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Web Readability Factors Affecting Users of All Ages

¹Walayat Hussain, ¹Osama Sohaib, ²Atiq Ahmed and ³M. Qasim Khan

^{1,3}Faculty of Information and Communication Technology, Balochistan University of Information Technology, Engineering and Management Sciences (BUIITEMS), Quetta Pakistan.

²Department of Computer Science and Information Technology, University of Balochistan, Quetta Pakistan.

Abstract: With the increase in the growth of internet since 1990 WorldWide Web have gained a worldwide popularity .Web has become an ultimate source of information throughout the world. The web has been a source of information, knowledge, entertainment and carrying out different tasks such as online shopping, reservation etc. Every one finds ways to the web due to easiness of access and the bulk of information that has been available so ways to make web more attractive and easy to interact with has been an issue under discussion since its inception. In this paper we have focused how to make a webpage more usable for different age group in terms of readability. We have focused on eight eternal readability factors i.e. color contrast, white space, line spacing, font style, font size, text width, headings, graphics and animation. These eight factors are compared that how different age group people behave with the web applications by varying these eight factors. Based on literature review we have proposed an idea that how to make web more readable for people of different age groups e.g. children, teenagers and old /senior users.

Key words: content usability, web readability, web accessibility

INTRODUCTION

Information is valuable only if one can understand it. Therefore readability is one of the important aspects of web usability. Readability is the property which makes any writing easy or hard to read, understand and memorize. Web Readability does effect in promoting any business, if the web portal is more usable and readable, the number of users will increase to interact and to do business. This is the reason that the content of most of websites are very simple and suggested that the main page content is at 8th grade level and wrest of pages at 10th grade level. The main theme of web readability is how to make web more readable so that the information required out of it can be easily understandable. The more web application is readable the more information can be extracted as well as it will attract its users.

In our previous work in (Hussain *et al*, 2011) we have revealed that although there are certain measures which does effect in the readability of web page like basic understanding of ICT, various factors like scroll bar, arrow, graphic etc. does effect the readability but the content of web page and the understanding of text effects a lot. There are four broad areas of web readability i.e. content, style, structure and design. In this paper we have point out eight factors out of these fourbroad categoriesand discussed with the context of different age groups.

Our focus is how to make web page more readable for people of different age groups e.g. children's, teenagers and old /seniors on this basis of following eight factors which are:

- **Color Contrast:** Contrast is the main aspect in whether or not text is easy to read and understand. Decent contrasts will make text easy and clearer to read.
- **White Space:** In layouts with heavy text, spacing adds to the readability of text. White space aids to balance large amounts of text and helps the user's eyes drift over the content. It also offers parting among components in the layout, comprising visuals and text (Friedman, 2008).
- **Line spacing:** Text with good line spacing is easy to read.
- **Font style:** Normal fonts are easy to read [W3Schools].
- **Font size:** Choose a font size that is easy to read.
- **Text width:** The undersized width makes the text easier to read.
- **Headings:** Use of headings and sub-headings aid readers discovers exact subjects and material.
- **Graphics and animation:** Use of graphics and animations depends on for whom you are designing the web [W3Schools].

Background:

Readability does affect any age group of web user; here we will analyze why web readability is essential for these age groups.

I. Web Readability for Old Age People:

Elders are among one of the fastest emergent age group on the Web. According to survey held in 2004 in US there are about 9 million Internet users above the age of 65 (Nielson, 2002). According to another assessments report by the United Nations, currently out of every nine person one person is at the age of 60 or above, which will increases by 2050 in which out of every five person one person is at the age of 60 or above, which may reach to one out of three persons in 2150, All developed countries have large population of elder people. Estimates shows that European countries in 1950 had a population of 65+ age of 45 million; in 1995 the population of 65+ age had doubled to 101 million ,and is estimated that by 2050 Europe will have 173 million folks of 65+ age(20% of the population). Even though they are retired, elders live an energetic life and take interest in new technologies for example internet, that provide them with a new way to interact with other people around the globe and provide facility to avail services more easily (Huber, 2005).

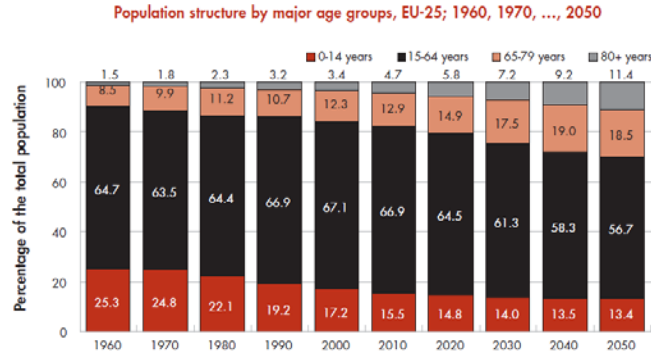


Fig. 1: Population structure graph of different age group in European Union from (1960 to 2050 estimates) (European commission report, 2006).

II. Web Readability for Teenagers:

According to survey conducted by Pew Internet and American Life Project, around 83 % of U.S. youths are using internet, more or less same proportion exist in other developed countries. We cannot ignore this mass portion of society; website must design to deal with the need this huge user group. According to [European school net report] online survey 66% of users who are above 18 years are online for more than ten hours per week, the report mention that time to spent on internet is directly proportion with age but up to certain limit

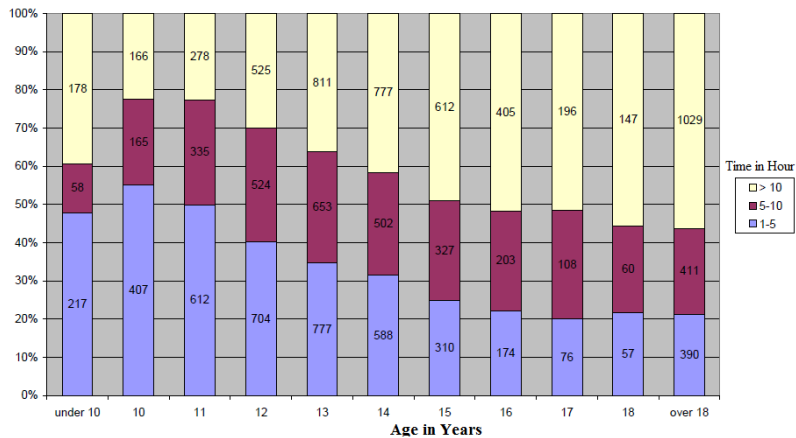


Fig. 2: Variation of different age group with respect of time on web.

Jacob Nielsen reveals that, teens dislike plain text websites with dense reading material. They appreciate carrying out chores on the website such as playing games, quizzes and solving puzzles. As a replacement for showing information in written arrangement on a website, merge communicating features with the information. For example, a column on teaching teenagers about hair care is placed on web; start with a referendum asking the teenagers how frequently they wash their hair. Finish the segment with a quiz about well-known star hairstyles.

III. Web Readability for Children /Kids:

Day by day technology is enhancing and internet is becoming common in school and now even in classroom. According to survey of US Department of Education, 95% of schools in US were using internet since 1999. According to another survey by Canadian newspaper 93% of secondary school and 62% of primary schools are using internet since 1999-2000 in UK. In 1999 Canada project, claimed to be the first in the world to connect its public school to the internet and target to connect 250,000 computer. Purpose is to provide internet facility in schools for students so that can easily do their class project (Large *et al*, 2002). Don Tapscott, a psychologist use a term “NET GENERATION” for children who were born in 80s and onward in US. The US department of Education; reported in 2005 that 32% of kindergartens age children and 50% of 1 to 5 grade student are using internet (Bernhardt, 2006).

Related Studies:

(Chadwick-Dias, 2003)identified that old age people experience low usability than other age group due to many factors and experience. Text size has low importance in any age group however large text size is good for old age people. Further they identified that different age group web users, have different access of internet. Senior users having age of above 65 years access internet only at home compare to other pre-retirement users who have both access internet at home and office, work etc. and this variation in use does affect the usability of web users.

(Sun, 2010) propose the design guidelines for people of old age. They suggested that four aspects play vital role while designing any website for old people i.e. interaction design, information structure, visual design and information design. Old people have many usability problems like vision, hearing, cognitive etc. due to mental and physical function decline due to aging factor. The guidelines proposed by them help any designer while designing any learning website for old people.

(Yan and Guo, 2010) discussed that readability design in one of the aspect of web design. Therefor it is important to develop a better design method for designer regarding web usability.

(Hussain *et al*, 2011) proposed a plain language text using English alphabets for web pages. The approach shows that changing the contents of web pages into local language by using English alphabets would get better results for any age group having lower literacy level.A guideline named by interface design guidelines published (agelight, 2001)identified six features which have great impact on different age group, few of guidelines are abstracted from WCAG and different software and hardware are proposed for users.

(Hussain *et al.*, 2011) also compare the three different web accessibility guidelines WCAG 2.0, IBM 5.1 and Section 508 against the Nielson readability characteristics for lower literate users. The results showed that content usability is improved following the WCAG 2.0 guidelines for all age groups of lower literate users.

(Hsin-Chieh, 2011) measured reading speed and proportion of correctness of Chinese digital text for E-Newspaper among different age groups. He identified that readability is affected by viewing distance and size of text and the requirement varies in various age group. Teenage and older people like shorter viewing distance compare to children. He analyzed that most suitable viewing distance for old age, teenage and children users were 444, 455,503 mm respectively. An average character size for old age, teenage and children was 55.2, 50 and 42 min arc. Resolution and contrast ratio also does affect in E-Newspaper display.

(Nandhini and Balasundaram, 2011) suggested a design of summarization tool for disable user such as dyslexic to help them in understanding of longer web content. Each test user was asked to a fill a questionnaire, they were given a summary along with passage. The tool works as a sentence extraction process considering the word frequency, sentence length, trigger word etc.

The Approach:

Four broad category of web readability are content, style, design and structure. We have selected eight key factors from these four broad categories of readability.

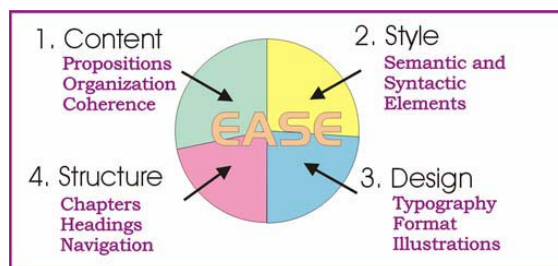


Fig. 3: Four broad category of readability.

The aim of this research is to compare eight key factors i.e. *color contrast, white space, line spacing, font style, font size, text width, headings, graphics and animation* with three categories of age groups i.e. children, teenage and old age users. The focus of the study is many online references and related literature that work as a basis for suggestion

Evaluation:

I. Web Readability for Old Age People:

- **Color contrast:** In a research led by the Institute for Color it is discovered that “individuals make an unintentional decision about another being, atmosphere, or merchandise in 90 seconds of first looking and about 62% to 90% of that valuation is built on color only” that why effect of color choice is very important in website design. The reaction to color rest on age of the user. Elder users may react well to a website scheme with soft colors (W3C, 2008). Research shows that elder people incline to be more fascinated by websites that have more conventional color patterns such as blues, grays, and browns, without flagrant contrasts that can fatigue the eye.
- **White spaces:** white spaces are essential to isolate text as well as visuals and vibrancies. With old age various problems such as eyesight, memory and many more rises so elderly people like websites that are clear and simple (Nielson, 2005).
- **Line spacing:** Proper line spacing makes text more visible and understandable. Without proper spacing text overlap and difficult to understand, which then will be difficult to understandable by old people. So proper line spacing increase readability.
- **Font style:** Do not use decorative font styles, as it is hard to comprehend and appears awkward.
- **Font size:** Websites that aimed seniors must practice at least 12-point type as the built in font size (Nielson, 2002). Growing old does not mean that the person must have a poor eyesight, yet, weakening eye site is a side effect of getting old. Researchers suggested font size of 14-18 for the reader of 65 or over, and 11-12 for the users of 40-65 (European schoolnet report).
- **Text width:** this means dividing any text into columns, to narrow the field of view. By narrowing the field of view will increase the readability for old age and also for people with lower literacy. We have seen it in newspapers that the main points which need to be highlighted and need to be read are placed in the column or in a box in the middle of the page to increase its readability.
- **Headings:** Usage of headings and sub-headings to arrange the text helps increase readability. Headlines between 14 and 30 points are preferred. More over the nearer in size to the body text, the difficult is to differentiate headlines from other writing (Nielson, 1997).
- **Graphics and animations:** Animated text and graphics disturb old age people they feel unpleasant and readability decreases significantly (Nielson, 2002).

II. Web Readability for Teenagers:

- **Color contrast:** A marked onlookers of teenagers will like a webpage design with vibrant and energetic colors (W3C, 2008).
- **White spaces:** white spaces are highly recommended so as to separate everything that has been presented on the web.
- **Line spacing:** Proper line spacing makes it easy to understandable and text makes sense out of it.
- **Font style:** Decorative font styles do not fascinate youngsters much. Simple styles with communicating features fascinate them much.
- **Font size:** Nelson research reveals that, while using web they stuck back to the chair so small font size often not good. Teenagers prefer large font sizes.
- **Text width:** As teenagers do not like much to read so dividing text into columns increase their interest and thus readability.
- **Headings:** In one of research it has been seen that normal user usually read 28% of the words on a web page. Web users scan information relatively than reading text word-by-word, so to breakdown the text. Usage of headings, lists, and sub headings make text scan able.
- **Graphics and animations:** Usage of visuals, simulations, audio and video help to make website that stimulates teenagers. Teenager’s emphasis on graphics more than adults does. Large images in loud colors attract them. Video added as a replacement for text provide them an exciting environment. Audio clips as background music enable them to listen while surfing any website.

III. Web Readability for Children:

- **Color contrast:** color contrast must be bright. Kids don’t want a dim color scheme. It must be mixture of some coloures.
- **White spaces:** white spaces are recommended between text and blocks of text (Yu, 2010).
- **Line spacing:** proper line spacing is preferred to make content clear.

- **Font style:** children like trendy style and like comic sans font.
- **Font size:** kid likes larger font size is must be 14pt.
- **Text width:** divide the text in to small columns.
- **Headings:** heading should be used to better divide the text so it is easy to understand.
- **Graphics and animations:** children are more attracted by graphic and animations. A picture that resembles the real world object helps them to understand the content

Results:

Different age groups have different preferences regarding web readability. If the above factors are considered while keeping in mind the different age groups the readability can be increased and a large number of users can be attracted [Table 1].

Table 1: Comparison of readability factors among different age groups.

Readability Factors	Old age users	Teenagers	Children
Color contrast	simple contrast black, gray and blue	Energetic and vibrant colors.	full of colors
White spaces	should be present	should be present	should be present
Font style	normal	normal	normal
Font size	large	large	large
Text width	divide into columns	divide into columns	divide into columns
headings	should be present	should be present	should be present
Graphics and animations	should be avoided	should be present	should be present

Conclusion and Future Work:

From the above comparative table we conclude that readability for any age group does effect on different factors which are color contrast, white space, font style and size, text width and heading, graphic and animation, understandability of content, vocabulary, text congestion etc. Among all these factor eight prominent web readability factors which have great influence on different age group. From various literature reviews we have seen that the impact of above mentioned eight factors except two i.e. color contrast and graphic and animation are same for every age group and variation in these factors does affect every age group. From this study we conclude that in order to enhance readability of any web page beside other factors above mentioned eight factors should be considered.

In future we will work on readability with respect of cultural usability, that how cultural values does affect web readability.

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