CHAPTER II

LITERATURE REVIEW

FTU Massive Open Online Course Project (FTU MOOC) System is a kind of web application. To develop the FTU MOOC, the project developers have studied some of the documents and related project as following:

● Definition of MOOC
● Object-Oriented
● Information of software/hardware used in development of
● Related work

2.1   DEFINITION

2.1.1   E-Learning

E-learning contains many similar words, such as distance education, computer-based training, and online learning. Thus, the definition of e-learning is an educational system based on formal teaching but with the help of electronic resources. E-learning can also be described as a transfer of skills and knowledge enabled by the network, and education is delivered to a large number of beneficiaries at the same time or at different times. However, e-learning learners can study the content online or from a CD, and most importantly, e-learning content can be presented through multimedia technology and interactive technology. (Bennett,2020)

Finally, the flow of e-learning has evolved into the open era. To support the access of many learners through the Internet and communication. The current interest stream is MOOC or (open online course). This is the development of an online course focusing on "open systems".

2.1.2   MOOC

MOOCs stand for Massive Open Online Course which means is an online course aimed at large-scale interactive participation and open access via the web. In addition to traditional course materials such as videos, readings, and problem sets, MOOCs provide interactive user forums that help build a community for the students, professors, and

teaching assistants (TAs). MOOCs are a recent development in distance education. (Sergio Luján Mora, 2013)

However, it is not entirely clear when a course is or is not a MOOC, but there are a number of features that are typically required for a course to be considered a MOOC:

• **Massive:** It should allow access to a very large number of students, and the course should be prepared to accept changes in the number of students in several orders of magnitude, for example, going from 1,000 to 100,000 students, without a major problem for operation.

• **Open:** No charge anyone can register.

• **Online:** Online lessons, this feature is essential for anyone from anywhere in the world with an Internet connection can participate in these courses.

• **Course:** It can be taught at any time.

 Moreover, Massive Open Online Courses are free. Anyone who has the Internet can have the freedom to choose to study in their own interests; choose a method, Choose the suitable time. And if you join the event or tested in each course, there is also an opportunity to receive certificate after completing a course or to transfer a course in some courses. (Ary Aranguiz ,2013)

2.1.3   Computer Network

Nowadays, type of communication that is Internet for the development of higher education system in many countries has been used in the development of education system in the university to learn through the network (Net) without charge. There are More than one million people worldwide have enrolled that called a Massive open online course, or MOOCs. And it's been praised The University has a reputation for teaching and learning to many students who has a hopeless for access to learning resources. In general, online classrooms are one way to promote the quality and productivity of teaching and learning as well as classroom learning.

William Bennett said: It felt like an Athens-like renaissance, "said John Hennessy, president of Stanford University." It was like a tsunami. (A tsunami coming 2553)

2.2 OBJECT-ORIENTED

Object oriented is a computer science concept that has been widely implemented, specifically in programming languages and applications/software. The object-oriented technique is different from conventional programming, which focuses on functions/behaviors, while object-oriented works on the interactions of one or more objects (Techopedia,2017).

Object-oriented features include the following:

- Encapsulation: This makes the program structure easier to manage because each object's implementation and state are hidden behind well-defined boundaries.
- Polymorphism: This means abstract entities are implemented in multiple ways.
- Inheritance: This refers to the hierarchical arrangement of implementation fragments

Object-oriented refers to a programming language, system or software methodology that is built on the concepts of logical objects. It works through the creation, utilization and manipulation of reusable objects to perform a specific task, process or objective.

2.2.1 OOP (Object-oriented Programming)

Object-oriented programming (OOP) is a software programming model constructed around objects. An Object may contain data (fields or variables) or code (methods or procedures). The creation of these objects is based on a programmer-defined blue-print also known as a Class.(edpresso,2020)

2.2.2 OOD (Object-oriented Design)

Object Oriented Development (OOD) has been touted as the next great advance in software engineering. It promises to reduce development time, reduce the time and resources required to maintain existing applications, increase code reuse, and provide a competitive advantage to organizations that use it. While the potential benefits

and advantages of OOD are real, excessive hype has led to unrealistic expectations among executives and managers. Even software developers often miss the subtle but profound differences between OOD and classic software development (Adhikari, 1995; Taylor, 1995).

The OOD process takes the conceptual systems model, use cases, system relational model, user interface (UI) and other analysis data as input from the OOA phase. This is used in OOD to identify, define and design systems classes and objects, as well as their relationship, interface and implementation.

2.3 TECHNOLOGY TOOLS

2.3.1 WAMP

WAMP (Windows, Apache2, MySQL and PHP) is an alternative to LAMP (Linux, Apache2, MySQL and PHP), the opensource stack that allows webmasters to create dynamic and powerful websites. LAMP powers majority of the websites and blogs online today.

Figure 2.1: XAMPP software logo

In this project, developer will use Xampp is software for simulating personal computer that work in the manner of Webserver, that is computer will be both the mother machine and the machine in the same machine. It's No need to connect to the Internet, you can test the site you create anytime anywhere. Nowadays, it's the popular among CMS users to create websites. The example software in figure 2.1

2.3.2 MVC Architecture Pattern

MVC is an architectural pattern in programming that isolates business logic from the UI, allowing one to be modified separately from the other (also known as separation of concerns). With MVC, Model refers to data, View refers to the presentation layer, and

Controller to the application or business logic. Basically, MVC breaks up the development process of an application, so you can work on individual elements while others are unaffected. Essentially, this makes coding in PHP faster and less complicated. (Techopedia,2017).

MVC or Model-View-Controller there are many frameworks for creating Web. But almost all are structured MVC. it separates the application into 3 main parts, known as the model (data), the view (user interface), and the controller (processes that handle input).(TechTerms,2020)
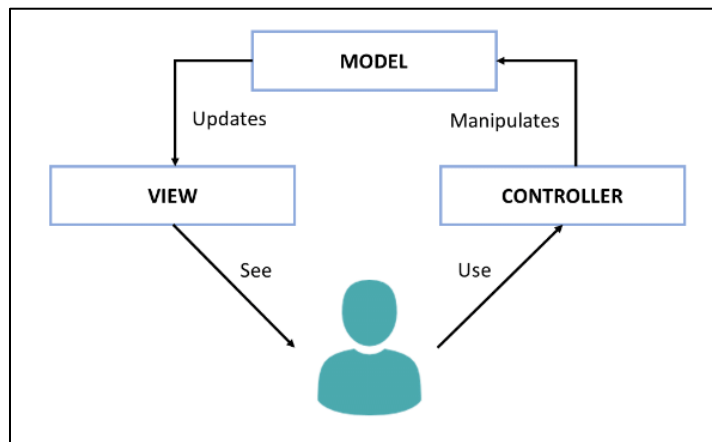

Figure 2.2: MVC Architecture Pattern.

❖ Controller- The interface between the user and the program. To contact with Database with Model and Data View through View. The main part of the program.

❖ Model- is data used by a program. This may be a database, file, or a simple object, the developer does not have to deal with the SQL command. It is a data validation task that Effect with database. Handles validation (Check the accuracy), association (database relationship), transactions, and more.

❖ View-Required to display through web browser. Write with the basics of HTML. Insert with PHP script. Working relationship with the controller. View is a logical

representation or how to provide information from the Controller class is displayed. The example architecture pattern in figure 2.2.

2.3.3 PHP Frameworks

PHP frameworks streamline the development of web applications written in PHP by providing a basic structure for which to build the web applications. In other words, PHP frameworks help to promote rapid application development (RAD), which saves you time, helps build more stable applications, and reduces the amount of repetitive coding for developers. Frameworks can also help beginners to build more stable apps by ensuring proper database interaction and coding on the presentation layer. This allows you to spend more time creating the actual web application, instead of spending time writing repetitive code. (Techopedia,2017).

Figure 2.3: Laravel Framework logo.

The framework use in this project is Laravel. Laravel is a comprehensive framework designed for rapidly building applications using the MVC architecture. Laravel is currently the most popular PHP framework, with a huge community of developers. Laravel has its own advantages both for the developer as well. So Laravel The framework use in this project is Laravel. Laravel is an MVC based framework of PHP, it is a new generation web framework. Web frameworks make it easier to develop applications. Major applications and web sites generally use a common set of functionalities and a framework is something that prevents developer from rewriting the code each time when developer create a website or web application. It gives developer tailor made modules to incorporate within the application. The example software in figure 2.3.

Laravel Framework is one of the best is best PHP framework to develop any kind of web application as MVC (Model Views Controller). Laravel Framework is easy to solve or modify codding MOOC.

2.3.4 Frontend Framework

A front-end framework is essentially a bundle of JavaScript code that someone else has written which you can include in your application to help you build it faster. It's somewhat analogous to the framework for a house—which might include instructions on how to build windows, doors, or certain rooms. The house's developer can then decide how to take the rules the framework gave them and build the house in the manner they desire. (Nikk Wong,2017)

Figure 2.4: Bootstrap framework logo.

Bootstrap is one of framework that used to design in this project. Bootstrap is a front-end framework with a focus on providing tools for faster front-end development. Bootstrap quickly became famous in the last few years, and now it is being used in many major projects. On Live coding, we have tons of videos for you to check out on Bootstrap! They range from beginner to expert level, and always have something to show new to show. The example software in figure 2.4.

2.3.5 Dependency Management

Dependency manager is used for managing projects and saving changes that developer makes in project. With Composer you can easily include another package (some code from another person that can be useful in your project). Also, you have a package manager, which is used for setting up system. (Ante Domjanović,2016)

Figure 2.5: Composer logo.

Composer is a tool of PHP package manager that use in this project. Composer allows declaring the libraries the project depends on and it will manage install and

update to MOOC project. Composer will manage the dependencies developers require

on a project by project basis. This means that Composer will pull in all the required libraries, dependencies and manage them all in one place. The example software in figure 2.5.

2.3.6   Version control

Version control systems are software that help developer track changes make in code over time. As edit to code, you tell the version control system to take a snapshot

of your files. The version control system saves that snapshot permanently so you can

recall it later if you need it. Without version control, you're tempted to keep multiple copies of code on your computer. This is dangerous-it's easy to change or delete a file in the wrong copy of code, potentially losing work. Version control systems solve this problem by managing all versions of your code but presenting you with a single version at a time (Robert Outlaw,2017).

Figure 2.6: Git logo.

Version control use in this project is Git. Git is the most commonly used version control

system today and is quickly becoming the standard for version control. Git is a distributed

version control system, meaning your local copy of code is a complete version control

repository. These fully-functional local repositories make it is easy to work offline or remotely. You commit your work locally, and then sync your copy of the repository with the copy on the server. This paradigm differs from centralized version control where clients must synchronize code with a server before creating new versions of code (Kayla Ngan,2018).

Git has the functionality, performance, security and flexibility that most teams and individual developers need. These attributes of Git are detailed above. In side-byside comparisons with most other alternatives, many teams find that Git is very favorable. The example software in figure 2.6.

2.4 RELATED WORK
There are several paper researches which related with massive open online course online (MOOC) such as below;

2.4.1 Thai Higher Education
Study the form of the huge open online course for Thai higher education. This research was to study the best practice of the MOOC model from famous foreign platforms, to study the opinion of Thai higher education on the MOOC model and to synthesize the practice of the appropriate MOOC model for Thai higher education. The sample for this research was national MOOC providers and institutional MOOC providers, and 18 research documents included the MOOC model chosen by purposeful sampling. An expert in MOOC management in higher education who possesses knowledge or experience in the field for a period of no less than 5 years who are chosen by means of purposeful sampling. The Brilliant who were the Higher Education Commission that provided distance learning education or online education and had experience in developing a massive open online course (MOOC).

The search tools were a foreign MOOC document tuning template.

Then analyze and synthesize opinion form about MOOC for Thai higher education. Next, support the coordination of the Thai higher education MOOC management model, keyword content analysis and keyword duplication.

The results of this research were as follows: 1. The foreign MOOC management model had 7 main components: management, order, service, teaching, planning, design, implementation, learning assessment and curriculum evaluation including 22 subcomponents. 2. The opinion on MOOC for Higher Education had 5 main components: Management, Curriculum Design, Curriculum Development and Curriculum Evaluation including 24 sub-components with stars emphasizing the model according to the opinion of the Higher Education Expert. (Natapattara and Thapanee, 2014)

Design a mixed training model with MOOC teaching style to develop information, media, and technical skills for undergraduates. This study aims to design a training model mixed with teaching style in MOOC to develop information, media and technical skills among university students and assess the suitability of the training model mixed with the teaching method in MOOC to develop information, media and technology skills among university students. Samples are five specialists chosen by purposeful sampling and the statistics used in this research are average and standard deviation.

The results of the research indicate that the model of training integrated with the method of teaching in MOOC to enhance the information, media and technical skills of undergraduates consists of seven steps: 1) the test of defining general knowledge before starting to study via the online system, 2) students' pre-study guidance in the form of Streaming media over the system via the Internet; this depends on the context of students, 3) Defining study goals and the contents of each course via the online system; This depends on the context of students, 4) Students studying content in the form of media streaming over the system online, 5) Students They exchange the interaction between students and students, Teachers, 6) perform activities in accordance with the tasks assigned, and submit assignments in the classroom and through the system online, and discussed in the classroom, 7) screening process knowledge after training by students required to conduct testing through the system online and an assessment of peer tasks. (Jarumon and Namon, 2015)

MOOC: Free Open Education in the Digital Age. This paper project was associated with free open education in the digital age. Education in the digital age has been moved from traditional classrooms to free open online education for lifelong learning at the speed of individual self. Education in the digital age has been moved from traditional classrooms

to free open online education for lifelong learning at the speed of individual self. Communication is a channel for bringing knowledge to students in the philosophy of education where it is learned. To enhance lifelong learning, open and distance education are principles of educational systems designed to provide opportunities for learners who are unable or unwilling to attend regular classroom and self-study programs through a variety of well-prepared media. Open Learning with MOOC (Massive Open Online Course) is a popular distance education system. (FIBA, 2558)

2.4.2 EDX

edX is an online educational destination and MOOC provider, offering high quality Courses from the world's best universities and institutions for learners everywhere. Students come from every country in the world. There is computer science, languages, engineering, psychology, writing, electronics, biology, or marketing. The mission is to increase access to quality education for all, everywhere. Promote teaching and learning on campus and online, and promote teaching and learning through research.

EDX is founded and continues to be managed by colleges and universities.

Open edX is the open source platform that runs edX courses and is freely available. With Open edX, educators and technologists can create learning tools, contribute new features to the platform, and create innovative solutions that benefit students everywhere.

2.4.3 Coursera

Coursera is an American online learning platform established in 2012 Coursera works with universities and other organizations to offer online courses, majors and degrees in a variety of topics, such as engineering, data science, machine learning, mathematics, business, computer science, digital marketing, humanities, medicine, biology, and social sciences, by Stanford professors Andrew Ng and Daphne Koller offer massive open online courses (MOOC), majors and degrees.

Coursera courses last about four to ten weeks, with one to two hours of video lectures per week. These courses offer short quizzes, weekly exercises, classified assignments, and sometimes a final project or exam. Courses are also provided upon request, in which

case users can spend their time completing the course with all the available materials simultaneously.

2.5 CONCLUSION

MOOCs play an important role in education throughout the world. For example, edX has 10,000,000 students. Other MOOCs such as Coursera, Udacity, Udemy, P2Pu and Khan Academy have also gained popularity. And there are technology tools to use for doing this project. And many theories used to study for more understanding about MOOCs. The discussion making understanding in related project from previous can help us to understand about how to develop and design.