**CHAPTER 2**

**LITERATURE REVIEW**

1. **Web Application**

Web application is a client-server application that uses web browser as its client program, which delivers interactive services through web servers distributed over the internet or intranet (Shklar & Rosen, 2009, p. 11). While a website can only delivers content from static files, a web application can present dynamically tailored content based on request parameters, tracked user behaviors, and security consideration.

In the recent years, web applications have become more popular compared to offline application due to some benefits it offers that fit the current needs of society. According to Fowler and Stanwick (2004), the benefits of creating a web-based application includes:

* Web application can provide rich information resources. On the internet there are many resources and libraries that can be easily included within the application. Help for web application can also be more easily updated and delivered through internet.
* The internet provides a level of collaboration and communication. There are many communication platforms that can be implemented within web application, for example e-mail.
* A very useful hybridization is possible. With the use of internet, the web-application can connect and make use of other already existing application or platform, such as skype and paypal.
* Applications don’t have to be compiled to run. When using Java, Javascript, HTML, or XML, the code doesn’t have to be compiled to see if it works. Developers just need to run it on their browser which is much more efficient.
* Applications delivered through a browser that doesn’t have to be installed on individual computers. To use a web-application, users can just easily open browser, which is certainly available within all computers, and type in the web address.
* Browser-based applications are portable, even mobile. Aside the fact that it can be opened through computers, it can also be opened easily through mobile browser, which means more accessibility for everyone.
* The web is international. Instead of being forced to distribute copies of databases throughout the world and update all each evening, developers only need to maintain a single central database.

However, whilst developing web-application, there are some factors that need to be considered, as stated by Fowler and Stanwick (2004), such as:

* Performance can be slow. Content with large size and checking input immediately may cause major performance hits.
* Browser incompatibilities and extensibility issues may appear. Things won’t act the same on different browser. Developers have to make sure that the web application will still be user-friendly even on different browsers.
* Network failure may be a risk. If the network is incapacitated because of spam attacks, equipments breakdowns, configuration mistakes, or other problems, everyone that uses the application will be directly affected.
* Security is more of a concern. Anytime the server is open to the outside, there is a risk that unauthorized people might get into the system.

These drawbacks can be easily evaded if the design, development and maintenance of the web applications are done properly.

1. **CodeIgniter**

CodeIgniter is a free, lightweight, and simple to install framework that can help the development of php-based website developed by EllisLab. Developing a website using framework, specifically CodeIgniter, will reduce the amount of code that needs to be typed, and makes the script easier to read and update, aside from giving the website a coherent structure (Upton, 2007). Using framework will simplify the coding of repetitive operations, making the website to be more robust. For developing a web-application that has various features, CodeIgniter will come in handy, as many of the library and helper contains a great functionality for coding process.

CodeIgniter uses MVC (Model View Controller) software development design pattern, which divides the application into three segments: models (database abstraction layer), view (front end layer), and controller (application logic layer). CodeIgniter also use singleton design pattern where if a class is loaded multiple time, the same instance of class will be returned (Upton, 2007).

1. **HTML 5**

In the past, the expectation of websites UI are considerably low compared to now. Websites could be built at a fixed width for there is an expectation that end users will have a fairly constant experience. However, nowadays various number of screen resolution appears, along with the appearance of smartphone which has small screen resolution, making it more difficult to decide which size that will suit the best for everyone. HTML 5 features a responsive web design that allows a website to fit across multiple devices and screens. It also emphasizes on the actual markup required to create our website not only responds to a specific viewport but also load in the fastest possible time (Frain, 2012). Furthermore, HTML 5 offers more benefits over the previous iterations of HTML such as new semantic elements and interactive feedback to user while submitting forms. This will decrease the amount of heavy resource like JavaScript form validation and enabling developers to create leaner and faster-loading code base.

1. **CSS 3**

Cascading Style Sheets (CSS) were introduced as a way of separating design from the content. It consists of a number of built-in modules that make a web page design highly customizable.

Ever since the wide variety of screen resolution were introduced, developers could no longer built a website with a fixed width. One of CSS3 modules called Media queries allow developers to target specific CSS styles depending upon display capabilities of a device.

1. **Twitter Bootstrap**

Twitter Bootstrap is a CSS and Javascript based framework for UI. It offers a number of new enhancements towards web development such as a responsive layout which adapted to desktops, tablets, and handhelds (Cochran, 2012). Twitter Bootstrap helps developers to achieve a balanced layout of elements and color harmony by providing standard grid sizes and page layout tools, and also set of base CSS rules (Young, 2016). Applying bootstrap to web is very easy and simple as developers only have to add suitable class name provided by bootstrap to the corresponding html elements.

1. **JavaScript, jQuery and Ajax**

In the recent development of World Wide Web, users have high expectation for the function and design of sites. To build interesting, and interactive sites, developers are turning to JavaScript libraries such as jQuery to automate common task and simplify complicated ones (Chaffer & Swedberg, 2011). Javascript gives websites the ability to change the content of HTML page while it’s loaded in browser. JQuery as a framework further strengthen Javascript by providing series of useful functionalities to build an interactive and responsive web-app, such as (Chaffer & Swedberg, 2011):

* Ajax support. Ajax, which originally stood for asynchronous JavaScript and XML, is used to retrieve information from server without having to refresh the page.
* Expanded event system. JQuery intercept wide variety of events, such as onclick, onblur, etc; without the need to clutter the HTML code with event handlers.
* Ability to use DOM (document object model). Without jQuery, more lines of code would have been required to locate specific part of an HTML document’s structure. JQuery has efficient selector mechanism that makes it easier to retrieve the exact piece of document needed.
* A collection of free plugins that have been developed. Various kinds of plugins with different functionalities are available for free on internet, which developers can take use of.

1. **HTML 5 Geolocation**

Geolocation can be defined as the act to identify the position of certain object or location. These days, the location can be easily found on different devices and now has been applied to various applications. In the past the geolocation function can only be applied on distinctive devices, but now thanks to the technology development, it is possible to write geolocation applications for the web directly in the browser. One of the options that can be practiced is W3C Geolocation API. Geolocation API is generally a series of simple JavaScript calls that retrieve latitude and longitude, altitude, accuracy of latitude and longitude, and altitude information, heading, and speed of the attached device. However, different devices have different technical capabilities, not all these value will always be available to be presented on the device.

Geolocation is expected to keep on developing in the future as more and more device is proven to be supporting the application of geolocation. Many applications also have used geolocation as one of its main functionality and backbone of business ideas.

1. **PHP (Hypertext Processor)**

**PHP and MySQL Development: Second Edition by Luke Welling and Laura Thomson**

PHP is an open-source scripting language that is designed specifically for website development. It can be embedded within an HTML page and interpreted at the Web server to generate a certain output to the web page. PHP is also known for its versatility since it can work well with many Web server software such as Microsoft Windows, and Unix.

PHP code begins with *<?php* and ended with *?>*, which means that any text between the tags will be considered as PHP code.

**UML Diagrams**

**Software Engineering A Practitioner’s Approach**

UML or Unified Modelling Language has become the most widely used notation for analysis and design modelling. It offers robust notation for the modelling and development of Object Oriented systems.

UML Diagrams are used to illustrate important analysis and design methods for both conventional software and web applications.

**JavaScript**

**JavaScript: The Good Parts: The Good Parts by Douglas Crockford**

JavaScript is one of the most popular programming languages for it associates well with web browser in order to provide some powerful functionalities for a webpage. It suffers from the API of the browser, the poorly specified and inconsistent implementation of the Document Object Model (DOM) and the usage of global variables for linkage.

Despite of all the drawbacks, JavaScript features several good ideas including loose typing, dynamic objects, and an expressive object literal notation.

**Agile Development**

Agile software engineering is a combination of a philosophy and a set of development guidelines that encompasses customer satisfaction through incremental delivery of software. The engineering is performed by a small number but highly motivated project team that focus on maintaining continuous communication with the customers.

The tendency to transform into agile development have grown significantly because of the modern business environment that forces computer-based systems and software products to be delivered quickly and ever-changing. This means developers must be agile enough to respond a fluid business environment. However, fluidity is expensive especially if it is uncontrolled and poorly managed.

An agile process is expected to be adaptable on each of the incremental process. This could be accomplished by providing an operational prototype as an effective catalyst to obtain customer feedback. Hence, software increments must be delivered in short time periods for the customer to be able to evaluate it regularly and provide necessary feedback to the software team.

Fowler and the Agile Alliance defines 12 agility principles for those who want to achieve agility (as cited in Pressman, 2010, 69-70):

1. Our highest priority is to satisfy the customer through early and continuous

delivery of valuable software.

1. Welcome changing requirements, even late in development. Agile processes

harness change for the customer’s competitive advantage.

1. Deliver working software frequently, from a couple of weeks to a couple of

months, with a preference to the shorter timescale.

1. Business people and developers must work together daily throughout the

project.

1. Build projects around motivated individuals. Give them the environment and

support they need, and trust them to get the job done.

1. The most efficient and effective method of conveying information to and

within a development team is face-to-face conversation.

1. Working software is the primary measure of progress.
2. Agile processes promote sustainable development. The sponsors, developers,

and users should be able to maintain a constant pace indefinitely.

1. Continuous attention to technical excellence and good design enhances

agility.

1. Simplicity—the art of maximizing the amount of work not done—is

essential.

1. The best architectures, requirements, and designs emerge from self–

organizing teams.

1. At regular intervals, the team reflects on how to become more effective, then

tunes and adjusts its behavior accordingly.

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