Web Design Focusing on Users Viewing Experience with Respect to Static and Dynamic Nature of Web Sites

R. M. Balajee, M. K. Jayanthi Kannan, and V. Murali Mohan

Abstract In recent days, Web design is mainly focused on screen size of the device and for that they are using some predefined cascading style sheet (CSS) like bootstrap. The responsive HTML is making some impact on viewers based on their viewing experience. A few Web sites additionally allow consumers to drag and drop controls to customize the Web page and freely publish the generated Web page. This has limited the user to a set of predefined Web page design styles. Also, the Web design is focusing and realigning the existing and new content of the page according to the new product recommendation by analyzing the previous purchase and similar purchased item. This recommendation is also based on the gender as well. Individual shopper's decision-making styles are also making an impact on shopping items. The Web details are getting varied on the basis of geographic location and the culture. Depending upon the Web contents, the Web design is changing itself in order to present their contents in a proper way. The researchers are also focusing about the links on the Web page and also about the number of clicks required to reach the particular content and its impact over the user by using this process. The alignment of pictures, videos, and some important text are having ability to contribute for attractive Web design. The papers are based on Web design, and the influence on the user has been taken into account for a survey over here. There are several factors that can influence Web design and the users who use it; we are on our way to developing better Web page designs that improve the viewing experience of users.

Keywords Screen size · Responsive HTML · Viewing experience · Alignment · Links on Web pages · Web design

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1 Introduction

The unique Web links are counting more than one billon in today's world [1]. In these, huge numbers of Web sites are developed by individuals, small- and medium-sized enterprises [2]. The professionals and also non-professionals are now building Web pages due to the easier way of drag and drop approach, which is introduced by some Web sites in order to build our own Web pages to publish [3]. This aspect brings a question mark on the viewing experience of the developed Web pages, even though it is filled up with some useful contents. The design of Web pages is considering the following parameters,

(i) Text element and formatting
(ii) Link element and formatting
(iii) Graphic element and formatting
(iv) Page formatting
(v) Page performance
(vi) Site architecture

Figure 1 illustrates the building blocks of Web page design,

Text, link, and graphical elements and their formatting are the basic blocks of Web design, over that page formatting [4], page performance, and finally site architecture laid on the top.

The building blocks are associated with few aspects and those aspects are listed here,

Text elements aspects: The level of text included on the page, wherein the split up has been made with tables and their visibility.

Link elements aspects: The number of links associated with the page and Web site and link type, which is based on the element, which enables the link.

Graphic elements aspects: A number of graphical items including images, videos, and animations are included on the Web page. It also includes image and video quality and the length of video play.

Text formatting aspects: This deals with font style, size, color, font family, quality of text, underline, bold and highlighting text, etc.

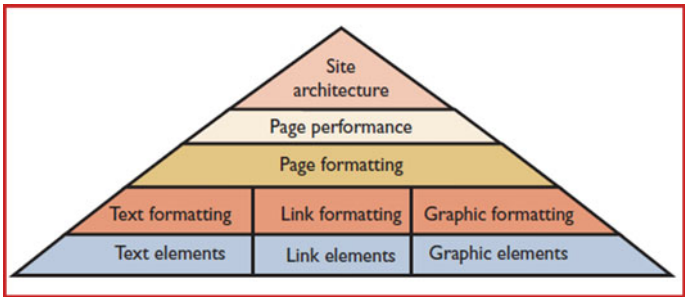

Fig. 1 Building blocks of Web design

Link formatting aspects: Link view ability based on its size, contents surround it and uniform pattern over the Web site.

Graphic formatting aspects: The height and width of graphical and positioning of those elements in Web pages.

Page formatting aspects: This deals with cascading style sheet and alignment of elements in Web page. [5] The combination of color impacts the viewing experience, menu bar placement, navigation links, positioning of interactive elements, etc.

Page performance aspects: Page content loading time is the only aspect we are considering for page performance.

Site architecture aspects: This includes page formatting and page performance in it together. [6] The number pages associated with the current page and entire Web site, number of pages in the Web site their inter link and flow control.

2 Literature Survey

The Web design of non-professional should also be improved and for that one tool has been developed, and this will inspect the building blocks of Web pages with multiple measures on each aspect [7]. A total of 154 measure is being examined to create page and site rating which in turn helps the user in modifying the Web pages. The tool can compute up to 157 pages in a Web site. It has reached 84% of accuracy on feedback. The rating provided by the tool and the participants is examined against each other for finding the accuracy of the developed tool.

The design components of Web pages can also be contents, containers, sidebar and header [8]. Each component can be designed with any width and height but there should be preferable width and height for each. The preferable width and height were found by user voting after viewing various templates participated in the contest [9]. The templates participated and the user voting for that are given as average over here in Table 1, which says about width of the content; similarly scores given by users over the containers width are given in Table 2; the header width and sidebar width are presented in Tables 3 and 4, respectively.

All the Web sites are associated with a set of Web pages and links for that too. The links may be from home page or from any subsequent page [10]. In survey paper [10], they set a threshold value for reaching destination page and they are checking

Table 1 Scoring for width of content

Characteristic	Width in pixels range	Score
Content	968–1200	5
	736–968	4
	504–736	3
	272–504	2
	40–272	1

Table 2 Scoring for the containers width

Characteristic	Width in pixels range	Score
Container	1088–1200	5
	976–1088	4
	864–976	3
	752–864	2
	640–752	1

Table 3 Scoring for header width

Characteristic	Width in pixels range	Score
Header	260–300	5
	220–260	4
	180–220	3
	140–180	2
	100–140	1

Table 4 Scoring for sidebar height

Characteristic	Height in pixels range	Score
Sidebar	260–300	5
	220–260	4
	180–220	3
	140–180	2
	100–140	1

average links required to do that against the threshold value set. If the average is more, then the pages need to be rearranged in such a way to reach the threshold value.

The Web site design is based on the Web site developer idea in early times but it should also consider the end user who is using it, and according to that, the Web site design needs to be re-modified or build [11]. The Razi University students of Iran conducted the survey on Web design and users need to develop satisfied design to build new Web site. For this, they had considered 12 different university Web sites and conducted analysis.

3 Results and Discussion

The weight in Table 5 is obtained from the average marks provided by the users over the 16 parameters specified, namely comfortable, efficiency, simplicity, uniqueness, professional look, attractiveness, perfection, creativeness, neat design, fast response,

Table 5 Web site analysis result

Image identity	Webpage weightage	Page BG Color			Header and footer color					Image section						Logo		Main menu		Multi-language feature	
		Blue color	White color	Golden color	Green color	Blue color	Red color	Gray color	Orange color	Side			Location			Location		Vertical text	Drop down	No	Yes
										Large	Medium	Small	Right	Center	Left	Right	Left				
1	2.98	0	1	0	0	1	1	0	0	0	1	0	0	1	1	1	0	0	1	0	1
2	4.41	0	0	1	0	0	1	0	0	1	0	0	0	1	0	1	0	0	1	0	1
3	2.78	0	1	0	1	0	0	0	0	0	0	1	1	0	0	0	1	0	1	1	0
4	1.33	0	1	0	0	1	0	0	0	0	1	0	1	1	0	1	0	0	1	0	1
5	2.63	0	1	0	0	1	0	0	0	0	1	0	0	1	1	0	1	0	1	0	1
6	2.72	0	1	0	0	1	0	1	0	0	1	0	0	1	1	1	0	0	1	0	1
7	3.56	1	0	0	0	1	0	0	0	1	0	0	1	1	1	1	0	0	1	0	1
8	1.78	0	1	0	1	0	0	0	0	0	1	0	0	1	1	1	0	0	1	0	1
9	4.72	0	1	0	0	1	0	0	0	0	1	0	1	1	0	1	0	0	1	0	1
10	4.23	1	0	0	0	1	0	0	0	0	1	0	1	1	0	1	0	1	0	0	1
11	1.69	0	1	0	0	1	0	0	0	0	0	1	0	1	0	1	0	0	1	0	1
12	1.93	0	1	0	0	0	0	0	1	0	1	0	1	1	0	1	0	0	1	0	1
Sum	34.76	7.79	22.56	4.41	4.56	23.86	7.39	2.72	1.93	7.97	23.32	4.47	18.55	31.98	13.67	29.35	5.41	4.23	30.53	2.78	31.98

Table 6 Web sites with shapes

Features	With	Without
Geometric pictures	20	40
Animation	40	20
Duotone presentation	18	42
Grid format	44	16
3D things	13	47
Large text	49	11

plain, lovely, hope, beautiful, update and modern design. The value of 1 and 0 indicates the availability of particular content on that Web site.

In a result of this made survey, it is clear that, white background color with blue header and footer is attractive than other combinations. Medium-size image with center alignment is looking good to score with end user. Right logo placement, dropdown box, and multilanguage feature are also good to have in the developing Web site.

The Web site design from 2013 to 2017 is considered, as well as the differences between them. Banks, schools, and libraries are among the 60 Web sites selected for their investigation. They found to have the following data present in Table 6,

They found that, animation, large typographical things and grid are used in most of the Web sites. Geometric shape, duotone and 3D are less popular among the metric.

Even in the year of 2018, the e-shopping in Pakistan was not so popular like other countries and so a survey has been conducted over that to identify the reason. The reason may be on the Web site design, belief of new online shopping method and some other problems [5]. 156 respondents are selected for this review. They found that, 89% of e-shopping has been done by females. Only 10% of the people are older than 40 years who does the online shopping. 49% of people doing only one transaction on online and continue it further [12]. In the end, they found Pakistanis are afraid to share their personal and economic status online.

Interactivity, color, quality, navigation, content and typography play an important role in Web page design attributes [13–15] to determine the trust, satisfaction and loyalty in terms of avoiding uncertainty in design among various available cultures. The focus on social network will help in collaborative filtering on product recommendation process [16]. Due to various products recommended for different user, the alignment may get changed on the Web page. These e-shopping Web sites should also consider gender of viewers, because of different mindset of male and female toward Web design [17]. Males are independent who most of the time required relevant information by themselves and which in turn reduces the effort in searching process. Women are much interested in social media and as communal nurturers, using the Internet as a tool in the way of maintaining social bonds of them [18–21].

There is a mental model [2] which says about the viewing point over the Web pages regarding particular type of content., based on this the Web content can be extracted from the particular position [22, 23].

When we are speaking about the Web scrapping, the position of the content need to be analyzed before trying to extract it from a particular position. For example, the extracted text may be title or advertisement or the actual content. To make it more precise, the expected area in the screen for each type of Web particulars extraction has been analyzed here, and the result is shown in Fig. 2.

Most of the Web site users are now viewing the Web site on mobile phone [24–26], due to the smart phone availability and Internet connection. The Web site design is moreover based on the screen size of the device which is used to view it, and the differences are shown in Fig. 3 (the same Web page is been opened in mobile

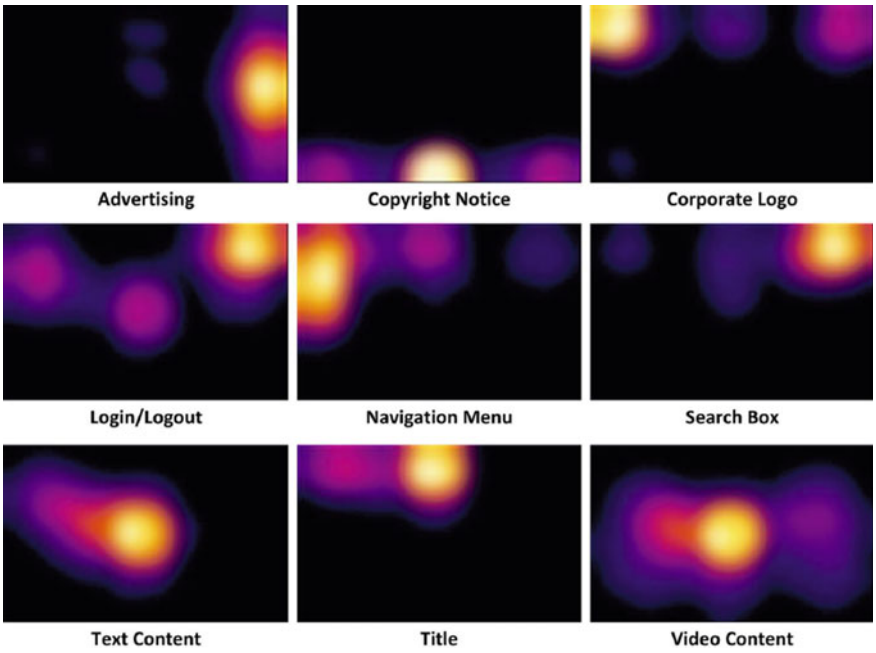

Fig. 2 Viewing areas of human with the expectations from previous experience

Fig. 3 Alignment of Web site in mobile, desktop, and smart TV

phone, desktop, and smart TV). The Web page alignment in different devices has been having the notable difference. Figure 2 is actually the analysis made on the desktop version.

It is not like a desktop application, which can be created with some fixed measurements and had an ability to adjust a little bit according to the screen. The problem on Web design is that, it can be viewed on the mobile phone and as well as in smart TV with some 50 inch screen [27]. The change in web design such like (due to different devices and browser paltfomes) causes major issues in the content alignment and navigation over that [28, 29] and this further leeds to make the be changes according to that screen size to provide good viewing experience to user.

The personalized Web pages are increasing in today's world, and retrieval of information from those Web pages is becoming difficult for the search engine. To overcome this problem, in survey paper [30, 31], they proposed a solution, they want Web sites to specify about their origin and user location has been extracted and according to that the Web sites are linked to search information. This will make a way to do efficient search over the available Web sites based on location.

4 Conclusion

The Web design is based on the user's device and hardware support for those devices, as well as the user's gender and mindset. Finally, the Web page displays the content. The Web page design should not be static in nature; else, anyone visiting those Web sites will be turned off by them. The e-shopping Web sites and other commercial Web sites are focusing on attracting the user with their products; this will not be perfectly accomplished without the proper design of Web pages. The proper Web design is relied on the dynamic nature of Web pages and static size and positioning of Web elements, so that the Web pages can also alter its design dynamically according to the demand on viewer side. The concepts discussed here are proving that, the Web pages are dynamically designed with the likes of alignment according to the screen, personalized product recommendation-based views and static design like color chosen, size, and position of each viewing component in Web page, and finally the tools to perform Web page analysis. The aforementioned approaches are making the Web page more attractive and utilizable for the end users.

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