaScript is a client-side scripting language run on client web browser to interact, control and manage web browser and content that display on the web page [7]. From the structure and features of JavaScript, it can modify output of the original HTML into interactive website, verify input format from users and create cookie to collect user information.

2.5. CSS 3

CSS 3 (Cascading Style Sheets 3) is a style sheet language used for describing the look and formatting of a document written in a markup language [8]. The main value and attribute that use for control your website look and design of the color, font, pattern, format, size, style etc.

2.6. MySQL

MySQL is most popular Open Source SQL database management system that developed by Oracle. MySQL is relational database that stores data in separate tables. Each table has 1 or more unique value attribute called "primary key" and the attribute use for link between table call "foreign key". The logical model of MySQL, with objects such as databases, tables, views, rows, and columns, offers a flexible programming environment to access data in the

database by using "Structured Query Language". SQL is the most common standardized language used to access databases.

2.7. phpMyAdmin

phpMyAdmin is a free software tool written in PHP, intended to handle the administration of MySQL over the Web. This tools provide easily accessing and managing data in MySQL database via portal with user interface on the website. Developer and system administrator can perform operation direct to database via user interface in website.

2.8. Laravel

Laravel is an open source PHP web application framework, designed for the development of model-view-controller (MVC) web applications. Laravel is released under the MIT license. Laravel handles everything from web serving to database management right down to HTML generation. A vertically integrated web development environment can provide superior experiences and easy for developer.

2.9. BitBucket

BitBucket is web-based hosting service for code revision control. BitBucket is free and give unlimited private repositories for up to 5 developers to collaborating work with teams with flexibility to grow and code without restrictions. Main purpose of BitBucket is designed for management of changes to document, information, computer program, and website. For code and website, changes are usually identified by timestamp that person make a change to the file. Revisions can be compared, restored and merged.

2.10. jQuery

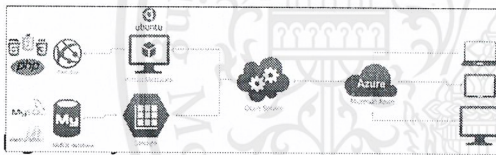
jQuery is a cross-platform JavaScript library designed to simplify the client-side scripting of HTML. Syntax of jQuery designed for assist developer to navigate, create, select and handle document, DOM, animation,

events and develop Ajax application easier. Developer can create low-level interaction and animation, advanced effects and high-level, theme-able widgets and dynamic website.

3. PROJECT DESIGN AND DEVELOPMENT

3.1. Architecture Overview

Web-based community system running on Cloud Services in Microsoft Azure cloud platform. Cloud Services provided 2 parts of the system, first is web role and second is worker role. Web role is a front-end of the system feature apache web server on Ubuntu Server for hosting website of the system, MySQL database with phpMyAdmin for store data and information. Worker is a back-end of the system that provides infrastructure such as virtual machine, cloud storage and load balancing to the system.



3.2. Use Case Diagram

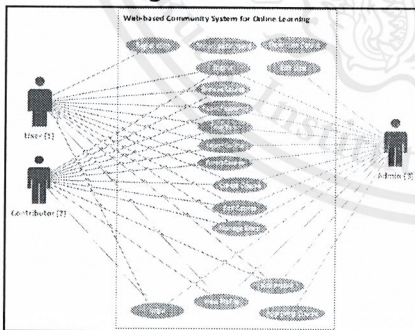


Figure 2. Use Case Diagram

3.3. Database Design

Table 1. Data Dictionary

Table Name	Description
USER	Table for store important data of user (username, password, type, etc.)

Table Name	Description
USER_DETAIL	Table for store description of user data
TYPE_LIST	Table for store type and class of user
SUBJECT_LIST	Table for store list of subject
CLASS_LIST	Table for store list of class
COURSE_LIST	Table for store description data of course
CONTENT_TYPE_LIST	Table for store list of content type
CONTENT	Table for store contents of course
EXAM	Table for store exam for each course
CHOICE	Table for store choice of each exam
ANSWER	Table for store answer of each exam
EXAM_TYPE_LIST	Table for store type of exam
LEARNED	Table for store course and score from the exam that user taken
PASSWORD_RESET	Table for store temporary credential data require to reset password

3.4. Infrastructure Design

The logical infrastructure of the system run on Cloud Services of Microsoft Azure Cloud Platform. Cloud Services with worker role provides high availability to the system by configure and implement multiple virtual machines in an Availability Set for redundancy. Auto scaling module combine with load balancer inside Cloud Service designed to manage and control virtual machine performance and availability by automatic turn on or turn off instances and distributes traffic between multiple virtual machines.

Infrastructure of the system has 2 identity virtual machines that run website role environment and both of virtual machines connect with the single storage.

In the peak-load period that CPU usage more than 60%, the system automatic scaling performance of 1 instance with 2 core processors and 3.5 GB of ram up to 2 identity instances, with same performance in A2 plan. After CPU usage less than 60%, the system automatic scaling 2 instances down to only 1 instance. Autoscaling module in Cloud Services is the controller of this mechanism and this module also control load balancer for distributes traffic of the system.

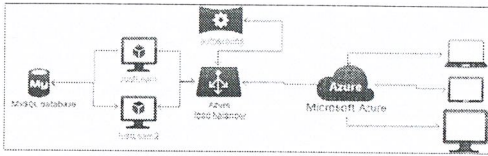


Figure 3. Infrastructure Diagram with worker role

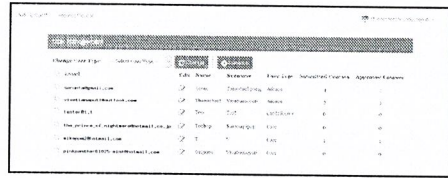


Figure 8. User Management Page

4. RESULT OF THE PROJECT

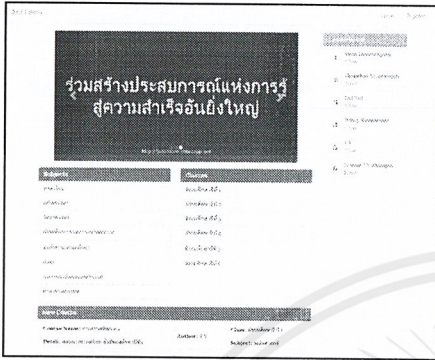


Figure 4. Home Page

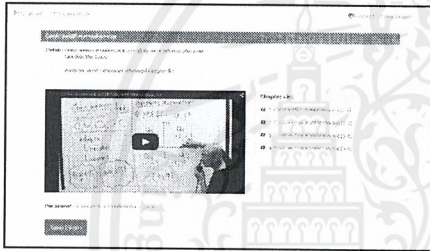


Figure 5. Learn Course Page

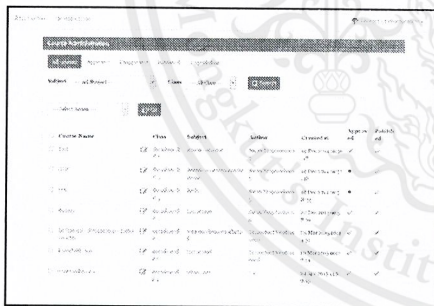


Figure 6. Course Administration Page

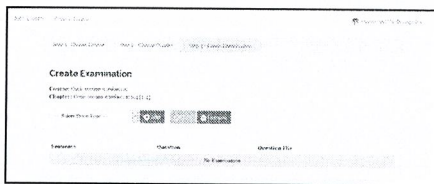


Figure 7. Examination Management Page

5. CONCLUSION

“Web-Based Community System for Online Learning” is a website that designed for students can access to study and learn online courses in 8 learning groups included Thai Language, Mathematics, Science, Social-Study Religion and Culture, Health and Physical Education, Arts, Career and Technology and Foreign Language for Mattayom. All online courses in these website are create from volunteers that has expertise in each disciplines. Student can enroll courses that their interest on the system to study and learn online course in form of multimedia content such as YouTube, video and voice file. After finished the course, student can take post-test exam in each chapter of the course, if the exam result more than 60%, student will receive the score based on the course. This is a part of strategy to encourage student to have more involvement on studying online courses in the system by creating competitive environment with score on the leaderboard system.

The system has 3 types of users. First “user” role, this type of user can enroll and access the courses in the website for study, learn and take post-test exam to gain the scores, beside user role can create their own course, but need admin of the system approving their course before their can publish. Second “contributor” role, user who has approved courses explicitly from other users, admin can nominate them to contributor role. The contributor role can create and publish their course without approving process from the admin of the system. Third is “admin” role, this type of user has every permission that user and contributor had, moreover admin has special console called “admin console” for using to manage every aspect about course administration and user management.

The website open for everyone can contribute knowledge to online society by creating the online courses with multimedia content divided into chapters and each chapter has post-test exam. Student can enroll and study courses, after student took the exam in the chapter and passed 60%, student will get the score that set by course creator based on difficulty of the course. The score from all courses that user gained will show on the profile. Leaderboard system will show top 10 users who has highest score in the website. From this strategy will build competitive environment to encourage student to have more involvement on study online courses.

6. GUIDELINE FOR FUTURE DEVELOPMENT

“Web-Based Community System for Online Learning” focused on develop the web-based system that open for everyone can access to learn and study online courses, the system running on cloud platform for deliver scalability and availability services to the users.

Scope of this project are create website to encourage people who has expertise in each disciplines to contribute the great things like sharing their knowledge by create online courses that relate to 8 learning group to the society.

In the future development, developer can integrate social network, as a part of the channel to promote and connect the system and social media, popular communication and community on the Internet today. The integration can help to make the system viral and quickly spread on the Internet and increase number of the users and contributors to the system. This strategy can create sustainable community and ecosystem of digital knowledge society by building strong user based to the system and adopt the system to student's daily life.

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