Effects of Typographical Factors in Online Reading

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Abstract

The purpose of this study is to investigate the effects of typographical factors in online reading. A descriptive survey with structured questionnaires was conducted to collect data from a representative sample of 179 students of 35 teaching departments at the University of Calicut, Kerala. The analysis reveals that Social Networking Sites and Wikis are the most used online reading platforms by the students. A majority of the students use mobile phones and laptop computers for reading online. The students download and save materials from the Internet for reading. A majority of the students prefer Times New Roman font type, 12 point legible font size and 1.5 inch line spacing. They strongly agree that small font size and line spacing make the text visually uncomfortable for reading online. Eye fatigue is the major problem faced by the students while reading online. However, a few students opined that the inability to leave marks or make notes on online documents, low rate of comprehension, dead-end webpages, inappropriate background colour, skipping links are their concerns while reading online. As the study sheds light on the effects of typographical factors in online reading, it will go a long way in designing online interfaces for e-learning.

Keywords*: Typographical factors; Online reading; E-learning; E-resources; University of Calicut*

1. Introduction

Reading is an intellectual activity to interpret the meaning of something or to understand something. It is an essential life skill to keep informed and a key to a wealth of experiences that links people in a way far beyond distance or time. According to Noor (2011), a good reading habit is necessary for healthy intellectual growth and to achieve practical efficiency. It is very important not only for enjoyment, but necessity; the basic tool of education (Mokatsi, 2005). Reading is not limited to increase in knowledge but it also builds maturity, sharpens thinking, and widens awareness in social, economic, political and environmental issues (Abidin et al., 2011). With the explosive growth of the Internet and widespread use of e-resources, the world of information is growing fast and it facilitates different interfaces for reading online. Online reading is an active and constructive process to support dynamic reading space (Coiro and Dobler, 2007). With an increasing amount of time spent on reading online, a screen based reading behavior is emerging (Liu, 2005). People all over the world use the Internet to get access to information as quickly, cheaply and sometimes more accurately. Online interfaces have many advantages such as interactivity, immediacy of accessing information, and the convergence of multimedia. However, reading online is undesirable to many people for several reasons.

The reading experience from screen varies from one reader to another, related with factors such as reader's motivation, reading strategies, the physical appearance of the text, background colour, line length, line spacing, column settings, etc.

These factors are typically known as typographical factors. Typography is the body-language of a text. Good typography enhances the meaning of text and adds a tone of voice that subliminally reinforces what the words say to influence how these words are perceived (Walker, 2015). It is the fundamental component of design with style and appearance to make reading easier. According to Nakilciouglu (2013), the most correct, clearest and most rational way of presentation of any information is a good typography. A well designed typography provides a well-structured physicality to the text and it will make the reading a pleasant experience. It acts as a mediator between the reader and the text. It will influence the mood of the reader and creates a fruitful ambience towards online reading. A text prepared without setting typographically may affect the reading speed, comprehension, readability, and legibility of the text. It may lead to physical problems to the body of readers like eye fatigue, headache, technostress, etc.

Students tend to rely more on e-resources than hardcopy resources. They use different reading strategies to understand different types of reading materials (Burns and Sinfield, 2003). The Internet provides different platforms for e-learning and the students use the interfaces for their academic and other purposes. Typographical factors influence the online reading performance of the students. However, advances in display technology have reduced problems related to online reading performance and legibility. A well-designed content will allow students to understand all the parts of the content, while making mental processing easier.

This study is an attempt to identify the effects of typographical factors in online reading among the students of the University of Calicut. The University of Calicut founded in the year 1968, was the second university to be established in Kerala. The study helps to understand how the typographical factors affect the students' online reading. The results of the study will be useful for designing e-learning platforms and interfaces.

2. Review of Literature

Reading is an important activity in the learning process of students. The Internet provides a wide variety of online interfaces for students to fulfill their academic purpose. In a study, Rose (2011) found that the students successfully make their body and minds to read online papers when necessary. Kareem and Amelia (2007) observe differences in the online reading habits and attitudes between male and female participants.

Students use different reading strategies for online reading and better understanding. In a study, Podolsky and Soiferman (2014) observed that for academic purpose the majority of the students prefer printed documents, because it is easier to take notes, comfortable to eyes and it leads to less eye strain and headaches. Kymes (2007) found that the use of the Internet and the reading comprehension abilities did not influence the students' reading strategies. In another study, Chouhan and Lal (2012) found that the reading habits changed from paper based to the Internet-based reading and most of the students read online every day. Abidin, Pour-mohammadi and Jesmin (2011) observed that online reading was a highly important strategy in enhancing reading habits of the students. Quaderi and Abomoge (2013) established that the students use the Internet and read more online materials for examination and their project works. Tsai et al. (2012) found that the university students online search strategies adopted for searching daily life information were significantly better than those utilized for learning activities, especially in behavioural and metacognitive strategies.

Typography provides additional features which provide quality to the text and layout. Typographical factors like font size, font type, font colour and background colour, line length, line spacing, etc. affect reading online with regard to its readability, reading comprehension and reading speed. Tseng (2010) concluded that students disliked reading on screen. The factors that affected their reading were font size, background colour, eyestrain, and inability to take notes or underline text, skipping links when reading hypertext on screen.

Font is an important factor in typography and has a significant role in the readability and comprehension of online text. In a study Soleimani and Muhammadi (2012) revealed that 12 pt. font was read faster than 10 pt. font. But font selection and line spacing did not have any significant effect on comprehension and recalling. Bernard, Liao and Mills (2001) revealed that 14 point fonts are more legible and promote faster reading among the old. Abubaker and Lu (2012) observed that Arabic text in font size 10 is not readable to students aged between 10 -12. On the other hand, font sizes 16 and 18 are more readable than any smaller size font. Age tends to have a negative correlation with reading speed, when age increases reading time decreases. Beymer and Russel (2008) revealed that smaller font sizes resulting slower reading, but not significantly slower. There is no significant difference in Serif vs. Sans Serif fonts and Serif font reading was slightly faster than the other. But Hojjati and Muniandy (2014) found that there was a significant difference between the readability of Serif and Sans Serif font type of on screen display. The research findings suggest Verdana font type as a better choice in displaying long text on screen display. Shaikh, Chapparo and Fox (2006) revealed that Sans Serif and Serif fonts were most likely to be appropriate for items that are typically read on screen. Banerjee, Majumdar, Pal and Majumdar (2014) found that readability was better for Serif compared to Sans Serif. This study also recommends 14 point font size for reading on computer screen. Weisenmiller (1999) found that there was no significant difference among reading speed or reading comprehension scores of subjects tested who read text which was typeset in any of the four typefaces.

Line length is another important element in typography and it makes a significant effect on the readability of the text in online documents. Khan and Khushdil (2013) found that reading electronic text or material from computer screen is considered more difficult than the paper or printed text. The study also found that the suitable line length of text considering deferent typographical variables, i. e. font style, font colour and font size for improving readability from the screen. Dyson and Haselgrove (2001) found that readers may vary in their reading rate to maintain a relative constant level of comprehension. A line length of 55 character per line (CPL) appears to support effective reading in terms of both rate and comprehension.

Spacing of text in online materials plays an important factor in online reading and it affects the readability and comprehension of the text. Vanderschantz (2008) revealed that the eye movements required for effective on-screen reading for children differed from those required for the adults. The readability of the online text is also depends upon the spacing between the letters in a text. Perea et al. (2012) suggest that slight increase in letter spacing would improve the readability of texts aimed at children, especially those with dyslexia.

The column settings of the page have a significant role in the readability of online text and it affects the reading speed and comprehension of the text. Backer (2005) found that reading speed for the two column full justified condition and one column left justified condition were fastest in overall. Fast readers performed best under the two column full justified condition. Slow readers performed best in one column left - justified condition. Layout is an important factor in determining reading speed and reading efficiency for fast and slow readers.

The review of the literature provided established explanations regarding the concepts. It can be seen that the studies conducted on effects of typographical factors in online reading by experimental research and also takes one or two elements of typography as variables.

3. Research Design

The study was conducted with a descriptive survey among the students at the University of Calicut. The population of the study consists of 1200 students of 35 teaching departments at the university campus. Structured questionnaires were used to collect data from a representative sample

of 275 students. Out of the 275 students selected, 187 students responded to the questionnaire. Out of the 187 questionnaires returned, 8 were found unsuitable for statistical analysis and finally 179 were selected for the study with a response rate of 74.58 percent. Among these 63 (35.2 percent) were male and 116 (64.8 percent) were female students. Data collected was analyzed with descriptive statistics such as tables, frequencies and percentages and analysed with SPSS.

4. Analysis and Discussion

The analysed data is presented in the form of tables and figures and necessary interpretations are provided alongside.

4.1. Online Reading Materials Used by the Students

Online reading is an important activity for the students to improve their skills and knowledge. It becomes an essential part of the modern education system. Students read online for different purposes and read different types of e-resources. It is found that all the students resort to online reading. The students were asked to indicate the type of documents read by them online and the responses are presented in Table 1.

Table 1
Online reading materials used by the students

Sl. No.	Reading Materials	Never	Rarely	Some-times	Often	Very often	Mean	SD
1	E-Journals	58 (32.4%)	62 (34.6%)	44 (24.6)	15 (8.4)	-	2.09	.950
2	E-Books	49 (27.4%)	49 (27.4%)	57 (31.8%)	18 (10.1%)	6 (3.4%)	2.35	1.088
3	E-Theses and Dissertations (ETDs)	75 (41.9%)	54 (30.2%)	33 (18.4)	9 (5.0%)	8 (4.5%)	2.00	1.102
4	E-Zines	73 (40.8%)	38 (21.2%)	47 (26.3%)	12 (6.7%)	9 (5.0%)	2.14	1.174
5	Databases	82 (45.8%)	29 (16.2%)	27 (15.1%)	30 (16.8%)	11 (6.1%)	2.21	1.341
6	E-Mails	28 (15.6%)	31 (17.3%)	50 (27.9%)	37 (20.7%)	33(18.4%)	3.09	1.321
7	Stories or Novels	51 (28.5%)	47 (26.3%)	49 (27.4%)	25 (14.0%)	7 (3.9%)	2.39	1.152
8	Market Trend	81 (45.3%)	31 (17.3%)	38 (21.2%)	20 (11.2%)	9 (5.0%)	2.13	1.247
9	Movie Reviews	51 (28.5%)	40 (22.3%)	41 (22.9%)	36 (20.1%)	11 (6.1%)	2.53	1.264
10	Horoscope	103 (57.5%)	36 (20.1%)	21 (11.7%)	14 (7.8%)	5 (2.8%)	1.78	1.103
11	Weather Report	84 (46.9%)	45 (25.1%)	38 (21.2%)	8 (4.5%)	4 (2.2%)	1.90	1.028
12	Health Information	60 (33.5%)	48 (26.8%)	42 (23.5%)	21 (11.7%)	8 (4.5%)	2.27	1.174
13	Sports Information	54 (30.2%)	29 (16.2%)	55 (30.7%)	30 (16.8%)	11 (6.1%)	2.53	1.251
14	Job Information	52 (29.1%)	21 (11.7%)	52 (29.1%)	37 (20.7%)	17 (9.5%)	2.70	1.336
15	Comic Strips	63 (35.2%)	39 (21.8%)	39 (21.8%)	25 (14.0%)	13 (7.3%)	2.36	1.288
16	Blogs	75 (41.9%)	42 (23.5%)	33 (18.4%)	18 (10.1%)	11 (6.1%)	2.15	1.243
17	Wikis	18 (10.1%)	10 (5.6%)	35 (19.6%)	57 (31.8%)	59 (33%)	3.72	1.254
18	Micro blogs	116 (64.8%)	26 (14.5%)	15 (8.4%)	15 (8.4%)	7 (3.9%)	1.72	1.161
19	Social Networking Sites	9 (5.0%)	6 (3.4%)	17 (9.5%)	28 (15.6%)	119 (66.5%)	4	1

It is found that a large number of students read different online reading materials. Majority of the students very often read social networking sites. The changes in mobile phone technology and the availability of WiFi in the campus accelerated online reading (mean 4 with SD 1). A few students were found to read wikis and e-mail very often. It was also observed that a few students very often read job and sports information online (mean 2.70 with SD 0.336). Majority of the students never read the micro blogs and horoscope online (mean 1.72 with SD 1.161 and mean 1.78 with SD 1.103 respectively). The results indicate that majority of the students use entertainment resources than academic resources online. The analysis also indicates that reading social networking sites and wikis are the most preferred online reading interfaces followed by reading e-mails. However, a good number of students indicated that they rarely use e-journals, ETDs, and e-books.

An independent-sample t-test was conducted to compare the gender wise use of online reading materials by the students. There was no significant difference in the use of reading materials in male (M=2.4211, SD=.51733) and female (M=2.4542, SD=.57657) students; F= 2.084, t=-.380, df=177, P>0.05. These results suggest that gender does not have significant influence in the use of online reading materials. Specifically, the use of online reading materials by both male and female students is more or less the same.

4.2 Devices Used for Online Reading

Students use different devices for reading online and these devices influence the reading habits of the students. The students were asked to indicate the various types of devices used by them for reading online and the responses are presented in Table 2.

Table 2
Devices used for online reading

Sl. No.	Devices	Gender		Total
		Male	**Female**	
1	Laptop computer	36 (57.1%)	65 (56.0%)	101 (56.4%)
2	Desktop computer	14 (22.2%)	23 (19.8%)	37 (20.7%)
3	Mobile phones	52 (82.5%)	88 (75.9%)	140 (78.2%)
4	Tablet	2 (3.2%)	10 (8.6%)	12 (6.7%)
5	Notebook	1 (1.6%)	-	1 (0.6%)

The analysis shows that majority of the students (78.2%) make use of the mobile phone technology and increased access to WiFi network increased the use of mobile phones. About half of the students indicated that they use laptop computers for reading online. It was also found that a little more than one fourth of the students use desktop computers and tablets for reading online.

4.3 Purpose of Online Reading

Students have various purposes for reading online such as communication, entertainment, and sharing of information. Reading purposes were influential in deciding the students' level of engagement in on-screen reading (Chou, 2012). The students were asked to indicate the purpose of online reading and the responses are depicted in Table 3.

Table 3
Purpose of online reading

Sl No	Purposes	Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Mean	SD
1	Improve personal knowledge	-	4 (2.2%)	26 (14.5%)	103 (57.5%)	46 (25.7%)	4.07	0.700
2	Project work	1 (0.6%)	1 (0.6%)	35 (19.6%)	86 (48.0%)	56 (31.3%)	4.09	0.759
3	Examination purpose	1 (0.6%)	5 (2.8%)	150 (8.4%)	83 (46.4%)	75 (41.9%)	4.26	0.774
4	Chatting	-	3 (1.7%)	13 (7.3%)	79 (44.1%)	84 (46.9%)	4.36	0.693
5	Online application/ Registration	-	-	18 (10.1%)	94 (52.5%)	67 (37.4%)	4.27	0.634
6	Discussion	9 (5.0)	24 (13.4%)	56 (31.3%)	60 (33.5%)	30 (16.8%)	3.44	1.076
7	Assignment	4 (2.2%)	6 (3.4%)	14 (7.8%)	95 (53.1%)	60 (33.5%)	4.12	0.859
8	Entertainment	2 (1.1%)	3 (1.7%)	9 (5.0%)	73 (40.8%)	92 (51.4%)	4.40	0.760
9	General knowledge	4 (2.2%)	2 (1.1%)	13 (7.3%)	88 (49.2%)	72 (40.2%)	4.24	0.817

The analysis reveals that about half of the students resort to online reading for entertainment (Mean 4.40 with SD 0.760) and chatting (mean 4.36 with SD 0.693). A good number of students use online applications and registrations (mean 4.27 with SD 0.634). There are a good number of the students read online for the examination purpose (91%) and for acquire general knowledge (mean 4.24 with SD 0.817). A good number of the students strongly agree to read online for fulfill their project work (mean 4.09 with SD 0.759). Majority of the students (83.2%) agreed that they read online to improve their personal knowledge (mean 4.07 with SD 0.700).

An independent-sample t-test was conducted to compare the gender wise purpose of online reading. There was no significant difference in the purpose of online reading between male (M=4.1658, SD=-46796) and female (M=4.1245, SD=.41163) students; F=1.378, t=.610, df =177, P>0.05. These results suggest that gender does not have any significant influence in the purpose of online reading among the students. In other words, the purposes of online reading of both male and female students are more or less the same.

4.4 Common Activities / Tasks in the Internet

The students use various activities or tasks from the Internet for easy reading or further reading purpose, such as copy, bookmark, share, cut and paste, etc. The students were asked to indicate the common activities performed by them while reading online and the responses are presented in Table 4.

It is found that the most common activity carried out online by the students was downloading of the reading materials from the Internet which helps them to read the materials according to their mood and time. About 93 percent of the students resort to this practice. Majority of the students (88.3%) save the documents from the Internet and it is the next common activity of the students after download. Moreover, majority of the students stated that they use the like and comment facility especially when they use social networking sites. Sharing of documents is another important activity in the Internet and a sizeable majority of the students (70.4%) use this facility in the Internet. A sizeable number of the students use the provisions copy (66.5 %) and cut and paste (61.5%). A little less than half of the students tag while reading online.

Table 4
Common activities / tasks in the Internet

Sl. No.	Tasks in Internet	Gender		Total
		Male	Female	
1	Tag	35 (55.6%)	50 (43.1%	85 (47.5%)
2	Cut & paste	40 (63.5%)	70 (60.3%)	110 (61.5%)
3	Download	58 (92.1%)	108 (93.1%)	166 (92.7%)
4	Bookmark	35 (55.6%)	54 (46.6%)	89 (49.7%)
5	Share	47 (74.6%)	79 (68.1%)	126 (70.4%)
6	Like	52 (82.5%)	85 (73.3%)	137 (76.5%)
7	Comment	46 (73. %)	75 (64.7%)	121 (67.6%)
8	Save	54 (85.7%)	104 (89.7%)	158 (88.3%)
9	Copy	42 (66.7%)	77 (66.4%)	119 (66.5%)

4.5 Preferred Font Type for Online Materials

In online reading, font type plays an important role for the readability of the text, reading comprehension, reading speed and recall of the information. There is different font types used in online text such as Arial, Times New Roman, Verdana, Book Man Old Style, Georgia, etc. The students were asked to indicate their preferred font while reading online and the responses are presented in Table 5.

Table 5
Preferred font type for online reading

Sl. No.	Font Type	Gender		Total
		Male	Female	
1	Arial	20 (31.7%)	36 (31.0%)	56 (31.3%)
2	Times New Roman	40 (63.5%)	72 (62.1%)	112 (62.6%)
3	Bookman Old Style	1 (1.6%)	6 (5.2%)	7 (3.9%)
4	Verdana	2 (3.2%)	2 (1.7%)	4 (2.2%)

It is found that a majority of the students (62.6%) prefer Times New Roman, a serif font, for reading online. The percentage of students who prefer Arial for online reading materials is only half of the percentage of those who like Times New Roman. The share of students who prefer Bookman Old Style and Verdana font type is much less. This is an important finding and supported by another study conducted by

Banerjee et al. (2014) which found that readability was better for serif compared to sans serif.

4.6 Legible Font Size for Online Reading

Font size is the important typographical element which affects the reading efficiency and performance of the students. Usually online documents are written with different font sizes varying such as 10, 12, 13, 14, etc. Mostly used font size for online material is 12 point. The students were asked to indicate their preferred font size while reading online and the responses are portrayed in Table 6.

Table 6
Legible font size for online reading

Sl. No.	Font Size	Gender		Total
		Male	Female	
1	10	2 (3.2%)	1 (.9%)	3 (1.7%)
2	11	7 (11.1%)	15 (12.9%)	22 (12.3%)
3	12	22 (34.9%)	45 (38.8%)	67 (37.4%)
4	13	4 (6.3%)	14 (12.1%)	18 (10.1%)
5	14	20 (31.7%)	23 (19.8%)	43 (24.0%)
6	15	1 (1.6%)	2 (1.7%)	3 (1.7%)
7	16	7 (11.1%)	16 (13.8%)	23 (12.8%)

It is found that a good number of students (37.4%) indicated that the most legible font size for online materials is the 12 point and 24 percent students preferred 14 point font for online reading. The share of students who prefer 11 point, 13 point and 16 points is comparatively less.

4.7 Preferred Line Spacing for Online Reading

Line spacing has an important role in enhancing the readability of the text in the Internet. Commonly used line spacing for online materials is 1.5 and 2. The students were requested to indicate the preferred line spacing for comfortable online reading and the responses can be seen in the Table 7.

Table 7
Preferred line spacing for online materials

Sl. No.	Line spacing	Gender		Total
		Male	Female	
1	1 line spacing	11 (17.5%)	15 (12.9%)	26 (14.5%)
2	1.5 line spacing	39 (61.9)	89 (76.7%)	128 (71.5%)
3	2 line spacing	10 (15.9%)	12 10.3%)	22 (12.3%)
4	2.5 line spacing	3 (4.6)	-	3 (1.7%)

The analysis shows that a good majority of students (71.5%) prefer line spacing of 1.5 inch. A few students prefer 1 inch and 2 inch line spacing and three students indicated 2.5 line spacing.

4.8 Effects of Typographical Elements in Online Reading

There are different factors which will affect the online reading performance of students like small font size, eye fatigue, technostress, etc. The students were asked to indicate in a five point scale the typographical factors effecting online reading and the responses are given in Table 8.

Table 8
Effects of typographical factors in online reading

Sl. No.	Statements	Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Mean	SD
1	Physical layout	9 (5.07%)	20 (11.2%)	47 (26.3%)	70 (39.1%)	33 (18.4%)	3.55	1.071
2	Small font size	5 (2.8%)	4 (2.2%)	28 (15.6%)	83 46.4%)	59 (33.0%)	4.04	.911
3	Font type of text	5 (2.8%)	6 (3.4%)	38 (21.2%)	90 (50.3%)	40 (22.3%)	3.86	.898
4	Font colour	12 (6.7%)	8 (4.5%)	31 (17.3%)	82 (45.8)	46 (25.7%)	3.79	1.084
5	Colour combination of font & background	8 (4.5%)	5 (2.8%)	37 (20.7%)	82 (45.8)	47 (26.3%)	3.87	0.985
6	Brightness of text	3 (1.7%)	8 (4.5%)	46 (25.7%)	79 (44.1%)	43 (24.0%)	3.84	0.919
7	Letter spacing	6 (3.4%)	18 (10.1%)	41 (22.9%)	61 (34.1%)	53 (29.6%)	3.76	1.103
8	Line spacing	5 (2.8%)	9 (5.0%)	20 (16.2%)	80 (44.7%)	56 (31.3%)	3.96	0.985

It shows that a good number of the students strongly agree that small font size make the text visually uncomfortable to read online (mean 4.04 with SD .911). Line spacing of text has a significant effect on the reading speed of the students (mean 3.96 with SD .985). About half of the students agree that font type (mean 3.86 with SD .898) and colour combination of font and background (mean 3.87 with SD.985) make the content more legible and easy for reading. A good number of the students agree that the brightness of the text

(mean 3.84 with SD 0.919), font colour of text (mean 3.79 with SD1.084) and physical layout of the text (mean 3.55 with SD 1.071) influence the movements of eyes in online reading.

4.9 Benefits of Online Reading

Online reading has various benefits or advantages such as convenience in reading, availability throughout, save, share, comment, cross referencing, etc. The students were requested to indicate the benefits of online reading and the responses are presented in Table 9.

Table 9
Benefits of online reading

Sl. No.	Benefits of online reading	Frequency	Percentage	Rank
1	Convenience	73	40.8%	1
2	Save printing paper	43	24.0%	3
3	Clear screen	30	16.8%	4
4	Online translation	27	15.1%	7
5	Copy/cut/paste	25	14.0%	8
6	Download	28	15.6%	6
7	Share	23	12.8%	10
8	Bookmark	22	12.3%	11
9	Tag	28	15.6%	6
10	Comment	23	12.8%	10
11	Like	23	12.8%	10
12	Multimedia information	29	16.2%	5
13	Online cross referencing	66	36.9%	2

The analysis shows that a good number of students indicated convenience (40.8%) and online cross referencing (36.9%) as the advantages of online reading. A saving of printing paper emerged as the third advantage (24%). Clear screen, multimedia information, tag, download, copy/cut/paste, share, comment, like, and bookmark were also pointed out as the advantages of reading online.

4.10 Problems in Online Reading

Similar to the positive sides of online reading, it has some drawbacks also like eye fatigue, technostress, skipping links, etc. The inability to annotate online texts is noted as major problem while reading online (Chou, 2012; Rose, 2011 and Vandenhoek, 2013). The students were asked to indicate their problems while reading online and the responses are presented in Table 10.

Eye fatigue is the major problem indicated by a little more than 70 percent of the students while reading online. In another study Chou (2012) also found that eyestrain was the biggest reason for the unwillingness of the users to read on computer screen. The students prefer to read from a large monitor as opposed to a small monitor. A good number of students (38%) indicated small font size as a problem while reading online making it the second biggest problem. About 23 percent of the students opined that the inability to leave marks or make notes in online documents is a problem. Technostress and low reading speed are pointed out as problems by about 20 percent of the respondents. Other concerns are low rate comprehension, dead-end webpages, inappropriate background colour and skipping links.

Table 10
Problems in online reading

Sl. No.	Problems in online reading	Frequency	Percentage	Rank
1	Eye fatigue	126	70.4%	1
2	Low reading speed	35	19.6%	4
3	Low rate comprehension	34	19.0%	5
4	Small font size	68	38.0%	2
5	Inappropriate background colour	32	17.9%	6
6	Skipping links	29	16.2%	7
7	Inability to leave marks or make note	42	22.9%	3
8	Dead-end WebPages	34	19.0%	5
9	Technostress	35	19.6%	4

5. Conclusion

The issues of online reading are multifaceted. Lack of in-depth and concentrated reading is considered to be a major issue in online reading. Online reading is more of a scanning or skimming type and less time is spent on in-depth and concentrated reading (Liu, 2005). An attempt was made by the investigator to study the online reading habits and the effects of typographical factors in online reading among the students of the University of Calicut. All the students in the university campus were found to read online and majority of them read social networking sites, wikis and e-mails. A majority of the students use WiFi facility in the campus and read online with their mobile phones. However, students mainly use this facility for entertainment. The students indicated that download, save, like and comment are the most used activities while reading online.

The survey found that online reading habits of the students were affected by the typographical factors. For online trading, the students preferred font type Times New Roman, font size of 12 point and the line spacing of 1.5. The physical layout, font size, font colour, colour combination of font and background, brightness of the text, letter spacing and line spacing have a significant impact in online reading among the students. The major benefits experienced from the online reading by the students are convenience, online cross referencing, save printing paper, and clear screen whereas eye fatigue, small font size, inability to leave marks or make notes, low reading speed are the main difficulties perceived by them.

The explosive growth of the Internet and widespread use of e-resources, and very sophisticated mobile devices increased online reading among the students. WiFi access in the campus and increased use of social networking sites also make them regular users of the Internet. Typographical factors influence online reading and a well structured typography increases the readability, reading comprehension and efficiency in online reading. As today's students are digital natives, the advances in screen quality is sure to improve the rate of online reading. The design and technology of online interfaces and devices should be improved to enhance the readers' comprehension and concentration.

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