



# A New Method for Web Development using Search Engine Optimization

**Chutisant Kerdvibulvech**

Department of Information & Communication Technology, Rangsit University  
52/347 Muang-Ake, Paholyothin Rd, Lak-HokPatumThani 12000, Thailand

**Kittidech Impaiboon**

Department of Information & Communication Technology, Rangsit University  
52/347 Muang-Ake, Paholyothin Rd, Lak-HokPatumThani 12000, Thailand

## ABSTRACT

In this paper, we present the website development that utilizes Meta tag and the code we used in our website to increase SEO (Search Engine Optimization) in the search engine. When people talk about search engine, a lot of people may think about Google but Google is not the one search engine in the world. Nowadays we have a lot of search engines for example Bing, Ask, Yahoo and etc. In this paper we'll show the evidence that we found from 20 people in Unilever Thailand we gave them a survey and made a graph to show that our website is better than the old one. After that we'll show the web browser structure which is very important for web developers when they develop a website.

## Keywords

Web Design; Search Engine Optimization; Code Structure.

## 1. INTRODUCTION

Technology in all fields has grown faster and stronger than it ever has in the past. What machines did in the past, is almost infinitesimal compared to what we can achieve today. But yet the true fuel of such innovations lies with us, the human need [1]. The need that have driven the likes of many scientists and researchers, around the world to further our understanding of the environment we reside in [2]. Like the chain of evolution has proven so and so again, to adapt is to survive; which brings us to one of mankind's arguably greatest achievements, the Internet. We are driven by the need for social interaction, self-growth and knowledge and through this determination we have given birth to an ever-growing living beast [3]. The World Wide Web, the pinnacle of human communication and interaction has demolished physical limitations and distances [4]. And in these webs of information brought about by sophisticated data communication techniques and a multitude of complex networking lies and equally sophisticated being, the front page of the internet, the very frontier we use to interact with, the websites.



## 2. SEARCH ENGINE OPTIMIZATION

Nowadays we have the technology that helps us find the information that we want, it is called the “search engine”. Imagine if we did not have a search engine, then when people want to find information, it’ll be very difficult because they have to remember the URL [5]. Related studies showed how to develop web application that invokes web service [6] [7].

Search engine optimization is the way that we use to aid in increasing our web ranking on the search engine, the following section will describe what we did and what we did not do on the code of our website.

Why do we have to utilize search engine optimization or SEO? The answer is because SEO can help us in increasing the chances of people that searching for education or international university in Thailand to find our website. How do we do that? It’s all about the “tags” in HTML code and that tag is called the “Meta Tags”.

Meta Tags are source codes in the part of the head tag, in HTML normally when we open up a webs page a part of the head tag will contain Meta Tags that shows the attribute of a that web page. In this case, the robot of each search engine that sees the Meta Tag will process and index our website in their system. Let’s move on to how we used these Meta Tags and how we used them in our website.

### 2.1 Meta Content Type Tag

This tag is very important for SEO because we use it for webpages to display the result correctly with the correct kind of character set and type of document on the website.

```
<meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
```

This is how we represent Meta content type tag in our website to show the SEO and increase our web ranking.

### 2.2 Meta Description Tag

This tag is used to explain a brief description of the website, the tag content should not be too short or too long because according to the rule of SEO, we should only have 150 characters and it is important to ensure that the description that is written on the Meta Description tag be related to the page,



IJCSBI.ORG

for example: this page is about the university then the description must be about the university.

```
<META NAME='DESCRIPTION' CONTENT='write the description of the website page'/>
```

This is the standard Meta Description tag that people use and next is the Meta Description tag that we used on our website.

```
<meta name="description" content="Rangsit International College offers unparallel education.
```

```
Study and learn from the best Thailand has to offer in international undergraduate and graduate courses.">
```

### 2.3 Title Element - Page Titles

This tag is another important tag that a lot of people don't know. Title tag is used for telling web crawlers what the topic of the current page is about.

```
<title> University website</title>
```

This is an example of how to use the title tag let's see how it works on our website.

```
<title>Rangsit International College - Education has never been better</title>
```

We use the word Rangsit international college and education because when people search about international schools or international universities they can find us easily. Also if they search for education they can find us this way.

### 2.4 <div> Tag Why we don't use the <table> Tag

In Thailand if you're a web developer or just somebody that is viewing the page source on a website in Thailand you will see that a lot of websites in our country uses the table tag to create web page layouts. Why issuing the table tag in our website a bad thing? The answer is when the search engine robot (spider, crawler) read the table tag it'll read the content line by line and the table tag is exactly like a table as described by its name.



When the search engine robot reads the information then it'll not read it correctly. This mean it will read the content in the wrong way, the problem is that, if they read the content in our website the wrong way when they index the information in our website it'll be wrong or a certain part of the content will be out of context, obviously this is bad for us so we have to change to the use of the <div> tag when we want to create a container to keep the information in our website. Tables all take up more space in term of bytes, making for slower page loading. Compared to using CSS for layouts, tables take longer to implement and breaks up content, especially images. Users accessing the web with screen readers will also find it difficult to scan the contents of a page. Tables are also bad for the long run as they are complicated to edit and manage [8].

```
<table border="1">
<tr>
<td>January</td><td>$100</td>
</tr>
</table>
```

This is an example of a table tag in use that makes the search engine robot read the information in the wrong way in the website.

In our website we use the <div> tag it is better than the <table> tag mainly because when the spider reads the information it'll understand and keep the information on our content clearly.

```
<div> Information in this box </div>
```

This is the structure of the <div> tag that people use and next is the <div> tag in our website that we use I'll pick just one <div>

```
<div id="ric_logo">
    <imgsrc="../images/Ric_logo.png" alt="Rangsit International
College" />
</div>
```

In this <div> we represent the logo of our college and this <div> keep the image on it to show the logo image of our college.



## 2.5 When you use <img> don't forget to write information in the alt tag

Why do we need have to write the alt in the <img/> tag? That's because the search engine robot can't read the image and it doesn't know what the image is about so according to SEO standards we have to write information in the <alt> tag to explain what that image is about, then the search engine robot will know exactly what that image tells us. Which in turn reveals more information about our web page, translating in to relevant content. That of course depends on what we put in the <alt> tag. Proper usage of <alt> tags also ensures that our HTML is valid. Meaning, it follows the guidelines set by the W3C. [9]

```
<imgsrc="../images/Ric_logo.png" alt="Rangsit International College" />
```

This is the structure of the <img/> tag in our website and we write the alt to explain to the search engine robot to understand what this image is about.

## 2.6 The On Page Ranking Factors

The on page ranking factors is the first group and identifies its ranking factor. This is the on the page SEO. These parts of the factors are those that the web developers are in total control of, they have the complete power to create their own content, or change it or delete it. On the page SEO categories consists of Content, HTML and architecture.

### 2.6.1 Content

This is simply a no brainer, the content is what you put out for your users to experience, the only reason they come to your website is because of this. This is in fact the least technical aspect, but the most vital part. After all content is king. In this category itself, if we follow the periodic table we have five more sub categories.

### 2.6.2 Content Quality:

What makes your content special? Developers and creators have to put stuff out, but not just any stuff. They need quality. Quality distinguishes competitors from one another, and people always want the best.

### 2.6.3 Content Research

Before you know your enemy, you need to know yourself. It's always important to do your research especially if you are going put yourself in the open. Learning about the most appropriate terms for your content can help by allowing people to relate to them easier, or even just understand them easier.



IJCSBI.ORG

In SEO terms, this would be the keywords that will be used on the site. Keywords are a factor in which Search Engines use to present ads or search results to users. So basically this is what the user will type in when searching for something. Of course keywords alone do not directly affect search results, if it were that easy, we wouldn't need SEO.

#### *2.6.4 Content Words*

Closely followed by Content Research, after the research you need to put it to use; using the right keywords for the right content. Keywords help highlight your content and what you are trying to present. Using them correctly will allow the user to feel like they have something they needed, abusing them however will just result in them clicking away.

#### *2.6.5 Content Engagement*

If you've got visitors you need to make sure they stay and have a good time. Search Engines may try to measure how engaging content is by how long users stay on your site, if they click in and move away immediately (bounce rate), it might be something they might not be looking.

#### *2.6.6 Content Freshness*

The same old stuff can get boring very fast, if users don't have enough to keep them going. They probably won't be coming back for more. Google also tries to support content freshness by what it calls "Query Deserved Freshness". If there's an increase in a search more than usual, Google will try to find the right content for that period of time. This might result in the website getting a slight boost up the search results.

#### *2.6.7 HTML*

This section concerns a few important HTML tags used on the website. The entire structure of the HTML does matter but these ones you have to pay a little more attention to as they come up first when a spider wants to know more about a website.

#### *2.6.8 HTML Title Tag*

The title says it all, (no pun intended). This tag will tell the spider what a page is all about. Like every person needs a name to distinguish themselves or like a report needs a title to explain what it's going to be about a Title tag will include and should include keywords that will help the page introduce itself to the user and the spider as well.

#### *2.6.9 HTML Description Tag*

Although this is not something that directly influences the search engine or the spider, it's still just as important. A description tag will be displayed when the web site come up in the search listings. A good description of the website directly to the user will help in letting the user know what he needs to know about a site without wasting his or her time. This description may very well be the deciding factor for a person to click on the link or not.



#### *2.6.10 HTML Header Tags*

Much like the Title tags, headers function as headings within the page itself. Header help identify sections of content to the viewers. Search Engines also make use of these headers to find out more about content. It's always a good idea have appropriate headings for content, if not for the search engine, then for the users who will be making use of the content.

#### *2.6.11 Architecture*

The architecture is the overall structure of your web page, right down to the HTML foundations, the way links are set up between pages and up to the very content and the way you display this content.

#### *2.6.12 Site Crawlability*

For a spider or crawler to be able to effectively do its job, it needs to be able to maneuver through the website. A web developer must make sure that the links all go somewhere and lead to the right places; avoiding dead links and misplaced links. Depending on how you place your links some pages might be accessible and the content on these pages might not even appear for the spider's index. Third party plug-ins like Flash or even JavaScript can cause links to unexpectedly disappear, or using such content instead of links will reduce a spider's ability to crawl through the site. The use of site maps greatly helps in carefully detailing the pathways of a site.

#### *2.6.13 Site Speed*

Fast websites are fast for a reason, that's because they don't want their users to wait. Nobody likes to wait longer than they should have to. Properly optimizing the structure and using correct content placement can help speed up website loading times. Over use of too many animations or effects can greatly reduce performance. If the home page is being slow, people might not even wait for your site to load. According to Google, a fast site may get a minor advantage over their slower peers.

**Having a Descriptive URL:** If your website is about kittens, make sure you don't call it monstertruckmadness.com. Unless you actually have monster trucks running over helpless little kittens. It's important for a URL to be easily read, and short so that users can quickly get to the point, the more they have to scan through the URL, the less likely they will click on it. Especially if there's something shorter they can read.

### **2.7 The Off Page Ranking Factors**

These elements of the table are things that web developers can't completely control. They are the external factors that surround the web site, but they are just as impactful. The sub categories can be broken down to Links, Social, Trust and Personal.



#### 2.7.1 *Links*

Links are an extremely important factor; both internally and externally. What goes around comes around. And on the internet, that happens through links. Links going out and coming in help determine your own standing among other websites. To search engines, links mean a lot, they are all a part of what a website is, but there are good and bad links, and some are just better than others.

#### 2.7.2 *Link Quality*

Google and other search engines have a way to determine how good a link is, or how it is a better link. As it is possible for many different websites to link to any other website, there are, however, some sites that are more reliable or popular sites. The link backs from these sites have high qualities that may reflect the reliability and popularity of your own site.

#### 2.7.3 *Link Text*

The very phrases that are used on the links pointing back or away from you also weigh in as a factor to not overlook. Just because a website has a ton of links, this does not mean it's better. Relevancy is an all-important factor in any case, so the text describing the link counts.

#### 2.7.4 *Link Numbers*

Although quality is preferred over quantity, you still need the quantity. Less you have, the less you can be evaluated for especially when it comes to links.

#### 2.7.5 *Social*

In the end it's all about the people. You may have the best links, the best website or even the best content, the best, at least for you. But for the others out there they will be the own judge of that. That however is actually a good thing. When people come across something amazing or something they find interesting, most people would want to share them, or just talk about them.

#### *Social Reputation*

The online social presence you maintain and something you can represent yourself online, social accounts are important in a way that they let creators or developers establish themselves as identities.

These social accounts let you interact and communicate with the users. However; the main point is to be active on social media. This is where a lot of buzz can be generated, and it's always better to approach people directly and with today's social media like Facebook and Twitter, you have a direct line between the users and creators.

#### 2.7.6 *Social Share*

This is the attention and activity you get on social media in relation to your website either through linking from social media or shares on Facebook, or



likes, tweeting about it, digging it or any other form of social sharing mechanism provided by the social media website.

#### *2.7.7 Trust*

Trust is simply that comes from being legitimate on your own content; having the right influence, coming from the right source, being believable and legitimate. Although it is still unsure how search engines measure a trust level of a website, nevertheless for humans they are very much an important factor.

#### *2.7.8 Trust Authority*

The best way to establish trust with users and search engines is by having a good reputation. Being true to your service and customers, or just simply being a legitimate service or content provider can help reign in good remarks from other people. This can happen through online reviews from blogs, or just simply more sharing from trusted social media accounts and links from popular sites; After all the power of authority is given by the people.

#### *2.7.9 Trust History*

The overall history of the website, it's almost like a track record for the lifetime of your site. Search engines will try to see if anything out of order has ever happened in the past. Of course the longer you've stayed the higher chances of you being trustworthy because the longer and more exposure you've had with users, though this is not always the case.

#### *2.7.10 Personal*

Ever wonder why you see different search results when searching in one country than in another country? That's because the major search engines out there have come to include localization factors to narrow down certain search results. This doesn't happen to every single thing you search for, but when it does. It's because the certain website is optimized in such a way.

#### *2.7.11 Personal Country*

Country is the easiest of factors to come across; depending on where you are in the country your website may not be relevant to someone else on the other side of the planet. Of course this does not just pertain to websites; the search terms themselves may have different meanings depending on the country.

#### *2.7.12 Personal Locality*

These are local search, narrowing down according to the city. Much like the country level, this will affect what is relevant in a local range.

#### *2.7.13 Personal History*

This solely depends on the personal preference of a person. Like the links they have clicked or continually click after searching for something. There



is no way to influence this other trying to get the first impressions right, on a person's first visit to the web page.

**Personal Social Connections:** This is the impression of what a person's social circle might have about web sites. The best way to strengthen this front is by actively participating in social networks. The more friends the more likely your content will be shared and higher chances of friends of friends finding your site.

## **2.8 The Violation**

These are things that are shunned upon by search engines. Things that web developers should avoid if they want to stay on good terms with the major search engines out there. These violations can generally result in a website being taken off from search engine result listings.

### *2.8.1 Thin Content*

Content that is lacking or relatively simple. Either the words do not coherently adhere to any form of grammatical sense, such as large texts of Spam created just for the purpose of getting a chance to appear in the listings or that the content itself is insufficient or repetitive. These factors can cause search engines to flag websites with penalties.

### *2.8.2 Keyword Stuffing*

Keywords are there to help, not abuse. However there are people who do just that. Keywords are good indicators to search engines of what you want to be found for but overusing them does not help. This is illegal in terms of SEO. Though it is not sure what extent of using keywords are considered keyword stuffing, but using a lot more than you have to might get you in to trouble.

### *2.8.3 Hidden Text*

This is a follow up from the previous technique. Instead of having all these unnecessary keywords become visible they are hidden in backgrounds by taking advantage of text colors or just simply hidden elsewhere; usually a place unbeknownst to the user. Search Engines however are fully aware of this, and they don't like it.

### *2.8.4 Cloaking*

This is the worst sin you can commit; the ultimate act of bad SEO. Cloaking involves letting the search engine have a different version of the site. So basically speaking, creating a fake Spam site that catches the attention of the search engine, but once a user clicks on it. It's a different site.



#### 2.8.5 *Paid Links*

This is when you pay for links; the exchange of money in return for high volume link backs or simply just buying links.

#### 2.8.6 *Link Spam*

Link spamming pretty much like all spam is repetitive posting of your link on every single blog, forum or comment section through the use of automated software. This is bad SEO practice. Not only will the links feel out of place, if they keep popping up everywhere people will start to tire of it, and those who actually click on it out of curiosity may never even come back.

### 2.9 **Blocking**

#### 2.9.1 *Personal Blocking*

Certain search engines gives the user to block an entire site from the result listings or block web pages they don't find very nice for whatever reason. In more cases it's because the websites are not relevant to the users but they keep appearing when the user search for a particular thing. This may necessarily be a bad website, but the user just happens to find it annoying.

#### 2.9.2 *Trust Blocking*

A handful of people blocking may not seem like a much of a deal. But once a good number of related people begin doing so, then there might be trouble. This is seen as a negative factor and might result overall blocking for any other average user.

### 3. **DESIGN AND LAYOUT**

In the present time a lot of people may think and suspect that personal computers and laptops are where people make use of the internet the most. This is in fact, not true. Mobile users are quickly exceeding desktop users. Anything the desktop PC can do, the mobile device can too, including surfing the web.

In our web design we have to manage the screen resolution carefully because on the web browser they place things in the order they see, and in the form of the box model, the contents on the web take up space in the form of rectangles; filling in available spaces from left to right and top to bottom. Depending on your screen size you might see more of the content or less.

For the user they may not care what screen resolution they have when viewing websites, but for web developers this creates an absolute nightmare when it comes to positioning objects on the page or placing content appropriately. If you are not careful the design might take unexpected turns with certain resolutions. With the increasing ranges of screen sizes and the



other way around, more people are using a variety of devices to view and interact with websites. A developer could simply decide not to cater to a range of audiences, but from a business perspective this is highly unacceptable.

With a multitude of screen resolutions to consider and the fact that more and more people are beginning to use handheld devices to view web pages on the internet. Placing content on the web is no longer as simple as just putting it there. There are many factors to consider such as the target audience, the screens they will be using, how much content there are and finally, the most important factor, how the web developer will be placing said content. Creating a different version for each website is simply something that is not worth it. The website itself needed to adapt to the differences.

The Layout is a vital factor in creating a website, as this will be the portion that users will be interacting, not only is it the face of the website, it is the entire external structure that users will be interacting with; So there is no surprise to why a lot of web designers heavily place priority in trying to get their layouts right before anything else.

There are basically three layouts that web designers ponder over when creating their website; the Fixed Layout, the Fluid Layout and the Elastic Layout. I will provide a brief explanation of each layout. There is no best layout for choosing, each form will have its own use and the web developer has to choose the correct layout based on his or her customers. As we move beyond these layouts, we will go in to something known as Responsive Web Design, which is very much what layouts are trying to achieve but done more sophisticatedly.

This is why we have to manage the screen carefully and why screen is so important to our website that we create. There are three kinds of layout we will explain them. For our website we used the Fluid Layout and we will show the code that we used on it and some images describing the three different kinds of layout.

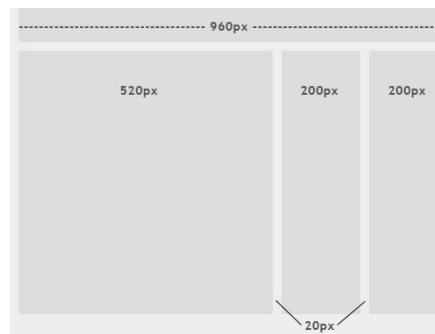
### **3.1 The Fixed Layout**

Each user has a different screen resolution such as 800x600, 1024x780, 1280x800, 1280x960, 1280x1024 pixels. Depending on what the developer sees fit, some websites may have smaller pixel dimensions for example a screen resolution at 800x600 and defined by the width of the content of about 780 pixels and the arrangement is on the center of the screen. So the users that use a screen resolution of 800x600 they will see a page full screen. For those using a screen resolution of 1024x780 they will see the content of the page in the center and the remaining area will either be a background color or a background image created by the web developer. If we make the screen resolution 1024x780 and the users use a resolution of



IJCSBI.ORG

800x600 the problem is they have to scroll and see the website. Which is time consuming and troublesome for the user. This shows us how crucial screen resolutions are to the web viewing experience. Figure 1 shows an example of a fixed layout. We have discarded the use of the fixed layout.

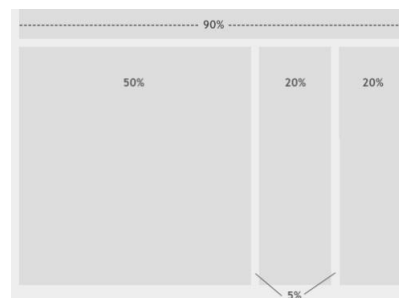


**Figure 1. Fixed Layout [4]**

### 3.2 The Fluid Layout

This layout is more user friendly as it adjusts to the user's screen as much as possible. However compared to fixed layouts, it is much more difficult to make and control for the matter, because what developer sees on his screen may not be the same for the users. Much of the trouble may come when placing content such as videos and images with fixed dimensions, as these may become harder to scale along with the screen sizes.

This is the layout we use to create our website. In short, Fluid Layout is the layout structure that uses percentages instead of pixels to determine content dimensions, which is different from the Fixed Layout that uses pixel values to control the page no matter what screen resolution a web page is being viewed in. In Figure 2 we replace the pixel values with percentages. For example if we create the width and height of the page as 100% then if users use 800x600, 1024x780 or any screen resolution they can view our website full screen so it's mean that if we use this design our website can open with almost every screen resolution on a computer.



**Figure 2. Fluid Layout [4]**



From the picture above the top part of the site displays a header which is wide 90%, the main part that shows the content is about 50% and 20% for the lateral side. This is a good example that makes web designer and web developer to look at and understand easily because it shows a simple webpage that makes it clear.

This layout is also used in our website because it can show our website in every screen resolution and it doesn't take too much time for doing this design layout and the result is very great so that's why we prefer this layout. This is the way we set the whole body of our page we set it 100% and our website we create it as a single page that a lot of websites in the world use.

```
#page1_content {  
    position: relative;  
    width:100%;  
    height:95%;  
    margin:0 auto;  
    background-color:#2e2f31;  
    color:#d8d8d8;  
    z-index:0;  
}
```

This is an example of page 1 that we use 100% of width and 95% of height and it depends on each page.

### 3.3 The Elastic Layout

A lot of testing has to go in to the design before it can be fit for all screens. In an elastic layout a special unit called the “em” is used for the unit of measurement. The em unit scales according to the users font size which is set in the unit em. This scaling can be done via the browser.

### 3.4 The Responsive Web Design

This is undoubtedly the next big standard that all web developers are and should be conforming to. Much like the layout techniques that are mentioned above, in fact the same thing but all combined together to provide the ultimate user friendly website possible. This technique is made possible through the use of a CSS3 selector called the media query and a fluid grid.



Responsive Web Design is probably the most confusing and the hardest to get right, but it provides the most flexible user experience across a multitude of screens, if not possibly all screens.

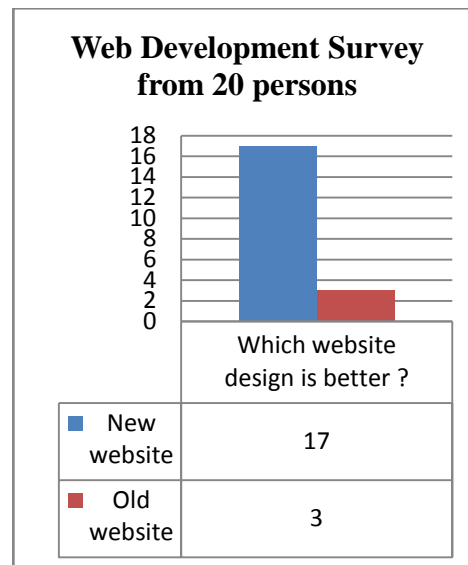


Figure 3. Example experimental results

### 3.5 Graph from survey of 20 people

In this part, the graph of the survey is shown that we made for the evidence that our website is better than the old website. Then we have about 5 graphs to show what people like why they like the old website and new website that we create. What we found from the survey we thought that our website is better than the old one but the truth is some people they think the style of the old one is better. The percentage that we found in the survey 85% of people they like our website and 15% they like the old website and we think that it is alright for us because we cannot make any website that a 100% people like. It is very difficult. Table I and Figure 3 show the experimental results.

Table 1. Web Development Survey from 20 persons

Table I	Web Development Survey from 20 persons
	<i>Which website design is better?</i>
New Website	17
Old Website	3



This is the graph that we made from our survey. The survey was given to 20 employees working at Unilever Thailand. We also found out that older people tend to like the old website better than the new one. But in this case it's not about the ages but it's about the opinion. Those that like the new design do so because of better design and usability. This graph is the evidence tells us 85% of people think our old website design is better.

The first thing that we make is better design that show the new website 10 out of the 17 chose the new website because of better design, demonstrating the fact that people often judge first on looks. An eye catching website has better chances of inviting people rather than a dull website. This means more than 50% of those who chose the website, did so because of the design [10].

This fact further emphasized as none of those who chose the previous did so because of design. Visual appeal is an important factor in attracting attention. Our website had gone with a modern look, appealing to younger people. In fact more time was spent on designing the website than actually coding it. As we continually asked for feedback from those who were testing the website, design has always been an important factor, not just in web design but almost everywhere. Taking this in to account, we had strived to make the design as suitable and as grand as possible. We had gone with a black and grey color scheme that allowed us to easily build contrast but adding color. As University websites serve to provide information for possibly future students, we found that it was important for us to be able to visually highlight important content on a web page. A dark background makes any bright color instantly pop, therefore guiding the user's eye. However this also raises problems colors visually clashing as there is no middle ground the colors can fall back on. We hoped to eliminate this problem by only using a set of colors to a certain amount, on a certain page. This next graph examines the remaining portion of those who chose the website. Each person can choose the website for more than one reason.

Of course a website's design is not the only thing of importance. You can't make fried eggs with an egg's shell. You need the yolk. A rather silly analogy as it may be, but what it trying to tell is very important. A website can look as great as it wants, but without good content, or access to that content for the matter, a user will quickly dismiss a website [11]. In order to collect data on how well we had structured the content we raised another topic for those who were surveyed.



IJCSBI.ORG

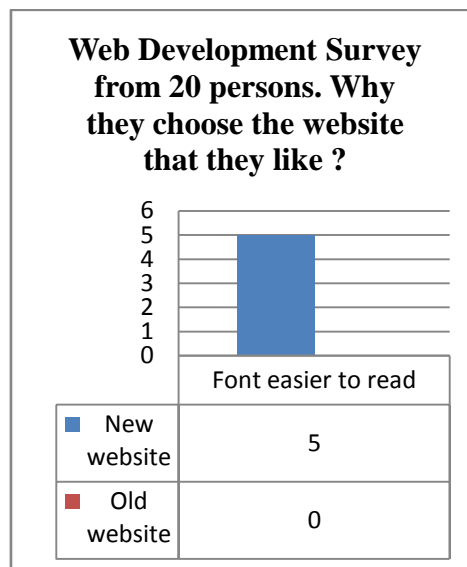


Figure 4. Web Development Survey

Yet again, more than half have chosen the new website, but however this time some had actually preferred the old website. The main reason was that the navigation on the old website was simpler. But then again, those who chose the new website also gave a contradicting reason, they had said the navigation on the new website was better. Judging by the numbers, it seems we would have to take this as factual data rather than personal preference. We employed a one page website design, putting as much content as we can in to a single page and dividing them in to sections. Users navigate via a fixed navigation bar with topics regarding the University. Clicking on the navigation will allow the user to smoothly scroll to corresponding location. Simply, but it is also stylish.

The next question is also concerned with user being able to make use of the content. Much like anything that has words in it. The most important thing is being able to read it. The main thing we could do ensure that users will have the most comfort reading our content was font selection, font sizing and spacing [12].

Table 2. Why they Choose the website that they like?

Table II	Why they Choose the website that they like?
	<i>Font easier to read</i>
New Website	5
Old Website	0



Though the numbers are significantly less than that of the other reasons, its importance is still proven by the fact that there are those who have chosen the new website over the old one because of readability issues. As shown in Figure 4, much like the design, the new website provides enough contrast which are easy on the user's eyes. After all people need to be able to know what they have managed to find on the website, and if they can't have pictures explaining things to them, then at least have words that they can read.

We have worked with the font BebasNeue, which is an easily distinguishable font and rather modern looking. This helps tie in the rest of the web design. Typography is an important design element that many people look over, often without a second thought. The best fonts are the ones that are the simplest, as users are trying to read content, not have to decipher them every time they want to find out about something.

The last remaining portion raises the questions of the layout of the content. It is whether the structuring of content made sense, or whether it followed a good pattern. As we have mentioned before we had used a fluid layout for the website, and screen resolution is also important.

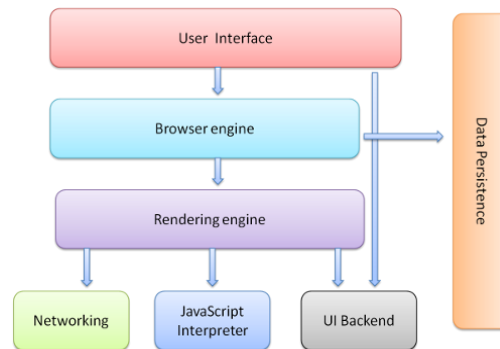
This is the graph is to find out whether people thought our website was accessible or not. So 35% of people think that our website is more accessible and 10 % think that the old website is better. Accessibility in this case refers to viewing on different screens, different browsers and the overall simplicity of the link structure from one web page to another.

#### 4. STRUCTURE

The main languages of the web are the HTML (Hyper Text Markup Language), the CSS (Cascading Style Sheet) and JavaScript. More on these languages will be explained but know that when a browser works on the web page, these are the languages that it has to interpret for the user as they are the languages used to construct the web pages themselves. The browsers interfaces as we know it are rather similar consisting of an address bar; where you type the URL (Uniform Resource Locator) of a certain web page, other basic functions include being able to book mark web pages, moving back forth between web pages with the back and forward buttons, and the home page button takes you to the page you have set as the default page. For the average user this might be all they know and need to know about a web browser, but for most web developers they might need to delve a little deeper. It is not a surprising fact however that most web developers themselves do not know how a browser works, at least in the most minute of details.



The browser can be broken down in to 7 components, each component working together to display the content as shown in Figure 5.



**Figure 5.The Browser's Structure [5]**

1) The UI Interface: This is the interface that users interact with, consisting of a graphical interface for browser functionalities such as bookmarking, zooming on web pages, refreshing web pages and other useful functions. This the application stage where users will interact with the browser. This is the visible component that all users are aware of.

2) The Browser Engine: The browser engine is responsible for acting as the bridge between the UI Interface and the Rendering Engine. It will take actions from the user and the results of the Rendering Engine to display a page in the browser window.

3) The Rendering Engine: The vital part of the browser, the Rendering Engine is responsible for displaying the page by parsing the web languages. The rendering engine will follow a flow in which it will gradually render the contents of the page. Chrome and Safari uses a rendering engine called the Web kit while Firefox uses one called the Gecko Engine.

The HTML will be parsed and the browser will begin construction of what is called the DOM tree or the Document Object Model. The DOM is the convention by which we control and manipulate HTML, XHTML and XML documents. It's called a tree because the code is divided in to nodes and laid out in a tree structure. Each HTML mark up tag will have its own hierarchy and the construction of DOM tree basically help lays the foundation for what each mark up means and what it does in relation to the browser. Once the DOM tree has been constructed, the styling elements of the web which is the CSS code will be used for the creation of another tree called the Render Tree. This tree will be responsible for laying down the visual



IJCSBI.ORG

elements that are included with the HTML. The nodes are laid out in rectangles in what we call the CSS box model where each markup takes up space like a box. Once the necessary elements have been loaded it is time to position the elements by where they will appear exactly on the screen.

The last stage is to finally paint the tree. What this means is that the rendering engine will use the UI methods of the underlying Operating system to render out each individual node.

4) Networking: HTTP requests and other networking calls are handled by this component. Implementing Data communication and networking protocols to send and receive data.

5) UI Backend: This is the interface that uses underlying UI of the operating system. That is used to draw basic graphical elements such as windows, check boxes, radio buttons and combo boxes.

6) JavaScript Interpreter: The JavaScript Interpreter is used for the execution and parsing of JavaScript code.

7) Data Storage: The database system of the browser in which it will save user specific data such as cookies and other web related user information.

## 5. CONCLUSIONS

The current five major browsers we in use today consist of Chrome, Internet Explorer, Firefox, Safari and Opera. Below you can see the usage statistics of each browser. It is evident the top three popular browsers are Chrome, Firefox and Internet Explorer. Since each browser renders out pages in slightly different ways, web developers have to constantly be aware of how their websites will turn out on each individual browser, Internet Explorer being a prime example of what works in one browser does not work in another. Browser differences are not the only factors that websites have adapted.

## REFERENCES

- [1] Elisabeth Freeman and Eric Freeman, Head First HTML with CSS and XHTML (First Edition), O'Reilly Media, Inc, United States of America, December 2005.
- [2] Browser Statistics and Trends, Available:  
[http://www.w3schools.com/browsers/browsers\\_stats.asp](http://www.w3schools.com/browsers/browsers_stats.asp)
- [3] J. Jones. (1991, May 10). Networks (2nd ed.) [Online]. Available: <http://www.atm.com>



IJCSBI.ORG

- [4] Kayla Knight (2009, June 2nd). Fixed vs. Fluid vs. Elastic Layout: What's The Right One For You? [Online]. Available:  
<http://coding.smashingmagazine.com/2009/06/02/fixed-vs-fluid-vs-elastic-layout-whats-the-right-one-for-you/>
- [5] Tali Garsiel& Paul Irish (2011, Aug 5). How Browsers Work: Behind the scenes of modern web browsers.  
Available:[www.html5rocks.com/en/tutorials/internals/howbrowserswork/#Painting](http://www.html5rocks.com/en/tutorials/internals/howbrowserswork/#Painting)
- [6] Mardiana, M., Araki, K. ,and Omori, Y., MDA and SOA approach to development of web application interface, TENCON 2011 - 2011 IEEE Region 10 Conference, pages 226 – 231, 21-24 Nov. 2011.
- [7] Rachit Mohan Garg, YaminiSood, BalajiKottana, PallaviTotlani, A Framework Based Approach for the Development of Web Based Applications, World of Computer Science and Information Technology Journal (WCSIT), ISSN: 2221-0741, Vol. 1, No. 1, 1-4, Feb. 2011.
- [8] GavinKistner. Why tables are bad compared to semantic HTML and CSS:  
<http://phrogz.net/css/WhyTablesAreBadForLayout.html> 2010
- [9] Patrick Sexton. Descriptive and accurate <title> elements and ALT attributes:  
<http://www.feedthebot.com/titleandalttags.html> 2011
- [10] Why graphic design is important  
<http://www.slideshare.net/LocalInternetTraffic/importance-of-graphic-design-in-web-development> (2008)
- [11] Julie M. Rinder, Fiserv, The importance of Usability Testing in Website Design (July 2012)  
<https://scholarsbank.uoregon.edu/xmlui/bitstream/handle/1794/12257/Rinder2012.pdf?sequence=1>
- [12] Sandra Gabriele. The role of typography.<http://www.longwoods.com/content/18465> (2006)