# CHAPTER TWO

# LITERATURE REVIEW

In the process of completing this project, the developers have taken upon to properly research the literature that already exists for the Web Based Application, Payroll System, Ajax technology, and MVC design pattern. The purpose is to get a better understanding on the subject before going further into the research and design phase of the development.

As such this paper will detail the sources in which the developer refer to and the knowledge gathered by the process. The main point of this research consists of example, and type of preexisting system that currently in used for the purpose of student information.

## 2.1: Web based application

A web based application is an application that is accessed by users over a network such as the Internet or an intranet. The term may also mean a computer software application that is coded in a browser-supported programming language (such as JavaScript, combined with a browser-rendered markup language like HTML) and reliant on a common web browser to render the application executable.

Web based applications are popular due to the ubiquity of web browsers, and the convenience of using a web browser as a client, sometimes called a thin client. The ability to update and maintain web based applications without distributing and installing software on potentially thousands of client computers is a key reason for their popularity, as is the inherent support for cross-platform compatibility.

### 2.1.1: History of web based application

In earlier computing models, e.g. in client-server, the load for the application was shared between code on the server and code installed on each client locally. In other words, an application had its own client program which served as its user interface and had to be separately installed on each user's personal computer. An upgrade to the server-side code of the application would typically also require an upgrade to the client-side code installed on each user workstation, adding to the support cost and decreasing productivity.

In contrast, web applications use web documents written in a standard format such as HTML and JavaScript, which are supported by a variety of web browsers. Web applications can be considered as a specific variant of client-server software where the client software is downloaded to the client machine when visiting the relevant web page, using standard procedures such as HTTP. Client web software update may happen each time the web page is visited. During the session, the web browser interprets and displays the pages, and acts as the universal client for any web application.

In the early days of the Web each individual web page was delivered to the client as a static document, but the sequence of pages could provide an interactive experience, as user input is returned through web form elements embedded in the page markup.

In 1995 Netscape introduced a client-side scripting language called JavaScript allowing programmers to add some dynamic elements to the user interface that ran on the client side. So instead of sending data to the server in order to generate an entire web page, the embedded scripts of the downloaded page can perform various tasks such as input validation or showing/hiding parts of the page.

In 1996, Macromedia introduced Flash, a vector animation player that could be added to browsers as a plug-in to embed animations on the web pages. It allowed the use of a scripting language to program interactions on the client side with no need to communicate with the server.

In 1999, the "web application" concept was introduced in the Java language in the Servlet Specification version 2.2. At that time both JavaScript and XML had already been developed, but Ajax had still not yet been coined and the XMLHttpRequest object had only been recently introduced on Internet Explorer 5 as an ActiveX object.

In 2005, the term Ajax was coined, and applications like Gmail started to make their client sides more and more interactive. A web page script is able to contact the server for storing/retrieving data without downloading an entire web page.

In 2011, HTML5 was finalized, which provides graphic and multimedia capabilities without the need of client side plugins. HTML5 also enriched the semantic content of documents. The APIs and document object model (DOM) are no longer afterthoughts, but are fundamental parts of the HTML5 specification. WebGL API paved the way for advanced 3D graphics based on HTML5 canvas and JavaScript language. These have significant importance in creating truly platform and browser independent rich web applications.

### 2.1.2: Interface

Web developers often use client-side scripting to add functionality, especially to create an interactive experience that does not require page reloading. Recently, technologies have been developed to coordinate client-side scripting with server-side technologies such as PHP. Ajax, a web development technique using a combination of various technologies, is an example of technology which creates a more interactive experience.

### 2.1.3: Structure

Applications are usually broken into logical chunks called "tiers", where every tier is assigned a role. Traditional applications consist only of 1 tier, which resides on the client machine, but web applications lend themselves to a n-tiered approach by nature. Though many variations are possible, the most common structure is the three-tiered application. In its most common form, the three tiers are called presentation, application and storage, in this order. A web browser is the first tier (presentation), an engine using some dynamic Web content technology (such as ASP, ASP.NET, CGI, ColdFusion, JSP/Java, PHP, Perl, Python, Ruby on Rails or Struts2) is the middle tier (application logic), and a database is the third tier (storage). The web browser sends requests to the middle tier, which services them by making queries and updates against the database and generates a user interface.

### 2.1.4: Business use

An emerging strategy for application software companies is to provide web access to software previously distributed as local applications. Depending on the type of application, it may require the development of an entirely different browser-based interface, or merely adapting an existing application to use different presentation technology. These programs allow the user to pay a monthly or yearly fee for use of a software application without having to install it on a local hard drive. A company which follows this strategy is known as an application service provider (ASP), and ASPs are currently receiving much attention in the software industry.

Security breaches on these kinds of applications are a major concern because it can involve both enterprise information and private customer data. Protecting these assets is an important part of any web application and there are some key operational areas that must be included in the development process. This includes processes for authentication, authorization, asset handling, input, and logging and auditing. Building security into the applications from the beginning can be more effective and less disruptive in the long run.

In cloud computing model web applications are software as a service (SaaS). There are business applications provided as SaaS for enterprises for fixed or usage dependent fee. Other web applications are offered free of charge, often generating income from advertisements shown in web application interface.

### 2.1.5: Web application development

Writing of web applications is often simplified by open source software such as Django, Ruby on Rails or Symfony called web application frameworks. These frameworks facilitate rapid application development by allowing a development team to focus on the parts of their application which are unique to their goals without having to resolve common development issues such as user management. While many of these frameworks are open source, this is by no means a requirement.

The use of web application frameworks can often reduce the number of errors in a program, both by making the code simpler, and by allowing one team to concentrate on the framework while another focuses on a specified use case. In applications which are exposed to constant hacking attempts on the Internet, security-related problems can be caused by errors in the program. Frameworks can also promote the use of best practices such as GET after POST.

In addition, there is potential for the development of applications on Internet operating systems, although currently there are not many viable platforms that fit this model.