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Portraying Screen Reading Behavior of College Students of University of Delhi

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ABSTRCT

The present paper explored various screen reading activities of undergraduate students of twelve colleges of University of Delhi. It included browsing/scanning, keyword spotting, concentrated reading, one time reading, reading selectively and non-linear reading. It also investigated several ways of handling the electronic documents along with frequently used reading devices and preferred location for reading the documents. The study administered structured print questionnaires and received 506 completed questionnaires from undergraduate students of different disciplines i.e. sciences, social sciences and humanities. Cronbach's Alpha Reliability Coefficient test was applied using the SPSS (Statistical Package for Social Science, Version-25) along with the Weighted Mean. Results revealed that Screen reading activities such as browsing/scanning (54.0 %), reading selectively (51.0 %), concentrated reading (36.2 %), one time reading (33.0 %), keyword spotting (28.3 %) and non-linear reading (23.5 %) were increasing among undergraduate students of all the three disciplines. The preferences of undergraduate students for reading devices and locations reveals that majority of 51.0 per cent students used smartphones followed by laptops (29.5 %), personal computers (7.4 %) and the minimum number of only 5.5 per cent of students were using tablets. Maximum number of 38.3 per cent students preferred reading at their homes followed by library (17.8 %) and while travelling (17.2 %). The lowest number of (6.8 %) students read books in their hostels. Overall, it revealed that in present scenario, students' concentration level has found increased reading the content on screen. Whereas, the situation was other way round with the earlier generations. Few factors such as convenience, flexibility, portability and ownership in using smart devices make them connected online with the peer groups and read content on screen at their own pace.

Keywords: Screen reading behavior; Electronic documents; Electronic devices; Reading location and undergraduate students.

1. INTRODUCTION

In today's time, students use internet and digital technologies in almost every aspect of their life. Most of the students who were born between 1980 and 1994 represent the first-generation students grow up with digital technology and have shown their confidence and familiarity with information and communication technology. They have spent maximum time using digital technologies[1]. Through the use of internet and World Wide Web new learning opportunities are coming up. The style of teaching and learning are expanding and tools and techniques to accommodate these new practices are evolving. Computer mediated communication in the form of blogs, wikis and online forums have transformed the learning[2]. In addition, it has greatly impacted students especially on their style of reading and made them more digitally driven and oriented than those in the pre-information age[3]. Thus, the present study made an attempt to find out the screen reading behaviour of undergraduate students of select colleges affiliated to University of Delhi by assessing their browsing/scanning, keyword spotting, concentrated reading, reading selectively and non-linear reading related activities. It also examined their preference for different reading devices along with their reading location.

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2. LITERATURE REVIEW

A major shift from daily reading to digital reading with an extensive use of mobile technology has been observed. Considering the potential of digital reading in transforming the concept of reading, it included emails and SNS content which have not been considered the objects of traditional reading. It emphasised on the reading of e-mails, e-books, websites and content on social networking sites regarded as digital reading, however, non-textual activities such as playing games and watching television and movies are not regarded as digital reading. The study entitled "Print or digital? Reading behavior and preferences in Japan" mainly found that participants' preferences favoured print media. However, approximately 70 per cent of the total time, they spent on digital media[4]. Another significant study on "Reading behavior in the digital environment: Changes in reading behavior over the past ten years" analysed the change in people's reading behaviour from the last ten years in the digital environment. It observed that screen-based reading behavior is emerging with increasing amount of time spent on reading electronic documents. It is

characterised by more time being spent on browsing and scanning, keyword spotting, one-time reading, reading more selectively, non-linear reading. "Browsing/scanning not only a means for locating information in a document, but also a means to get a sense of the whole text". Keyword spotting is employed as a strategy to locate needed information from the overload information environment. Concentrated reading emphasis to put focus on the content of the document which seems quite difficult while reading documents on the web. As it is evident from the name itself that one time reading refers to the reading of majority of documents one time to keep pace with the information growth. On contrary, in selective reading small percentage of document are read. Emergence of hypertext enables more non-linear reading that is also called jump reading[5]. Another study titled "Reading on the move: A study of reading behavior of undergraduate smartphone users in China" examined the wide spread use and adoption of smartphones or internet-capable mobile phones. The study found significant reading bahavior difference on smartphone from reading on laptop or desktop computers. Increased use of smartphones has shaped new behavior of less in-depth and concentrated reading as people make use of mobile devices at unpredictable and varied locations or while in transit. One of the important issues in the change of reading behavior was found in mobility of information engagement that human information theory should embrace[6]. In another study titled "Undergraduates' academic reading format preferences and behaviors", the author examined academic reading format preferences and behaviour among undergraduate students. It revealed that students preferred print over electronic format for learning purposes but multiple factors such as cost, complexity, accessibility and importance of reading to course affect their actual reading behaviour. It also indicated that 90 per cent of the undergraduates use laptop for reading their electronic course readings and 28 per cent make use of phones and 26.4 per cent iPads/tablets[7].

3. SCOPE AND OBJECTIVES

The study covered twelve coeducational colleges affiliated to the University of Delhi for collection of data. Out of twelve colleges, it selected four colleges i.e. Acharya Narendra College, Dyal Singh College, Hansraj College and Shivaji College for Sciences and another four colleges i.e. Aryabhatta College, Delhi College of Arts and Commerce, Ramjas College and Shri Venkateshwara College for Social Sciences and the remaining four colleges i.e. Hindu College, Ramanuja College, St. Stephen College and Zakir Husain Delhi College for Humanities to collect the responses from undergraduate students on their screen reading behaviour. The study addressed the following specific research objectives:

- To study the screen reading behaviour of undergraduate students in different disciplines.
- To find out preferences of undergraduate students for various reading devices and their location of reading.

4. METHODOLOGY

The present study prepared a complete list of 74 affiliated colleges of University of Delhi accessing through the University of Delhi URL: http://www.du.ac.in. "The selection of a representative sample of colleges from University of Delhi was done using multistage sampling method. The first stage sampling unit was colleges and sampling frame was

Table 1. Distribution of questionnaire and response rate

Colleges Covered	Total Population	Questionnaire Distributed	Distribution Rate (%)	Response Received	Response Rate (%)
Acharya Narendra Dev College	275	80	29.1	43	53.8
Aryabhatta College	413	105	25.4	38	36.2
Delhi College of Arts and Commerce	525	110	20.1	37	33.6
Dyal Singh College	312	92	29.5	39	42.4
Hansraj College	510	105	20.6	44	41.9
Hindu College	581	120	20.7	46	38.3
Ramanujan College	530	105	19.8	44	41.9
Ramjas College	680	120	17.7	45	37.5
Shivaji College	280	75	26.8	42	56.0
St. Stephen College	305	85	27.9	45	52.1
Shri Venkateswara College	582	110	18.9	41	37.3
Zakir Husain Delhi College	305	90	29.5	42	46.7
Total	5298	1197	22.6	506	42.3

Table 2. Response rate of respondents in different disciplines

College Name	Sciences		Social Sciences		Humanities		Total	
	F	P (%)	F	P (%)	F	P (%)	F	P (%)
Acharya Narendra Dev College	43	8.5	0	0.0	0	0.0	43	8.5
Dyal Singh College	39	7.7	0	0.0	0	0.0	39	7.7
Hansraj College	44	8.7	0	0.0	0	0.0	44	8.7
Shivaji College	42	8.3	0	0.0	0	0.0	42	8.3
Aryabhatta College	0	0.0	38	7.5	0	0.0	38	7.5
Delhi College of Arts and Commerce	0	0.0	37	7.3	0	0.0	37	7.3
Ramjas College	0	0.0	45	8.9	0	0.0	45	8.9
Shri Venkateshwara College	0	0.0	41	8.1	0	0.0	41	8.1
Hindu College	0	0.0	0	0.0	46	9.1	46	9.1
Ramanujan College	0	0.0	0	0.0	44	8.7	44	8.7
St. Stephen College	0	0.0	0	0.0	45	8.9	45	8.9
Zakir Husain Delhi College	0	0.0	0	0.0	42	8.3	42	8.3
Total	168	33.2	161	31.8	177	35.0	506	100.0

Note: F = Frequency, P= Percentage

the preparation of complete list of colleges with its subject details. From this list, out of 52 coeducational colleges, a sample of 12 colleges was obtained using stratified sampling method. The second stage sampling unit was the preparation of list of colleges with two common subjects in the discipline of sciences, social sciences and humanities. Subjects covered under sciences were physics and chemistry; economics and political Science in social sciences and english and philosophy were covered in humanities. It was the second stage sampling frame. From this list, a sample of four colleges were obtained for survey in each discipline and in this way, total twelve colleges were selected to survey the undergraduate students of different colleges of University of Delhi". It analysed the sample size of 506 completed questionnaires out of 1197 distributed print questionnaires from the total population of 5298 undergraduate students of twelve colleges. The sample size 506 undergraduate students which is quite larger, however the sizable sample of 362 was determined using the following formula postulated by the Krejcie & Morgan[8] and also consulting the corresponding table.

$$s = X^2NP(1-P) \div d^2(N-1) + X^2P(1-P).$$

s = required sample size
X^2 = the table value of chi-square for 1 degree of freedom at the desired confidence level (3.841).
N = the population size.
P = the population proportion (assumed to be .50 since this would provide the maximum sample size.
d = the degree of accuracy expressed as a proportion (.05).

Table 1 gives the complete picture of the total population, questionnaire distributed and response received from the undergraduate students of twelve colleges under the study. Total population of twelve colleges is 5298. Out of which, total 1197 questionnaires were distributed in all twelve college. The same number of highest 120 questionnaires were distributed in Hindu college and Ramjas College and the lowest in 75 Shivaji college. However, it is worth noting that Questionnaires were distributed consciously in the respective colleges according to its population. Hence, it shows that the distribution rate varies between 17.7 per cent to 29.5 per cent and overall distribution rate of the questionnaires is 22.6 per cent. The study received total 506 questionnaires completed in all respects from twelve colleges with the aggregate response rate of 42.3 per cent, though it varies from 33.6 per cent to 56.0 per cent.

5. RESULTS

The present study analysed various aspects of screen reading behaviour of undergraduate students using SPSS (Statistical Package for Social Sciences). It was observed that reading behaviour of undergraduate students has changed due to the availability online content and smart devices. Screen reading behaviour is an emerging style of searching for information; however it is not the same among all the students. Thus, data in Table 2 was collected from students to understand their way of reading on screen in different disciplines.

The highest response of 8.7 per cent was received from Hansraj College and the lowest response of 7.7 per cent from Dyal Singh Colleges in Sciences. The overall response rate in Science discipline was 33.2 per cent. On the other hand, the highest response rate of 8.9 per cent from Ramjas College and the lowest response rate of 7.3 per cent from Delhi College of Arts and Commerce in Social Sciences. The aggregate response rate in Social Sciences was 31.8 per cent. While

Table 3. Screen reading behaviour of undergraduate students

Screen Reading Activities	Levels	Sciences		Social Sciences		Humanities		Total	
		F	P (%)	F	P (%)	F	P (%)	F	P (%))
Browsing/Scanning	Increasing	80	15.8	98	19.8	95	18.8	273	54.0
	Decreasing	11	2.2	7	1.4	18	3.6	36	7.1
	No Change	24	4.7	25	4.9	18	4.3	36	14.0
	Don't Know	53	10.5	31	6.1	42	8.3	126	24.9
Total		168	33.2	161	31.8	177	35.0	506	100.0
Keyword Spotting	Increasing	38	7.5	53	10.5	52	10.3	143	28.3
	Decreasing	21	4.2	17	3.4	19	3.8	57	11.3
	No Change	32	6.3	35	6.9	38	7.5	105	20.8
	Don't Know	77	15.2	56	11.1	68	13.4	201	39.7
Total		168	33.2	161	31.8	177	35.0	201	100.0
Concentrated Reading	Increasing	66	13.0	51	10.1	66	13.0	183	36.2
	Decreasing	31	6.1	34	6.7	52	10.3	117	23.1
	No Change	21	4.2	29	5.7	22	4.3	117	14.2
	Don't Know	50	9.9	47	9.3	37	7.3	134	26.5
Total		168	33.2	161	31.8	177	35.0	506	100.0
One-time Reading	Increasing	51	10.1	46	9.1	70	13.8	167	33.0
	Decreasing	26	5.1	34	6.7	27	5.3	87	17.2
	No Change	27	5.3	38	7.5	36	7.1	101	20.0
	Don't Know	64	12.6	43	8.5	44	8.7	151	29.8
Total		168	33.2	161	31.8	177	35.0	506	100.0
Reading Selectively	Increasing	76	15.0	90	17.8	92	18.2	258	51.0
	Decreasing	15	3.0	18	3.6	19	3.8	52	10.3
	No Change	23	4.5	20	4.0	22	4.3	65	12.8
	Don't Know	54	10.7	33	6.5	44	8.7	131	25.9
Total		168	33.2	161	31.8	177	35.0	506	100.0
Non-linear Reading	Increasing	28	5.5	46	9.1	45	8.9	119	23.5
	Decreasing	23	4.5	20	4.0	32	6.3	75	14.8
	No Change	30	5.9	24	4.7	23	4.5	77	15.2
	Don't Know	87	17.2	71	14.0	77	15.2	235	46.4
Total		168	33.2	161	31.8	177	35.0	506	100.0

Table 4. Reliability analysis of screen reading activities

Screen Reading	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Browsing/Scanning	12.52	18.686	.430	.224	.733
Keyword Scanning	13.14	18.986	.423	.209	.734
Concentrated Reading	12.73	18.834	.461	.217	.723
One Time Reading	12.89	18.000	.542	.342	.702
Reading Selectively	12.56	17.300	.579	.380	.690
Non-Linear Reading	13.27	18.237	.510	.305	.710

Table 5. Reliability statistics

Cronbach's Alpha	Cronbach's Alpha based on the standardised items	Number of Items
.751	.752	6

Table 6. Handling of electronic documents

Ways of Document Management	Sciences		Social Sciences		Humanities		Total	
	F	P	F	P	F	P	F	P
Book-Mark	19	3.8	21	4.2	17	3.4	57	11.3
Download & Save	136	26.9	134	26.5	150	29.6	420	83.0
Print-outs	13	2.6	6	1.2	10	2.0	29	5.7
Total	168	33.2	161	31.8	177	35.0	506	100.0

Table 7. Frequently used devices for reading

Devices	Sciences		Social Sciences		Humanities		Total	
	F	P (%)	F	P (%)	F	P (%)	F	P (%)
Personal Computer	22	2.4	21	2.3	25	2.7	68	7.4
Laptop	81	8.8	91	9.9	99	10.8	271	29.5
Smartphone	156	17.0	150	16.3	163	17.7	469	51.0
Kindle/eBook Reader	15	1.6	24	2.6	22	2.4	61	6.6
Tablet	5	0.5	21	2.3	25	2.7	51	5.5
Total	279	30.3	307	33.4	334	36.3	920	100.0

Table 5. Preferred Reading Location of Undergraduate Students

Location	Sciences		Social Sciences		Humanities		Total	
	F	P (%)	F	P (%)	F	P (%)	F	P (%)
Library	74	6.6	51	4.6	74	6.6	199	17.8
Home	143	12.8	136	12.2	150	13.4	429	38.3
Class Room	50	4.5	29	2.6	45	4.0	124	11.1
Hostel	23	2.1	17	1.5	36	3.2	76	6.8
While Travelling	46	4.1	79	7.1	67	6.0	192	17.2
College Campus	28	2.5	24	2.1	47	4.2	99	8.8
Total	364	32.5	336	30.0	419	37.4	1119	100.0

the highest response rate of 9.1 per cent received from Hindu College and the lowest response rate from Zakir Husain Delhi College with 8.3 per cent in Humanities. The total response rate in Humanities was 35.0 per cent which was observed the highest response rate among all the three disciplines.

The present study referred various screen reading activities from the research work entitled "Reading behavior in the digital environment: Changes in reading behavior over the past ten years" by Liu, Ziming. Data in Table 3 clearly revealed an increase in browsing/scanning in social sciences (19.8 %) followed by humanities (18.8 %) and sciences (15.8 %). Keyword spotting was also increasing in social sciences (10.5 %) followed by humanities (10.3 %) and sciences (7.5 %). Concentrated reading was found increased in sciences and humanities (13.0 %) followed by 10.1 per cent respondents in social sciences. Whereas, One-time reading was increasing in all the three disciplines with humanities (13.8 %) followed by sciences (10.1 %) and social sciences (9.1 %). There was also an increase in reading the content selectively in humanities (18.2 %) followed by social sciences (17.8 %) and sciences (15.0 %). It was also found that non-linear reading was increasing in social sciences (9.1 %) followed by humanities (8.9 %) and sciences (5.5 %). Overall, it can be concluded that Screen reading behavior i.e. browsing/scanning, keyword scanning, one-time reading, reading selectively and non-linear reading found increased in all disciplines, Further, it revealed that students' concentration level was also increased while reading online content. Cronbach's Alpha reliability coefficient was performed to measure the degree of accuracy of the collected data from respondents on their screen reading activities as this coefficient is an indication of the correlation of the total number of items included within the test if these items are integrated.

Table 4 depicted that total six screen reading activities were included on the scale namely browsing/scanning, keyword scanning, concentrated reading, one time reading, reading selectively and non-linear reading. The Cronbach's alpha value of the respective item is mentioned in the last column of the table which clearly depicts that all values are appropriately standardised. It does not require the deletion of any value from the scale.

In addition, reliability statistics can be seen from the Table 5 that the Cronbach's Alpha value for the overall scale is .751 and the value .752 is the Cronbach's Alpha based on the standardised items. It revealed that the Cronbach's Alpha value of the scale is greater than 0.7 which indicates appropriate data reliability due to the appropriate correlation of the items on the scale.

Students were asked by giving three frequently used options whether they book-mark, download or take print-outs of the electronic documents. Data in Table 6 revealed that the maximum number of 26.9 per cent respondents download and

save followed by 3.8 per cent book-mark and 2.6 per cent take print-outs in sciences. Whereas, the highest number of 26.5 per cent respondents download and save followed by 4.2 per cent book-mark and 1.2 per cent take print-outs in social sciences. On the other hand, 29.6 per cent download followed by 3.4 per cent book-mark and 2.0 take print-outs. Overall, it can be concluded that 83 per cent of respondents download and save followed by 11.3 per cent book-mark and 5.7 per cent of the respondents take print-outs.

Technologically advanced society has given emergence to a wide array of smart gadgets namely personal computer, laptop, smartphone, kindle/eBook reader and tablets etc. Thus, it is felt to know preferences of the respondents for using various devices for reading purpose.

It can be seen from Table 7 that the maximum number of 17.0 per cent respondents used smart phones for reading purpose in sciences followed by laptops (8.8 %), personal computer (2.4 %), kindle/eBook Reader (1.6 %) in sciences and minimum number of 0.5 per cent respondents make use of tablets. On contrary, the highest number of 16.3 per cent of respondents used smart phones followed by laptops (9.9 %), kindle/eBook Reader (2.6 %) in social sciences and the lowest number of 2.3 per cent of respondents use personal computers and tablets. Whereas, 17.7 per cent respondents used smartphones followed by laptops (10.8 %), personal computer and tablet (2.7 %) in humanities and the minimum number of 2.4 per cent use kindle/eBook Reader for research and learning activities. Overall, it was found that the majority of 51.0 per cent respondents frequently use smartphones followed by laptops (29.5 %), personal computers (7.4 %), kindle/eBook Reader (6.6 %) and the lowest number of 5.5 per cent of respondents use tablets.

Everyone has his/her own preference and comfort zone for reading various sources of information. Few students prefer reading in library or few in home. That' why, an attempt was made by asking undergraduate students in different disciplines about their preference for various reading locations. Data analysed in Table 8 revealed that the maximum number of 12.8 per cent of students preferred reading at their home followed by library (6.6 %), class room (4.5 %), travelling (4.1 %) and college campus (2.5 %) in sciences. The minimum number of 2.1 per cent students read in their hostels.

Whereas, the highest number of 12.2 per cent respondents preferred reading at their home followed by while travelling (7.1 %), library (4.6 %), class room (2.6 %) and college campus (2.1 %) in social sciences. The lowest number of (1.5 %) respondents were found interested in reading at their hostels.

On the other hand, the majority of 13.4 per cent respondents read at their home followed by library (6.6 %), while travelling (6.0 %), college campus (4.2 %) and class room (4.0 %) in humanities. The minimum of 3.2 per cent respondents preferred reading in their hostels. Overall, it was observed that the majority of 38.3 per cent respondents preferred reading at their homes followed by library (17.8 %), while travelling (17.2 %), class room (11.1 %) and college campus (8.8 %). The lowest number of (6.8 %) read books in their hostels. The reason for few respondents preferred reading in hostel may be because of the fact that the majority students were day boarder.

6. FINDINGS

This study mainly explored the undergraduate students' style of reading on screen and their preference for using different reading devices and the location of reading. Results revealed that screen reading behavior includes browsing/scanning, keyword scanning, one-time reading, reading selectively and non-linear reading are increasing in all disciplines, Whereas, it was interesting to note that students' level of concentration was found increased while reading online content. The maximum numbers of 83 per cent of respondents download and save the electronic documents followed by 11.3 per cent book-mark. Very few respondents (5.7 %) take print-outs.

It was found that the majority of 51.0 per cent respondents frequently made use of smartphones followed by laptops (29.5 %), personal computers (7.4 %), kindle/eBook Reader (6.6 %) and the lowest number of 5.5 per cent of respondents use tablets. The highest number of 38.3 per cent respondents preferred reading at their homes followed by library (17.8 %), while travelling (17.2 %), class room (11.1 %) and college campus (8.8 %). The lowest number of (6.8 %) read books in their hostels.

7. CONCLUSIONS

It is quite surprising to note that the present generation students' level of concentration was found increased while reading on screen. Whereas, there were so many previous studies exist which revealed that users felt comfortable in reading print sources and also their concentration level was more in reading print resources in compare to the electronic resources. In addition, other screen reading activities i.e. browsing/scanning, keyword scanning, one-time reading, reading selectively and non-linear reading were found increased among the students of all disciplines. It also revealed that majority of students download and save the online content for future reading. Very few were found taking the print out for reading purpose. It clearly showed that majority of students were using their smart phones for reading followed by laptops. The portability is one of the features of the smart devices which make students to read the content on screen at their homes at any time as per their convenience. At last, the study highlighted that screen reading behaviour have become latent feature of their overall personality.

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