MENTAL WORKLOAD AND TIME TAKEN WITH VARYING PARAGRAPH SIZE AND NUMBER OF COLUMNS DURING ONSCREEN READING

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In recent times, researchers have noticed a drastic shift from paper based reading to on-screen reading. Withtimes, morepeople are getting major chunks of information from internet.Be it news, education or even literature, there is no end to the variety of information penetrating our lives through internet. This has certainly changed the way we read and interpret textual matter. Since onscreen reading is an important factor of Human-Computer Interaction model, it has been widely discussed by many researchers who aim at a mellifluous interaction between users and Information systems. As suggested by many scholars, onscreen reading is dependent on eight key factors namely font type, font size, angle of viewing, background color, text color, paragraph length, number of columns, screen size.Among thesefactors, font type and size are the most argued topics in the literature. In most of these studies,Serif fonts were identified as more legible than Sans serif fonts buts still people find issues in readability. In addition, it is well now established that most common font types on computer screen are Times New Roman (TNR), Georgia (Serif), Arial, Verdana (Sans serif). Among these Times New Roman was purposefully designed for both legibility and economy of print space and thus became popular fonts for print media. On the other hand, Georgia and Verdana were developed specifically for use on the computer screen.

Our research evaluates the influence of paragraph length and orientation on reading. The popular serif and sans serif fonts are Times New Roman (TNR), Georgia (Serif) and Arial and Verdana (Sans serif) on a computer screen in a group of young adults. Our research evaluates the influence of paragraph length and orientation on reading. We have used the most popular serif and sans serif fonts discussed above in our stimulus material on a computer screen as a treatment to a sample of young adults. Fifteen subjects have volunteered for our study. Total of six short stories were selected of same length and sameperceived subjective difficulty of the paragraph and each story was formulated in six different paragraph lengths and column types, namely a) 1 paragraph, 1 column b) 2 paragraph, 1 column c) 3 paragraph, 1 column d) 1 paragraph, 2 column e) 2 paragraph, 2 column f) 3 paragraph, 2 column.

Subjects were randomly assigned to different manipulations. For e.g. if one subject read a story x of 'a' type then other subject read story y of 'a' type. Reading time, ranking (Subjective preferences) and mental workload were the measured dependent variables.The average reading time was least for 1column X 3Paragraph (171.54 + 27.20 sec) but the observable change was not so much varying as anticipated before and it was also not as significant (p>0.05). It was followed by 1column X 3Paragraph.

No significant interaction was observed between different paragraph sizes.Subjects ranked different paragraph size and no. of column combinations on a six point scale. They ranked 1column X 3paragraph (3.46) as the most preferred readable column and paragraph size combination in comparison to other combination. 2column X 2paragraph (3.23) was ranked as the second best preferred.Overall mental workload for each paragraph size and no. of column combination were calculated by averaging the four dimensions of NASA TLX with the same weight. It was least for 2Column X 3 Paragraph (46.65 + 13.11), followed by 2Column X 2Paragraph (48.45 + 15.12) and 1column X 3Paragraph (49.48 + 17.30).Wilcoxn Test was performed on each pair between 1 column paragraphs and then 2 column paragraphs for the combinations 1column X 1Paragraph & 1Column X 2Paragraph, 1Coloum X1Paragraph & 1Column X 3Paragraph was found satisfactory in 0.1 P value range. Similar results were found for 2 columns.

From our Observation least time was taken for 1X3 and then for 1X2, the reasons for this can be the Paragraph wise division. Based on Wilcoxon test on Mental workload data for one column, the results came significant for comparisons between (1X1 & 1X2), (1X1 & 1X3) but it was not significant for (1X2 & 1X3). Based on Wilcoxon test on Mental workload data for two column, the results came significant for comparisons between (2X1 & 2X2), (2X1 & 2X3) but it was not significant for (2X2 & 2X3). Overall comparison of metal workload between each sample, when derived from Friedman chi test, found out that the changes were not significant for the tests but the reasons for these could be the less no. of subjects as test is generally performed for large set of data. From the observation we can say that people find it more easy to read short paragraphs rather than long paragraphs and short paragraph reduce their mental workload and increase the motivation of reading. Division of paragraphs in 2 column format decrease the reading time but increase the mental workload due to scrolling of pages.