The Scientific Comparison between Web-Based Site and Web-Builder (Open Source) Project: Functionalities, Usability, Design and Security

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Abstract:
In developing web sites there are some rules that developers should depend on in order to create a site suitable to the users' needs and also to make them as comfort as possible when they surf it. Before creating any website or operating any application, it is important for developers to address the functionality, design, usability and security of the work according to the demands. Every developer has his/her own way to develop a website, some prefer to use website builders and while others prefer to what they have primarily formed in their mind
What they have primarily formed in their mind preferred software and programming languages. Therefore, this paper will compare the web based sites and open source projects in terms of functionality, usability, design and security in order to help academic staffs or business organization for choosing the best way for developing an academic or e-commerce web site.

Keywords: Web-Based, Web-Builder, Open source, Google Site, Web Programming Languages, Functionalities, Design, Security

1. Introduction

It is clear in this advanced stage of technology everything is going to be more electrical in a way that the classic methods are going to be very rare or outdated. The organizations, universities, schools, companies, etc. are all trying to have their own websites for the sake of advertising and presenting their efficiency and capability in offering as much need as users have all over the world. Having a website will secure an edge in any competition. It will help you to create a reputable portfolio to encourage people to visit your website. Nevertheless websites draws the customers' attention when they want to meet their needs even at weekends and evenings. They offer an incredible convenience to the customers as they can access what they need in their doorstep. The above mentioned reasons in conjunction with many others oblige academic, non-academic, and business institutions to be very unlikely to evade online presence.

There are more than one approach to build a website, it depends the ability of the designers to choose the best practical way to do so. Some prefer to design their website sing the website builders meanwhile the others prefer to use hand coding for that purpose. With using a website builder there is no need to hire an expert to know programming languages because most of the website builders does not require any programming skills. Hence, it is quicker to develop a website using website builders. However, in the case of utilizing website builders to showcase uniqueness, there should be some knowledge of HTML and CSS in most of the website builders. Furthermore, security on top level is needed, because in case of any cyber-attack on the main website builder, the newly design website will be affected too.

On the other hand, the usability of some builders is not necessary; they may cause complexity during the

customization. In spite of that, functionality is limited for designer according to the tool builder.

In this paper diverse feasible methods for designing websites will be discussed with examples and addressing the advantages and disadvantages of each of them.

2. Open Source Software

Open source software is computer software with its source code available for enhancement or modification by others. Computer users are not allowed to see the source code part in the software. This part is manipulated by the programmers to change how a piece of application or software works. Having access to the source code part means the program can be improved by fixing parts and or adding more features to the program. Furthermore, developing, testing and even maintaining open source software are done through public collaboration [1].

3. The Most Known Website Builders (Types of Website Design Builder)

With website builders, it is possible to build a website with a basic coding experience or even in some cases without having coding experiences. These tools are used to construct a website without manual coding. Here, the following identifies some of the most known builders.

3.1 WordPress

WordPress is one of the most popular online open source builders in the world. It is written in PHP. According to Hosting (2016) the fastest growing Content Management System (CMS) currently is WordPress. The main functionality of WordPress was basically to make blog experiences easier. After using its functionality, it can be used to create more complicated websites and expanded it to a content management system rather than a blogging tool. Recently, it is considered as the easiest CMS to use with a very friendly interface. Furthermore, there is a variety of plugins which makes its functionality extended in various possible ways [2].

While WordPress is used, one does not need to know PHP or HTML. A pre-installed template function and plugins allows them to be installed very easily. All the user needs to do is to choose a template or plugins and click on it to install. In addition to that, over thousands of plugins are available for the script on its website. This is the reason why WordPress should be considered as

CMS, not only as a blogging script. Most of the plugins are available for free. Moreover, thousands of graphics templates can be viewed on the scripts homepage, which can yield incredible changes in the website's look. There are both free and paid templates. Moreover, it is easy to add fields to the forms either by using plugins or by your own actions. This will allow adding categories, descriptions or additional labels to the blogs or subpages [3].These can be measured as the main advantages of WordPress.

However, the above described method has some drawbacks that the user should be aware of them. With using WordPress, some of the modifications require knowledge of PHP; like removing a date field. Most of the templates available on the homepage are very alike. It requires some knowledge of CSS and HTML in order to create a unique one. Besides, so as to work with Drupal or Joomla, a number of plugins should be installed. Which unfortunately, these plugins cause problems to the script's efficiency. The reason for the prior mentioned complication is a number of plugins created by different authors for the same purpose. Sometimes it takes time to choose the right one [3]. Moreover, one of the most serious problems is Lack of protection compared to the other applications. With using WordPress and any other popular software platform, there is the possibility of security vulnerability. Due to the fact that WordPress is one of the most known software platforms in the world, In the event of global cyber-attack your website will be affected too. In Addition, automatic upgrades causes to serious problems, which is why removing the ability of updating themes and plugins from the production environment is highly recommended. Furthermore, the process of customization employs a considerable amount of time. Customizing themes, plugins, templates, and widgets sometimes takes months to rectify them [4]. Modifying graphics or tables is not an easy process in WordPress. All additional non-standard fields that make WordPress a CMS require additional query syntax; this makes the query syntaxes more difficult [3]. All the drawbacks discussed previously may convince some users to avoid using WordPress in order to prevent all anticipated problems when they consider their webpage modification.

3.2 Weebly

Weebly was found on 2006 by David Rusenko, Chris Fanini and Dan Veltri while attending

Pennsylvania state university. They came up with creating the project when the university required every student to create a Web portfolio. The Three students developed the software to help everyone to create a personal website. Over hundred templates and multimedia features offered by Weebly. By dragging and dropping widgets into different places, the members of the site can change the appearance of their Weebly-hosted website [5]. According to Wong (2016) by far the easiest website builders to use is Weebly. It is intuitive and very user friendly, there is no need to know anything about coding and you still can build an appealing website. Currently Weebly powers over 30 million websites. This is equivalent to almost 2 percent of the websites on the Internet which are run by Weebly this figure is still growing continuously [6].

Weebly interface is so intuitive and very easy to use for all levels of users even for those who are Reluctant to do anything with technology. Weebly's latest templates are all mobile responsive, so the looks of the websites with Weebly is professional across both mobile devices and desktops. If one wants to update the look of the website by changing the existing template to a new one, they may just click on the new one automatically all the content will be transferred over. Weebly also gives access to the template's HTML/CSS codes; this provides the user the flexibility of changing the design extensively. In addition, Weebly has more than 40 preset page layouts to choose from if one does not know where to start designing the pages. These include page layouts for home. Services, about, contact, portfolio pages, and restaurant menu. The users can pick one and customize the layouts to make it as wanted [6].

On the other side, a common complaint against Weebly is that the design of templates is very basic. Because Weebly is all about maintaining simplicity, so if someone wants more advanced designs, they should choose other website builders [7]. Limited template customization is another problem complaint by the Weebly users. It allows changing only the overall color schema for the templates and the style of the font. So, if modification is necessitated, except the mentioned ones; such as, changing the content background design or adjusting the content width, the codes of the template should be modified in order to do so. Another problem is that the Weebly's blogging function needs improvement. Weebly does not have the ability of

highlighting the most popular or latest posts and related ones, which are very basic features for almost every blogs [6].

3.3 Google Site Builder

Google Sites initially started as a product named JotSpot which Google procured in 2006 and then released in 2008 as Google Sites. Over time Google has added new features to the underlying JotSpot code (such as the horizontal navigation bar). This Site is able to act like newer web design tools which can be constantly edited and also layouts that respond to mobile device [8]. It is suitable for schools, small organizations, and individuals who need to create websites but were struggling with Sites lack of updates and modern features. Therefore, it is not appropriate for a universities, huge business and huge company or organization. This builder is remarked by "Powered by Google Site "on all own pages. Google site is free for Academic Website but limited functionality. Besides, it has a lot of apps and new futures are useful for academic services, portfolios and personal website. For example, users can create a sample classroom website with the new Google Sites to simplify sharing between academic staffs. Google site is not dynamic website but it is statics that are the key new features Google has revealed for Sites. Firstly, Google site has Drag and Drop feature. The major editing of the sites is done through one of the fallings drop down menus, altering settings in pop-up windows, or openly editing the HTML code in case of having knowledge about HTML and CSS. This should also be applied to adding new content to your Site, as well as rearranging items, For the purpose of adjusting the properties of images and other media. Another feature of Google Site is Real-time Collaboration. Currently, the web page can have multiple editors, but only one editor can modify a specific page at a time [9].

Finally, Responsive Design feature is the most common complaints about the current version of Sites. It is incapability to display well on screens other, such as phones and tablets, than a standard computer monitor. The new version of Site builder has new "themes and layouts designed to scale and flex to any screen size". As more and more students "Client" consumes their content through a mobile phone.

Like the previous website builders, those properties

of Google site has been improved that paved the way for various advantages for some functionality. At the same time, it has several main drawbacks when the designers depend on Google Site.

4. Web Programming Languages

At the present time, different web technologies have been introduced with the fast growing of the World Wide Web. There are many web technologies, which could be applied for developing a website or a web-based system starting from server side language or a web server to an RDBMS (relational database management systems).

Websites can be organized in tiers like: one tier, two tiers, three tiers or n-tiers. The structure, which is the most common, is the three-tiered website that consists of Presentation layer, Business Logic layer and Data access layer [10].

These languages are used for developing a website, are called server side languages because they are executed on the server, rather than on our computers. On our computers, just a request for the page is performed. Consequently, the responses are returned from the web server, and are displayed by the web browser on the computer. Besides, it's known by Dynamic web pages and powerful web applications which can be developed using the server side programming languages. These pages can be described as the pages whose contents are dynamically regenerated each time the web page is requested [11].

In this section the focus will be on two well-known programming languages that help developers in designing websites and adding functionality to the designs.

4.1 JSP & Servlet

According to Zambon (2007) the use of JSP and Servlets together in a specialized form of Java Platform called J2EE (Enterprise edition). This technology is a widely used approach for developing websites and produced by Sun. Java2 platform Standard edition includes features that J2EE takes benefits from them. Some of those features are "Write once, Run anywhere" portability, CORBA technology for interaction with existing enterprise resources and JDBC API (application programming interfaces) for database access. Furthermore, features such as reusability, platform independence, a security model and access to JAVA APIs are also included [12].

The JSP files contain most of the HTML code therefore are mostly used for the presentation layer of a website, which developed in J2EE. However, they could also contain Java code, which would be the business logic layer. Briefly, both static and dynamic content can be included in JSP files. The photo 1 is shown the JSP file which includes HTML and JAVA code.

Photo 1: example of JSP File to show JAVA code with HTML code

The Java code represents the dynamic part of the JSP that is executed according to the user's request and subsequently the content changed. Furthermore, components such as JavaBeans (Java classes) are used for performing more complex processing tasks. Servlets are special Java programs (Java classes) that run on the server side and used in the business logic layer of a website. A number of Servlets can be used for each associated JSP page, or many JSP pages can have a single Servlet. A very good feature of Servlets is the use of memory space to run and consequently reducing the web server's crash chances [13].

Even though there are other widely used web programming languages, it is amusing that when it comes to websites that attract high traffic, Java and JavaScript are the most used web programming languages. Look at figure 1.
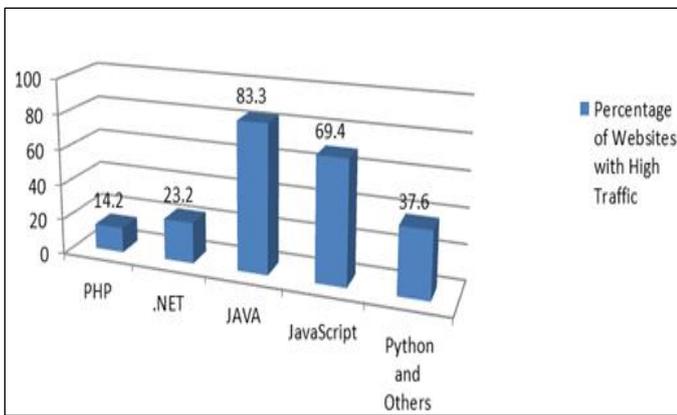
Figure 1: Programming language VS high traffic Websites (Millares, 2015)

4.2 PHP

PHP is also a scripting language on the server side, and it is an open source language that is used for developing web pages. Static web pages can be turned into dynamic web pages through using PHP. In addition, windows, Linux and UNIX platforms support PHP language, in other words it is a cross platform language. The PHP language is one of the earliest and widely used languages for developing websites, and according to trends.builtwith.com PHP is installed on more than 30 million websites [15].

Besides, PHP is supporting a variety number of databases and it does not need a specific development environment or IDE (Interactive development environment) for developing a web page because it is directly fitting into the HTML web page. Furthermore, PHP is used in developing many websites from e-commerce systems to social network websites. Moreover, PHP provides a good security that is the reason behind using it in e-commerce websites [16]. Look at the Photo 2 is shown PHP file which include PHP code and HTML code.

```
1   <html>
2   <head>
3   </head>
4   <body>
5       <center>
6           <form action="delete_class.php" method="post">
7       <?php
8       $id = $_REQUEST['id'];
9
10      include('connect.php');
11      $query ="DELETE FROM class_cl WHERE  id_cl='".$id."'";
12      $result = mysql_query($query,$connect) or die
13      ("<br> <font color = red size = 5> can not delete this class!! </font>");
14
15      include('form_delete_class.php');
16      echo" <br> <font size= 4 color = red> deleted class successfully...</font>  ";
17              ?>
18          </center>
19      </body>
20  </html>
```

Photo 2: example of PHP File to show PHP code with HTML code

5. Advantages and Disadvantages of Using Website Builders

As mentioned to build a website there is more than one choice. However, in order to find the optimal solution there is a number of important approaches that are to be taken into consideration. Making the decision on the right choice relies on different aspects. Here we will discuss the benefits and drawbacks of website builders to help those who need to build a website to choose the best for their demands.

One of the main advantages of using website builders to create a website is that it is the cheapest option. There are free website builders; however the paid ones guarantee the best outcomes. The cost of the paid websites is a small proportion of what it will cost to hire a web designer [17]; however, most of them are free for academic purpose until now. Additionally, affording to Steele (2014) you will be the boss of your project if you choose a website builder. You can get control over layout, design elements, functionality, and content. This means editing the website will be significantly speed up while there is no need to ask the designer to do so and send you back the new versions [18].Furthermore, you can independently carry out updates and maintain your website in the future without hiring a content manager and having a designer-on-call.

Although, in some cases a website builder can be a great option, yet there are some disadvantages that may rule it out as the best option. The biggest disadvantage is that the website builders restrict you in what you can do with the site. Since only allowed templates can be used, further customization is not permitted. While it is an issue for designing the smaller websites, but it may not be an appropriate method for more complicated ones as an academic or e-commerce, you will probably find yourself with very limited with design options [17]. Another problem failed to handle in website builders is avoiding deprecated code (code that is no longer supported by W3C), in the body and in their use of Meta information. This results in cross-browser compatibility, because deprecated code has no guarantee to render out uniformly across different types of browsers. Moreover, another serious problem with website builders is that you will never actually own the website. Because you have to build the site using their tools and it is closed inside of a proprietary environment, you will be worry about it as long as the provider is in business. If anything goes wrong with the provider, it will impact your

website too. The a backup copy of site file will not be secured including JPG's, HTML, PHP and all other files that go into making the site builder. Furthermore, the reimbursement for any attack like: loss, deletion or misplacement of your files will not be guaranteed, since they own them not you [19].

Finally, it can be concluded that building a website using the existing website builders may offer some benefits and it may work for the small business but it will never be a best choice for the large websites and businesses.as it has been discussed previously, it is not recommended to use database and relationship; due to tremendous data repetition and user should enter the data more than once. This is almost impossible scenario with academic and new technology. Therefore, all the work done in a Site is hard to transfer to another Site [9]. For this purpose this types of website is known as a static website. Photo 3 is shown one of the researchers acade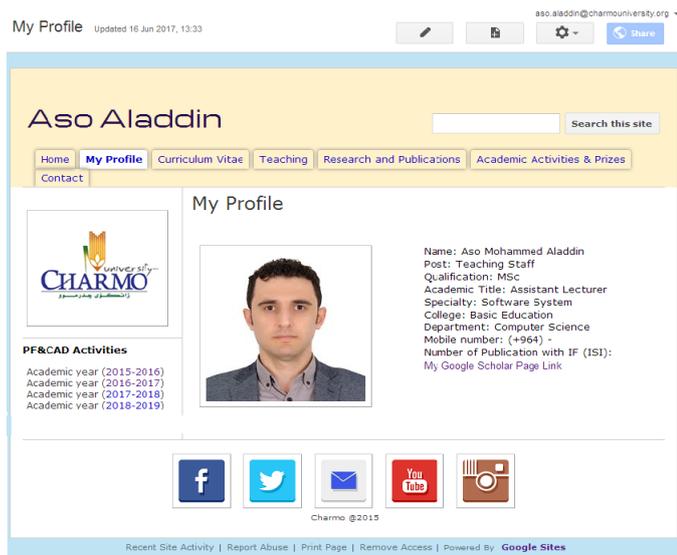mic profile website that designed by Google site and visit (https://sites.google.com/a/charmouniversity.org/aso-aladdin/home).

Photo 3: example of website builder by Google site

6. Advantages and Disadvantages of Using Web Programming Languages

These languages are still used by those sites where efficiency and speed are critical. In this section some of the advantages and disadvantages of the web programming languages will be stated.

One of the major and important advantages of the programming languages is that they are open sources and free technologies, which provide developers with access to huge libraries of pre-written code and it is a very well structured documentation. Object Oriented Programming

(OOP) is also supported by for example JSP, which speeds up development, because it allows the reusability of the code throughout the web application. The most significant advantages of JSP and Servlet is being able to run on different platforms such as windows, Linux, Mac and others that mean it is a cross-platform technology [20]. In addition, a framework for developing and deploying web services on the Java platform is provided by JSP and Servlet, besides offering full web services support.

Furthermore, learning a language such as PHP language can be relatively easy. Facebook and Wikipedia are examples of those websites, with which PHP as a web programing has been developed [21]. To add on, these programming languages provide a good security which could be the reason behind using them in e-commerce websites, for example Amazon and EBay, and the majority of the web servers all over the world support most of these languages.

The best point depends on using database and relationship; so that data repetition is avoided and user single access per one attempt is secured. All of these measures is because, it is the top situation with academic and new technology. Look at Finger 2 is exposed the relational database example for web programing language. Besides, it helps the developer to transfer all the work in the proper time.
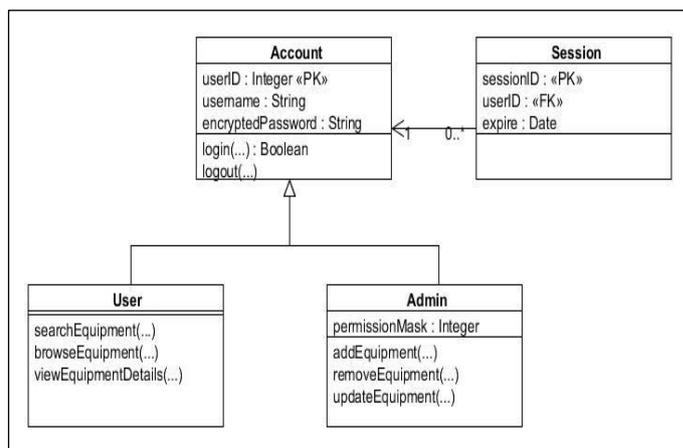

Figure 2: Example of relational database by Class Diagram

Like any other process web programing languages have own strengths as well as weaknesses. Some of their weaknesses are stated in this section. To start with, the learning curve of some of these web programming languages such as JSP and Servlet is far steeper than those of site programing languages. However, if one has former experience with Java, it is not that difficult technology that could not be

adapted to. Also, finding errors within JSP pages are difficult because of translating and then compiling JSP pages into Servlets. Therefore, it is possible to tell that JSP pages need more disk space on the server because they are translated into ". Class" files. Moreover, compiling JSP pages when first accessed causes a little delay; however, this only occurs when the JSP page is accessed for the first time.

In addition, the ability to handle error is poor in a language like PHP, because and it is not a compiled language, this is the main disadvantage of PHP, but can be interpreted. Interpreted code seems to be slower than compiled code because once the code compiled it will be error free. Moreover, effective code maintenance is not offered by PHP therefore, as the functionality of the website expands the code gets larger without having a definite structure [20].

7. Result and Discussion

In this paper website designing with both website builders and hand coding is discussed. As it has been addressed the selection of the best method utterly depends on the demands, affordability and accessibility. It has been shown that the website builders are always the cost effective choice. They can also be updated and created by people who do not have any knowledge about programming languages. This means there is no need to hire a programmer in that regard. However, in terms of customization and security using website builders will pose problems in some cases. For instance, if a unique website with a pleasant interface is required, HTML and CSS edition should be involved too, and sometimes the PHP and other languages in the background is also a prerequisite. Furthermore, as far as security is concerned, any anticipated cyber-attack should be carefully considered, since any attack on the website builder denotes risk on the newly designed website. Not to mention, with using the website builders', mere ownership cannot be claimed since the borrowed tools from the website builder have been employed. As the result similarity, functionalities and usability are limited in many cases.

Therefore, it can be inferred that there are some rules which can be adopted to decide the best possible method. Hand coding can be taken in to account as the prime option if security measures, ownership, uniqueness and a programmer for frequent updates are accessible. This means; with hand coding uniqueness in designing websites can be achieved as desired. In other words, Hand coding can be suggested as the chief method for designing

websites for sensitive establishments, like large firms and academic institutions. Since, those places always possess sensitive data; that are regarded as classified information this means that they should always have access to update their security measures, however this does not change the fact that website builder is still the best choice for personal websites, blogs, and portfolio.

8. Conclusion

Having an online presence is like a must in today's life for every academic and nonacademic places, even the small business are having their own website. There is more than one way to build a website. Some prefer to use the existing website builders to build their own site while the others prefer to hire someone to build it for them using hand coding. Each of the choices has its benefits and drawbacks. It totally depends on the owner of the website to decide which one is the best. However, generally there are some points to be considered to decide which option will work the best.

As discussed, one of the benefits of using website builders is the cost. Building a site using the existing builders will less expensive than using hand coding and hiring a programmer although some of the builders are paid. Additionally, the process of editing and updating will speed up using the website builders because there will be no need to employ the designer to do so or to ask him for sending the new version; the mere ownership can be accomplished.

However, using website builders have some drawbacks; limiting the customization and deprecated code which are problems in using builders. Furthermore, considering the builders to create your website you will not allow access to personally desired amendment, as the tools are borrowed from the website builder. While, by using programming languages your site is more customizable and easy to add new properties any time. Moreover, the website is more functional and reusable instead of duplication. In addition, you are the owner and have full control over your website. Besides, it can be easy to transfer for anywhere according its owner.

Finally, as addressed in this paper building a website needs to propose as per demanded well by the owner, and resorting to the best option should be decided accordingly. However, it will be safer for the site owners especially those of large enterprise sites to choose the best possible option with less risk and more controllability.

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