

# **READING BEHAVIOUR IN DIGITAL ENVIRONMENT: A STUDY AMONG STUDENTS OF UNIVERSITIES IN KERALA**

*Thesis submitted to  
the University of Calicut in partial fulfillment of  
the requirements for the award of the Degree of*

**Doctor of Philosophy (Ph.D.) in Library and Information Science**

by

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2018**

## **Declaration**

I hereby declare that the thesis entitled **Reading Behaviour in Digital Environment: A Study among Students of Universities in Kerala** is the authentic record of research work carried out by me, for my Doctoral Degree under the supervision and guidance of Dr. Mohamed Haneefa K., Associate Professor, Department of Library and Information Science, University of Calicut, and that no part thereof has previously formed the basis for the award of any degree or diploma or any other similar titles or recognition of any other university.

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## **Certificate**

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**Certificate**

I, **Dr. Mohamed Haneefa K.**, do hereby certify that the Ph.D. thesis entitled **Reading Behaviour in Digital Environment: A Study among Students of Universities in Kerala** is a record of bonafide study and research carried out by **Mrs. Divya P.** under my supervision and guidance.

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## **Abstract**

With the growing amount of digital information available and the increasing amount of time that people spend reading on electronic media, the digital environment has begun to affect people's reading behaviour. A vast amount of reading time is spent more on skimming and browsing for information on the Internet. Youth, especially students who have opened their eyes in full bloom of electronic revolution, adopt these sources most of all. On the other hand, the nature and purpose of reading seems to deviate as well from the traditional reading methods, which are brief, linear and less structured. Considering the advancement of e-resources during the recent years, it is of significance to analyse reading behaviour in digital environment. This study was conducted in an attempt to enhance the understanding about reading behaviour in digital environment among the students of universities in Kerala.

The statistical population comprises the post graduate students of the four state universities in Kerala; namely, University of Kerala, University of Calicut, Mahatma Gandhi University and Kannur University. A representative sample of 700 students was selected with two-stage stratified random sampling technique. Structured questionnaire was the instrument for data collection. Out of 700 questionnaires distributed, 588 questionnaires were returned with a response rate of 84 per cent. The data collected through the questionnaires were consolidated and segregated with Microsoft Excel and further statistical analysis was done by SPSS.

Students revealed a combination of reading patterns for both print and digital materials. As per the findings, students spend more time for reading print resources compared to digital resources, especially the female students. Majority of the students mentioned that they read mainly for the purpose of examination and they prefer to read more at morning and night. Meanwhile, blogs and e-zines were mostly preferred by the male students and academic books,



magazines and literature were highly preferred by the female students. Majority of the students read the digital resources through online and a good number of them also like to read offline. The female students tend to print out the digital resources for reading more than the male students.

Regarding the digital reading competency of the students, findings clearly revealed that a good number of the students showed a medium level of competency. Male students exhibited a higher level of competency as compared to female students. Results also depicted that there exists a significant relationship between digital reading competency and level of competency to use computer and other digital devices.

The comparison of media provided a fascinating insight into the way students read. The students reported a better comprehension and concentration, if they read on print resources as opposed to digital resources. The students also indicated a higher content absorption and comfortability levels with print materials compared to digital materials. The main advantages of reading digital resources reported by the majority of the students were 24 hour access followed by quick access and up-to-date information. Students admitted that they still prefer print media for depth reading, relaxed reading, for lengthy documents, for taking notes, etc. by indicating the physical discomforts related to digital materials. Vast majority of the respondents revealed that the eye strain was the main disadvantage of digital reading followed by physical strain and power problem.

The extent to which students positively or negatively engage in reading is influenced greatly by the attitude they have towards reading. Results also indicated that majority of the students have an average level of attitude towards digital reading and male students exhibited more positive attitudes towards digital reading than female students. In a similar vein, there found no significant discipline-wise or university-wise difference in the attitude towards digital reading among the subjects.

A good number of the students revealed that while reading digitally, they get distracted by the links, colours and advertisements of the digital materials. A staggering per cent of the students stated that save and download feature helped them a lot for digital reading and majority of the students mentioned that features like copy, paste, search and find options also helped a lot. The students also reported that the factors like font size and text layout were the highly influencing variables while reading digitally. Students agreed that through digital reading, some changes had occurred in their reading practices. They indicated that digital reading increased their interactive reading, quick reading, browsing, scanning, keyword spotting, selective reading and sequential reading and at the same time decreases their concentrated reading, in-depth reading, one time reading and sustained attention. These changes on reading practice were greater for the male students than the female students.

Findings also depicted that an average level of change has occurred on the reading practices of the students by digital reading, which is reported by majority of the students. Difficult to read from screen and lack of knowledge about proper sites were the main factors hindering the students for the effective use of digital resources for reading. Vast majority of the students also stated that they have an average level of influence of digital resources on their reading culture.

Online reading strategies and skills are required to address the identified impacts. Some suggestions for improving the reading behaviour in digital environment are stated in the study. Directions for future research are also suggested. Future research can be extended to more scientific evidence to justify these findings.

# Contents

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<b>Sl. No.</b>		<b>Page No.</b>
	Declaration	iii
	Certificate	v
	Acknowledgements	vii
	Abstract	xi
	List of Tables	xix
	List of Figures	xxiii
	List of Abbreviations/Acronyms	xxv
Chapter 1	<b>INTRODUCTION</b>	<b>1-49</b>
1.1	Reading	1
1.2	Digital Reading Behaviour	3
1.3	Digital Publishing	6
1.4	Information and Communication Technology Competency for Reading	9
1.5	Traditional Attachment and Technological Advancement (Print Vs. Digital)	11
1.6	Reading Attitude	12
1.7	Typographical and Cognitive Factors Affecting Hypertext Reading	15
1.8	Influence of Digital Resources on Reading	21
1.9	Need and Significance of the Study	23
1.10	Profile of the Universities Selected	26
1.11	Statement of the Problem	29
1.12	Definition of Key Terms	30
1.13	Objectives of the Study	32
1.14	Hypotheses	33
1.15	Scope and Limitations of the Study	34
1.16	Organisation of the Thesis	36
1.17	Conclusion	37

---

---

Chapter 2	<b>REVIEW OF LITERATURE</b>	<b>51-138</b>
2.1	Introduction	51
2.2	Reading Pattern	52
2.3	Digital Reading Competency	69
2.4	Preference of Reading Print and Digital Resources	74
2.5	Attitude towards Digital Reading	90
2.6	Influence of Digital Resources on Reading	97
2.7	Conclusion	118
Chapter 3	<b>METHODOLOGY</b>	<b>139-155</b>
3.1	Introduction	139
3.2	Variables	140
3.3	Sampling Design	144
3.4	Data Collection Tools	148
3.5	Data Collection Procedure	150
3.6	Tools and Techniques for Data Analysis	151
3.7	Conclusion	153
Chapter 4	<b>ANALYSIS AND INTERPRETATIONS</b>	<b>157-339</b>
4.1	Introduction	157
4.2	Reading Pattern	157
4.2.1	Time Spent for Reading Print and Digital Resources	158
4.2.2	Types of Reading Materials Used	163
4.2.3	Preferred Time for Reading	166
4.2.4	Purpose of Reading	167
4.2.5	Factors Encouraged to Read	170
4.2.6	Reading Style	172
4.2.7	Methods Used for Digital Reading	174
4.2.8	Frequency of Reading Digital Resources	176
4.2.9	Devices Used for Digital Reading	182
4.3	Digital Reading Competency	185
4.3.1	Experience of Use of Computer	186
4.3.2	Computer Related Course Attended	189
4.3.3	Level of Competency to Use Computer and other Digital Devices	191

---

---

4.3.3.1	Score for Level of Competency to Use Computer and other Digital Devices	193
4.3.4	Level of Competency in Digital Reading	197
4.3.4.1	Score for Level of Competency in Digital Reading	208
4.3.5	Need of Training for Digital Reading	211
4.3.6	Level of Confidence in Digital Reading	214
4.4	Preference of Reading Print and Digital Resources	221
4.4.1	Preferred Resources for Reading Books, Journals, Newspapers, Magazines, Theses & Dissertations	222
4.4.2	Techniques Used while Reading Print and Digital Resources	229
4.4.3	Frequency of Annotations while Reading Print and Digital Resources	235
4.4.4	Level of Comprehension while Reading Print and Digital Resources	239
4.4.5	Level of Concentration while Reading Print and Digital Resources	243
4.4.6	Level of Absorption while Reading Print and Digital Resources	246
4.4.7	Level of Comfortability while Reading Print and Digital Resources	249
4.4.8	Choice of Reading Media under Different Circumstances	252
4.4.9	Advantages and Disadvantages of Digital Resources for Reading	258
4.4.10	Advantages and Disadvantages of Print Resources for Reading	263
4.5	Attitude towards Digital Reading	267
4.6	Influence of Digital Resources on Reading	277
4.6.1	Influence of Different Facilities in Making Change in Digital Reading	278
4.6.2	Distraction while Digital Reading	280
4.6.3	Helpfulness of Different Features while Digital Reading	283
4.6.4	Influence of Different Factors while Digital Reading	287

---

---

4.6.5	Changes on Reading Practices by Digital Reading	290
4.6.6	Factors Hinder the Effective Use of Digital Resources for Reading	298
4.6.7	Perception about the Influence of Digital Resources on Reading	303
4.7	Conclusion	311
Chapter 5	<b>FINDINGS, SUGGESTIONS AND CONCLUSIONS</b>	<b>341-375</b>
5.1	Introduction	341
5.2	Major Findings of the Study	341
5.3	Tenability of Hypotheses	357
5.4	Suggestions	364
5.5	Conclusions	368
5.6	Recommendations for Further Research	374
	<b>Appendix A: Questionnaire</b>	<b>377-385</b>
	<b>Select Bibliography</b>	
	<b>List of Publications</b>	

---

## List of Tables

<b>Table No.</b>	<b>Title</b>	<b>Page No.</b>
1.	Population and Sample of the Study	146
2.	General Profile of the Respondents	147
3.	Time Spent for Reading Print and Digital Resources	159
4.	Time Spent for Reading Print Resources (Gender-Wise)	161
5.	Time Spent for Reading Digital Resources (Gender-Wise)	162
6.	Types of Reading Materials Used	164
7.	Preferred Time for Reading	166
8.	Purposes of Reading	169
9.	Factors Encouraged to Read	171
10.	Style of Reading	173
11.	Methods Used for Digital Reading	175
12.	Frequency of Reading Digital Resources	177
13.	Frequency of Reading Digital Resources (Gender-Wise)	180
14.	Frequency of Reading Digital Resources (Discipline-Wise)	181
15.	Devices Used for Digital Reading	183
16.	Experience of Use of Computer	187
17.	Experience of Use of Computer (Discipline-Wise)	188
18.	Computer Related Course Attended	190
19.	Computer Related Course Attended (Discipline-Wise)	191
20.	Level of Competency to Use Computer and other Digital Devices	192
21.	Level of Competency to Use Computer and other Digital Devices (Gender-Wise)	194
22.	Level of Competency to Use Computer and other Digital Devices (Discipline-Wise)	195
23.	Level of Competency to Use Computer and other Digital Devices (University-Wise)	197
24.	Level of Competency in Digital Reading	199

---

25.	Level of Competency in Digital Reading (Gender-Wise)	206
26.	Classification based on Competency in Digital Reading	209
27.	Comparison of Competency in Digital Reading (University-Wise)	210
28.	Comparison of Competency in Digital Reading (Discipline-Wise)	211
29.	Need of Training for Digital Reading (Gender-Wise)	212
30.	Need of Training for Digital Reading (Discipline-Wise)	214
31.	Level of Confidence in Digital Reading (Gender-Wise)	215
32.	Level of Confidence in Digital Reading (Discipline-Wise)	217
33.	Comparison of Competency in Digital reading among Students those who have Attended Computer Related Course and not Attended the Course	218
34.	Relation between Level of Competency to Use Computer and other Digital Devices and Digital Reading Competency	219
35.	Preference among Print and Digital Resources	223
36.	Preference among Books and E-books	224
37.	Preference among Journals and E-journals	225
38.	Preference among Newspapers and E-newspapers	226
39.	Preference among Magazines and E-zines	227
40.	Preference among Theses and Dissertations and E-theses and Dissertations	229
41.	Techniques Used while Reading Print Resources	231
42.	Techniques Used while Reading Digital Resources	233
43.	Frequency of Annotations while Reading Print Resources	236
44.	Frequency of Annotations while Reading Digital Resources	238
45.	Level of Comprehension while Reading Print Resources	240
46.	Level of Comprehension while Reading Digital Resources	242
47.	Level of Concentration while Reading Print Resources	244

---



---

48.	Level of Concentration while Reading Digital Resources	245
49.	Level of Absorption while Reading Print Resources	247
50.	Level of Absorption while Reading Digital Resources	248
51.	Level of Comfortability while Reading Print Resources	250
52.	Level of Comfortability while Reading Digital Resources	251
53.	Choice of Reading Media under Different Circumstances	254
54.	Choice of Reading Media under Different Circumstances (Gender-Wise)	256
55.	Advantages of Digital Resources for Reading	259
56.	Disadvantages of Digital Resources for Reading	261
57.	Advantages of Print Resources for Reading	264
58.	Disadvantages of Print Resources for Reading	266
59.	Attitude towards Digital Reading	270
60.	Attitude towards Digital Reading (Gender-Wise)	274
61.	Attitude towards Digital Reading (Discipline-Wise)	275
62.	Attitude towards Digital Reading (University-Wise)	276
63.	Influence of Different Facilities in Making Change in Digital Reading	279
64.	Influence of Different Facilities in Making Change in Digital Reading (Gender-Wise)	279
65.	Distraction while Digital Reading	281
66.	Helpfulness of Different Features while Digital Reading	284
67.	Helpfulness of Different Features while Digital Reading (Gender-Wise)	286
68.	Influence of Different Factors while Digital Reading	289
69.	Influence of Different Factors while Digital Reading (Gender-Wise)	290
70.	Changes on Reading Practices by Digital Reading	292
71.	Changes on Reading Practices by Digital Reading (Gender-Wise)	296
72.	Changes on Reading Practices by Digital Reading (Discipline-Wise)	297
73.	Extend of Hindrances made by the Different Factors for the Effective Use of Digital Resources for Reading	299

---

---

74.	Extend of Hindrance made by Different Factors for the Effective Use of Digital Resources for Reading (Gender-Wise)	302
75.	Perception about Influence of Digital Resources on Reading	305
76.	Perception about Influence of Digital Resources on Reading (Gender-Wise)	309
77.	Perception about Influence of Digital Resources on Reading (Discipline-Wise)	310

---

## List of Figures

<b>Figure No.</b>	<b>Title</b>	<b>Page No.</b>
1.	A Process Model for Hypertext Reading	18
2.	Level of Frequency of Reading Digital Resources	179
3.	Level of Competency in Digital Reading	203
4.	Attitude towards Digital Reading	273
5.	Changes on Reading Practices by Digital Reading	295
6.	Extent of Hindrance made by Different Factors for the Effective Use of Digital Resources for Reading	301
7.	Perception about Influence of Digital Resources on Reading	308

## List of Abbreviations/Acronyms

ANOVA	Analysis of Variance
APA	American Psychological Association
ASRA	Adult Survey of Reading Attitude
C-book	Conventional book
CFF	Critical Flicker/Fusion Frequency
EEG	Electro Encephalo Gram
ELT	English Language Teaching
EFL	English as Foreign Language
ELC	English Language Center
ERAS	Elementary Reading Attitude Survey
ESL	English as Second Language
ETD	Electronic Theses and Dissertations
ICT	Information and Communication Technology
IELS	Interact E-book Learning System
IESG	Independent English Students Group
IFND	Integrated Format No Dictionary
IFOD	Integrated Format with Online Dictionary
IM	Information Model
IPD	Interpupillary Distance
KDSE	Kolej Datin Seri Endon
LIS	Library and Information Science
LISA	Library and Information Science Abstract
MIMIC	Multiple Indicators Multiple Causes
MSF	Manipulation Skills and Facilities
NCR	National Capital Region
NDTLD	Networked Digital Library of Theses and Dissertations
NEA	National Endowments for Arts

OECD	Organisation of Economic Cooperation and Development
OPAC	Online Public Access Catalogue
P-book	Paper book
PDA	Personal Digital Assistance
PISA	Programme for International Students Assessment
PLS	Partial Least Square
QUIS	Questionnaire for User Interface Satisfaction
RS	Reading Stations
SAND	Split Attention No Dictionary
SAOD	Split Attention With Online Dictionary
SARA	Survey of Adolescent Reading
SORAB	Survey of Online Reading Attitude and Behaviour
SORS	Survey of Reading Strategies
SPSS	Statistical Package for Social Science
SRP	Serial Reading Processor
TEEAL	The Essential Electronic Agricultural Library
TM	Task Model

# Chapter 1

## **INTRODUCTION**

### **1.1 Reading**

Reading is an exact procedure which includes definite, point by point consecutive perception and recognisable confirmation of letters, words, spelling patterns, illustrations and gigantic dialect units. More essentially expressed, reading is a psycholinguistic game and it includes a communication between thoughts and language. Effective reading does not come about, because of precise perception and identification of all components, however from ability in selecting the slightest, more beneficial cues important to produce guesses which are correct in the primary gone through. The ability to anticipate that which has not been seen, clearly, is crucial in reading, just as the ability to anticipate what has not yet been heard is indispensable in listening (Mohsin & Sonwane, 2013). Manuscript, which was one of the essential or primary documentary sources for reading, was accessible just to the exclusive class of society. But printed word was accessible to all with the entry of the Gutenberg printing press. The Gutenberg printing press conveyed phenomenal changes to the fundamentally oral society of the day. It was clearly an awesome bounce in the humanity's onward march to the reading society.

Reading is the procedure of using over 'eyes', our 'mind' to grasp or comprehend the literal as well the hidden meaning of what the writer was endeavoring to pass on. Appropriately reading gives both power and pleasure with understanding by reading the material as a unified whole by which one can amplify the frontiers of knowledge and scholarship (Ahuja, Mishra & Goyal, 2010). Reading has social, financial, scholarly and survival significance, in the light of the fact

## *Introduction*

that democracy of a nation can survive when individuals all over the place having reading competence.

In the Internet age, with its expansion of information required for scholarly purposes, students are exposed not only to conventional text, but also electronic content. The extend of reading resources has changed drastically in the digital environment to include Websites, Web pages, e-books, e-journals, e-newspapers, e-mail, discussion boards, chat rooms, instant messaging, blogs, wikis, and other multimedia documents. Broad utilisation of digital resources has accomplished noteworthy changes in reading practice and behaviour as students spend more time reading on the Web. Cull (2011) stresses that, since readers are extremely acquainted with reading and doing it consistently in numerous parts of our lives-it is often taken for granted. It is easy to forget how pivotal reading keeps on being to the formation and communication of human learning. It is fundamental to the operation of cutting edge society.

In any case, since reading is so important, an apparently small change is likely to have profound ramifications. A long way from a little advancement, online digital text represents a revolution in human learning and correspondence that are just starting to get it. Five generalisations are streamed from research of the previous decade on the nature of reading. The first generalisation is that reading is a constructive procedure; second generalisation is that reading must be fluent and familiar; the third is that reading must be strategic; the fourth is that reading obliges inspiration and the fifth is that reading is a continuously creating aptitude (Camachou, 2003).

## **1.2 Digital Reading Behaviour**

Advancement in technology and innovation had made e-books and computerised libraries a reality. With the quickly developing Information Technologies, the texts are transferred to the electronic pages and they are published through computers. In order to access the new information the readers ought to read on the screen. Consequently, a new type of reading called 'reading on the screen' and a new type of reader called 'screen reader' created.

Digital reading activities in which the readers normally engaged are reading e-mails, e-journals, e-books, e-zines, e-newspapers, blogs, wikis, etc. With the growing measure of time spent on reading electronic records, the screen-based reading behaviour is emerging. The screen-based reading behaviour is portrayed by more time on browsing and scanning, keyword spotting, one-time reading, non-linear reading, and reading more selectively; while less time is spent on in-depth reading and concentrated reading, and sustained attention is diminishing (Liu, 2005).

Computerised media add to a transformative movement in reading. They likewise present various influential points of interest that are customarily absent in printed environment, such as interactivity, nonlinearity, immediacy of getting to information, and the union of text and images, audio and video (Liu, 2005). Dillon (1994) has recommended a system for depicting digital reading. This schema contains diverse issues: (1) TM (Task Model) manages with reader's necessities and uses for the reading content; (2) IM (Information Model) provides mental model for the reading context; (3) MSF (a set of Manipulation Skills and Facilities) that support physical utilisation of the reading materials; (4) SRP (a Serial Reading Processor) speaks to the cognitive and perceptual processing involves



## *Introduction*

in reading words and sentences. Digital reading involves reading with great cognitive exertion in transforming electronic text based data. The capability of an individual's attention span, working memory, and long-term memory ought to be considered.

Digital reading can be centered around from a couple of interchange viewpoints; the fields of Cognitive Psychology, Education, Information Studies, and Literary Studies have all contributed to distinctive parts of current knowledge of digital reading. The most noticeable or prominent theory of digital reading today is hypertext theory (Miall & Dobson, 2001). The term hypertext was at first initiated by Theoder H. Nelson in the 1960s, and can be portrayed as content made out of blocks of words (or images) linked electronically by multiple paths, chains, or trails in an open-ended, perpetually incomplete textuality (Landow, 1998).

Hypertext gives different degrees of context and choice to readers and can take numerous distinctive structures. Hypertext is characterised by few principles. As a matter of first importance, hypertext is delineated as non-linear; in view of this readers are seen as being able to make the content as they read, contingent upon the decisions made when reading. Hypertext is said to bring freedom to readers, making new terms, for example, wreader and secondary author. Since hypertext is joined by links, every reader has the ability to create a unique way through the content, hence having a role in the text's authorship. Each reader would then be able to make a unique text as indicated by the links followed (Carusi, 2006).

Hypertext is unique in light of the fact that it empowers readers to pick and choose the pieces of content in the text by interfacing with the machine. It is a method of sorting out or organising data and browsing through electronic texts that is stored on personal

## *Introduction*

computers and frameworks. Hypertext now consolidates a broad variety of computer applications such as interactive books, reference books like encyclopedias, online reference list, and different types of non-linear reading and composing which are created through computer technology. For reading hypertext documents, readers cannot turn page as they do on a printed book, they need to figure out how to explore and navigate the electronic text (Tseng, 2010).

Two sections in hypertext are links and lexias. A lexia is a reading unit or segment of text, can be of differing length and structure which are joined by links. Lexias gain importance or meaning through these links and structure the text as a whole. Contingent upon the reader's decisions this whole is changeable and can be organised again with every reading. As readers change in accordance with the digital medium, certain new variables are acquainted with the reading procedure (Carusi, 2006).

To begin with, the digital text is less material than content on a page, and can act in diverse courses than print content. Words on the screen can have hyperlinks and can be changed through computer function. It is not yet evident whether hyperlinked words are read in the same route as print-based words. The non-linearity of hypertext may besides affect the reading procedure. Readers by and large no longer have the totality of texts before them and must figure out how to explore imperceptible areas of content (Gervais, 2007). At the point, when reading digital text, basically making one's way through the text regularly obliges more idea and practices than it does when reading print texts.

Gervais (2007) clears up that every demonstration of reading involves three zones: manipulation, comprehension, and interpretation. The manipulation of conventional print texts is frequently overlooked in

## *Introduction*

the act of reading, yet this part of the reading procedure is developing in significance with digital reading. If a text cannot be manipulated, readers will encounter issues in comprehension and interpreting the text. Readers must keep on making sense of how to manipulate texts on screen as they adjust to the digital reading environment. As indicated by Carusi (2006), the central instance of hypertext theory is that it constitutes a challenge to existing reading practices. Hypertext might have the capacity to change the roles of readers, the consideration given to texts, and the sort of texts themselves.

By and by the reader may favour print on paper for longer, depth and expanded times of reading and utmost the reading onscreen to paragraphs and citations. With the development of advanced e-reading devices, these reading habits however are reliably altered. Previously, poor screen resolution had made sustained reading tedious and troublesome. Be that as it may, now with current technological advancement and reader software improvements, reading onscreen presents a less aggravating and more adaptable reading experience to an increasing number of individuals.

### **1.3 Digital Publishing**

Digital publishing covers all parts of traditional publishing, however in a digital domain it is a substitute of major technological progression empowered by the convergence of computer and communication network. Print-based or non-print based may be the last product or result of digital publishing. In the non-print structure, the final products are accessed digitally through conventional medias like Digital Versatile Disc (DVD), Compact Disc Read Only Memory (CD-ROM), or through Internet as e-journals,

## *Introduction*

online databases, e-books, or as Online Public Access Catalogue (OPAC), blogs, wikis, podcasts, and so on.

Digital media advancement and developing collection of digital documents has significantly affected reading. It was found that the progression of digital libraries is involving a general societal trend toward shallower, more fragmented, less concentrated and in-depth reading. Digital libraries are of numerous types which create, convey and preserve digital objects from numerous diverse organisations of data. As per standards of collection development, it is a managed collection of digital objects, which is created or gathered (Deegan & Tanner, 2002).

With the development of digital libraries in the course of the most recent three decades, university libraries can provide their users access to a variety of digital resources which helpfully supplement print collection and it has become a significant instrument for research and study (Gutierrez & Wang, 2001; Noh, 2012; Zha, Zhang & Yan, 2014).

Another example of digital publishing is e-journal, which is a full text journal, electronically distributed, and can be accessed on the Web and it may be free or membership based. Points of interest of e-journal are its ease of access, regular updating, simplicity of downloading articles, and so forth. Numerous distributors now offer e-journals alongside print form with sometimes free access to the e-journals on subscribing to the print version. An increasing number of journals are directly accessible just electronically, though online databases have large amounts of information stored in a search tool's Website (Mutula & Wamukoya, 2007).

Depending upon the subject necessities of the scholastic community, libraries subscribe to various sorts of online database. Most of the

## *Introduction*

online databases have a user-friendly search interface to search the database and an option of saving the acquired outcomes or results for future utilisation. Ebsco (Humanities and Social Sciences), Web of Science, LISA (Library and Information Science Abstracts), Manupatra (Legal studies), etc., are some of the examples.

The most recent addition in the world of digital publishing is e-books. E-books are intended and designed to use with e-book readers. E-book readers, for example, Kindle and Nook are designed fundamentally for e-books. A large number of e-books can be saved to the e-book reader and can be brought anywhere easily. They permit us to look up words and translation of pages. Readers can pick up advantages from some of their elements, for example, font size adjustment, underlining and highlighting writings. Some of them have content to speech feature which changes content into audio, in this manner empowering their readers to listen and additionally read.

With the advancement in digital publishing, different academic institutions are making accessible their collection of doctoral theses and dissertations online. Digital theses collections of Networked Digital Library of Theses and Dissertations (NDTLD), a global association dedicated to promote the adoption, creation, use, dissemination, and preservation of Electronic Theses and Dissertations (ETD), and in India, Vidyanidhi digital theses, Shodhganga of INFLIBNET (Information and Library Network), Electronic theses collection of Mahatma Gandhi University and Cochin University of Science and Technology (Dyuthi), etc., are examples (Susan Mathew, 2011).

## **1.4 Information and Communication Technology (ICT)**

### **Competency for Reading**

Today's quick paced world is getting to be progressively portrayed by technology driven communication which has changed the world into an extensive global connected community with perpetually expanding outreach of ICT. ICT refers to the scope of advancements that are applied in the process of collecting, storing, editing, retrieving, and transfer of information in different structures. At that point, when reading electronic texts, students need ICT skills, such as moving a mouse, scrolling down pages and clicking on links, and in addition advanced cognitive skills such as scanning and skimming among hyperlinks to search for significant and relevant material or judging the credibility of a text (Leu et al., 2008).

Consequently, the cognitive process and strategies required in reading printed and electronic texts are similar, Yet the procedure are much more complex for electronic texts. Both online and traditional text readers construct or develop their own particular mental models to make meaning of text they read. The fundamental difference between traditional printed text and new reading literacy is that new literacy is fixated on an issue and requires the readers to pick among various online links to effectively build their own particular intertext and to assess the quality and also the coherence of the text they read. When compared with conventional printed text, online reading contains the intertextual connection which is frequently made more explicit so that it provides increasing access to complex texts for readers to explore in their mind and on the screen (Coiro & Dobler, 2007; Lee & Wu, 2012). Student who had better attitude, confidence and access to ICT will read more online/electronic texts, despite the fact that their original intention might not have been to read. Online reading experiences, which

## *Introduction*

include complex cognitive processing of online information and the utilisation of reading techniques, at last transferred to and improved students reading of printed texts.

Leu et al. (2004) summarised five online reading processing practices, which include identifying vital inquiries, finding data, critically evaluating information, synthesising information, and communicating information. The greater parts of these practices are imparted with traditional reading, yet have a tendency to measure more in the online reading context. For instance, critical thinking for online readers to evaluate the information is more vital, because of the advancement of unbounded informational cyberspace. As for amalgamation, more work is required for online amalgamation due to the more complex online construction of mental models and intertext. In addition, new skills and techniques are required to impart successfully using online tools such as e-mail, blogs, wikis, discussion boards, chats, and messaging.

From the above mentioned reading practices, locating information is unique to online reading. At the point when searching for information on the Web, one needs to use a search engine, to read the outcomes provides via search engine, to find data on Web Pages, and to make an induction and figure out which link will lead to the desired information starting with one Website then onto the next (Henry, 2006; Lee & Wu, 2012). Basic skills for searching the online information are so important. It decides whether the readers succeed or fail to grasp the online content as confirm by the nonisomorphic case of a struggle offline reader who performed well in the online reading environment, in light of the fact that reader procured the aptitude, techniques, and disposition fundamental to online reading comprehension.

### **1.5 Traditional Attachment and Technological Advancement (Print Vs. Digital)**

Reading is not a solitary action rather, it can appear in assorted structures, and readers who are talented are aware of these reading styles and strategies used by them in various circumstances for various purposes. Reading in the 21<sup>st</sup> century networked society is no more restricted to the print reading. The extent of the reading has reached out to the Internet sources that changed the conventional reading culture of the readers. There is a continuous transition of reading from print to screen and the book is challenged by an expanding number of advanced reading gadgets like computers and laptops, tablets, smart phones, etc. The worldview of reading, specifically for youngsters, is progressively screen-based rather than paperbound.

De Groote and Dorsch (2003) reported the following reasons behind utilising printed documents: better quality design, document portability, and capacity to highlight the article, original formatting retained and more legible tables. Reasons for preferring online publications included quicker and easier to locate, 24-hour access, lower cost, access from home/office, efficiency and convenience. Liu (2005) finds that in the print environment annotating and highlighting while reading is a typical action. In any case this “traditional” pattern has not yet moved to the digital environment when individuals read electronic documents, most likely in light of the fact that technology as of now does not permit easy annotating. Readers’ decisions and inclinations for reading on screen and reading on paper are contextual.

Previous examination exhibits that individuals incline toward reading online over reading on paper at the time, when they read short



## *Introduction*

documents (e.g., e-mails), when they do casual reading (e.g., news and entertainment), or when they feel bored. In some circumstances readers, however, prefer reading on paper over reading online while at the time of reading lengthy documents (e.g., textbooks), when they require serious/in-depth reading, when they read something that is difficult to understand, when they read academic/research papers, or when they have to take notes (Liu & Huang, 2008).

Studies have demonstrated that individuals have traditional attachment to print media (e.g., page numbering, ownership, and smell). Fixity is an inherent element or feature of paper documents, while digital documents accompany fluidity. Fixity is instrumental to keeping up informative or communicative solidness and repeatability. In any case, it is unclear that this traditional attachment will keep on extending to the coming era of online readers. It should also be noted that the newest generation of readers (i.e., the messaging, chatting, blogging, and YouTubing kids) is prone to have an altogether different experience toward digital reading. It is additionally critical to look at whether the reading practices have changed or stay unaltered in the online reading environment.

### **1.6 Reading Attitude**

Attitude towards reading are described as an individual's feeling about reading which makes readers to embrace or stay away from a reading circumstance. Attitude and enthusiasm toward reading can be related to feeling and their ability or willingness to read (Karim & Hasan, 2007). Ajzen and Fishbein (1980) define attitude as a scholarly manner on the most proficient method to behave, either negative or positive; and the attitude of reading alludes to the individual's tendency towards reading as an activity. Attitude is a learned product of a cognitive procedure and has an impact on

## *Introduction*

behaviours. Most human attitudes emerge from a direct interaction with the attitude object. The sort of the attitude one has towards that object depends on the positive or negative encounters with the attitude object (Keskin & Bastug, 2014).

Then again, Zajonc (1968) focuses to 'the exposure effect', keeping up those attitudes are shaped as an after effect of many times of exposure to the attitude object. At the point when the reading frequency is considered as exposure to reading, the argument appears to recommend that the reading frequency is an element in reading attitude. Students attitude towards reading are a focal element influencing reading performance. The level of positive or negative attitudes towards reading differs according to the sort of reading to be performed and the motivation or purpose behind reading (McKenna, Kear & Ellsworth, 1995). Positive reading attitudes motivate positive reading experiences. This makes the potential outcomes to energise higher scholarly performances (Bintz, 1993; Walberg & Tsai, 1985).

Walberg and Tsai (1985) contemplated that an inspirational or positive attitude toward reading is one of the most grounded correlates of reading accomplishment. Among the adolescents some elements add a positive attitude towards reading which include: when they trust that reading is significant and enjoyable, when they have a high-self concept as a reader and having a home circumstance where verbal collaboration happens consistently (Walberg & Tsai, 1985; Annamalai & Muniandy, 2013).

Guardians doing literacy practice with their children considerably affects their children's attitude developments towards reading and writing (Hume, Lonigan, & McQueen, 2015). As indicated by DeBaryshe (1995), parents must involve in exercises such as literary

## *Introduction*

practice and library visits which help their children to build up a positive attitude to reading as parents are their role models. To experience the entertaining aspect of reading, reading activities at home should be arranged co-operatively by guardians and children. Moreover, having a reading attitude has an influence on one's reading motivation. In this manner, it can be argued that through the reading attitude the frequency and quantity of reading indirectly affects the reading motivation (Keskin & Bastug, 2014).

In a study, Schaffner, Schiefele and Ulferts (2013) found that the quantity of reading serves as full mediator for the reading inspiration, which proposes that those students who are involved in more broad or extensive reading will probably have positive reading attitudes. McKenna Model of Reading Attitude Acquisition proposes three factors that lead to the development of individual's reading attitude. First factor is normative beliefs i.e., how one's friends view about reading, second factor is beliefs about the results of reading (whether reading is probably going to be pleasurable, significant, frustrating or boring) and beliefs about outcomes of competing activities and third factor is particular reading experiences (McKenna et al., 1995).

As per McKenna et al. (1995), the reading attitude is molded by past reading experiences and by one's perceptions and beliefs about the result that is derived from reading. With respect to family environment, it is an important variable in the process by which reading experiences affect attitudes. That is on account of children see their parents as a source of learning that includes various learning types (Keskin & Bastug, 2014). By understanding students' attitudes and text preferences, empowers the academician and parents to plan, design and teach reading activities that are pertinent to the necessities and interests of each student. Then it

helps to improve positively the students' level of engagement with reading.

### **1.7 Typographical and Cognitive Factors Affecting Hypertext Reading**

Reading text is an art of interpreting printed, composed or written words in the midst of which readers extract visual data from the page and comprehend the content's significance. Contingent upon a reader's motivation or inspiration, the text type, the media design, and the context, the strategy of reading varies between and within readers. By considering these, it is imperative for Web-based instructional designers to pick the suitable textual style, especially for long blocks of text, with a specific end goal to upgrade the level of readability (Ali et al., 2013). For instance, reading a printed book might be an engrossing, easy, and relaxing experience that continues for a significant long time, however reading the same content in electronic format may be an intentionally demanding technique in the light of poor text legibility and innovation-related obstructions. Along these lines, the reader may encounter frustration, weakness, eye fatigue or visual inconvenience, which could impact reading-related practices (Polonen, Jarvenpaa & Hakkinen, 2012; Divya & Haneefa, 2015).

In the midst of the earlier decades, certain typographical variables have been indicated to have an essential role in text legibility. Different variables can impact or enhance the readability of content on a computer screen, for instance font type, font size, white space, the separation between lines of text (leading), style of paragraph, line length and word length. According to Hill and Kroemer (1986) e-books designers ought to pay consideration on the font typeface, font type size, inter-character and inter-word spacing, line length,

## *Introduction*

full justification of lines, inter-line spacing, number of lines per page, page size and design, and in addition the internal navigation options. For computer based instructional outline, suitable font selection affects students, particularly regarding perceiving and reading the symbols effectively. At the point when the letters are set together to shape or form words, the part of perceiving these symbols or characters is imperative for perfect readability (Yoshida, 2000).

Text or content is typically compared in light of font type and size. Standard fonts or textual style can be put into two classes i.e., Serif and San Serif. Serif was the early textual style, made before the period of metal sort printing. Historically, the most broad and generally used fonts were Serif, for example Humanist (Venetian), Old Style (Old Face, Geralde), Transitional, Modern (Didone), and Egyptian (Rabinowitz, 2006). At the end of the letters, Serif fonts have small strokes, whilst San Serif textual style does not (Ambrose & Harris, 2006; Amdur, 2007; Conover, 2003; Rabinowitz, 2006). Each text style or font has an alternate anatomy, such as x-height, set width, and baseline. These elements make every font exceptionally not the same as each other with their own identities (Amdur, 2007).

In any case, some interface designers differ on the choice of either font as fitting or appropriate choices for good readability on computer screens (Erdogan, 2008; Ferrari & Short, 2002; Shaikh & Chaparro, 2004; Tullis, Boynton & Hersh, 1995). This distinction is reflected by different conflicting findings in the literature. A couple of studies demonstrate no differences between the fonts (Boyarski et al., 1998), while others recommend that in terms of readability, San Serif fonts are better for computer screens (Wilson, 2001). Tullis, Boynton and Hersh (1995) in their study found no distinction amongst Serif and San Serif fonts in terms of reading speed. While,

## *Introduction*

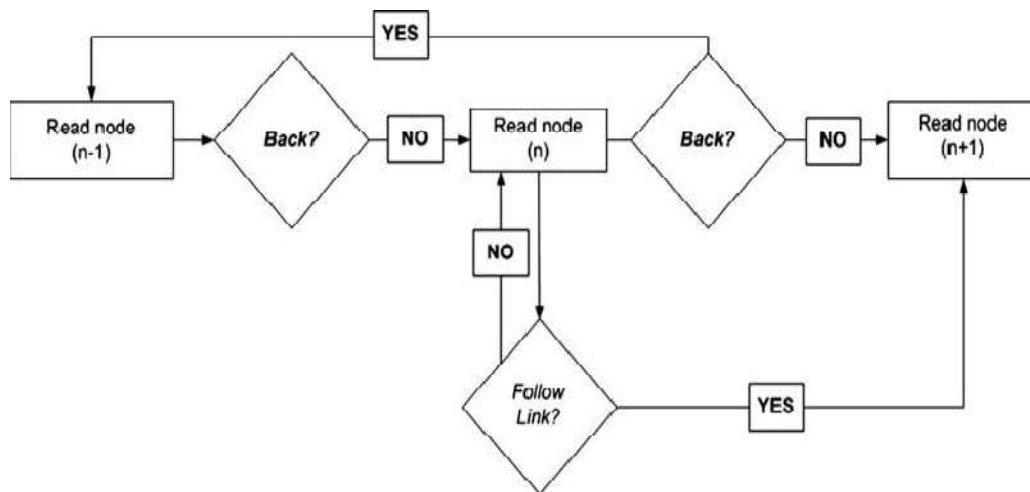
Bernard et al. (2003) demonstrated that on electronic screens San Serif typefaces were clearer than Serif typefaces. Notwithstanding type face contrasts, pixel count, stroke width, and font style smoothing have been shown to effect text legibility thresholds, and individual letters might be more key in the word recognising proof procedure than word shapes. These discoveries propose that recognising the most appropriate font for optimum use on a computer screen is essential (Morrison & Noyes, 2003). Strikingly, a few designers recommend that Serif fonts and San Serif textual styles ought to be consolidated in the primary or main text and titles of a Web interface (Conover, 2003; Yoshida, 2000).

With the access of modern reading appliances, upgraded screen innovation, progressing number of electronic documents, these reading habits however are being changed. With the current technological advancement and various reader softwares, reading onscreen presents a less irritating but rather more versatile reading experience. Various typographical variables affect the reading performance, paying little mind to the media utilised. Advances in display technology, especially the increased resolution and progression of device-related typographical components, have emptied or lessened numerous text legibility issues (Divya & Haneefa, 2015).

The process of reading is the interaction between what the writer has composed and the readers own background and experience. As such, it is a cognitive procedure and the lessening of instability and uncertainty about meaning. In the case of hypertext, reading and navigating are prone to place demands on the working memory. Working memory is characterised as the set of mental resources that individuals use to encode, enact, store, and manipulate information while they perform cognitive undertakings (Baddeley, 2003). Theories

## *Introduction*

of working memory provide a beneficial method for operationalising the build of cognitive load, in light of the fact that a typical supposition of working memory models is that a constrained measure of data can be at the same time handled or processed. This prompts the supposition that increases in mental load are associated with diminished performance in reading of hypertext. Hypertext reading presents another arrangement of cognitive necessities to the reading task, subsequently expanding working memory requests, and increases the mental load. The accompanying figure represents the sequence of steps incorporated into hypertext reading.



**Figure 1**  
**A Process Model for Hypertext Reading**  
(DeStefano & LeFevre, 2007)

In a linear text, that has just the following and back links, a reader at node (n) settles on the choice to either go ahead to the next or following node (n+1) or go back to the previous node (n-1). On this perspective, linear text is the slightest requesting of cognitive load. However, hypertext with embedded links demand that readers settle on an additional choice at every link, which is demonstrated in the above figure by the decision diamond marked 'Follow link?'. The

## *Introduction*

reader either goes ahead to the linked text, node (n+1) in the figure, or continuous reading the text in the present node (n). Every choice about whether to follow a link requires cognitive resources and in this manner, hypertext with more embedded links deliver more noteworthy cognitive load than hypertext with few or no embedded links (DeStefano & LeFevre, 2007; Haneefa & Divya, 2013).

Besides, each time a reader chooses to follow an embedded link, the text he or she encounters in node (n+1) potentially works as an interruption of the advancing comprehension procedure. Comprehension includes the improvement of circumstance models, which are complex mental representations framed when readers incorporate the statements in the text with their knowledge. To the degree that the text in node (n+1) is related to and enhances the developing situation model, the interruption may have immaterial effect on comprehension. To the extent that the text in a linked node is detached to the text in node (n), disruption of the creating situation model may happen.

Furthermore, on the grounds that the reader will be confronted with additional choices when he or she is processing the linked text, that is, to either come back to node (n) or possibly to take after other embedded links, the disruption to developing comprehension may be extreme. By then it can be anticipated that the situation model advancement ought to be better for hypertext structures in which links are restricted to firmly related nodes, as in progressive hypertext. This interference with the comprehension procedure might be a source of disorientation that impacts the hypertext reading (DeStefano & LeFevre, 2007; Haneefa & Divya, 2013).

Both hypertext and conventional print contents give framework for learning and arranging complex theoretical data. Hypertext and print



## *Introduction*

text processing occurs at various levels, from low-level strategies like decoding characters, parsing sentences, perceiving words; to higher-level comprehension processes through which readers build up a situational model of the content by organising new data into their current knowledge base.

Despite cognitive procedure, reading furthermore incorporates metacognitive activity. Readers who are talented constantly and continuously monitor comprehension to recognise distinguish information gaps in their situation model and particularly assign attentional resources on the basis of relevance and importance of information (Reynolds, 2000). Same reading procedure is grounded in learning from print text and hypertext, yet making meaning or importance in a hypertext assisted learning environment puts additional cognitive demands on the reader (Niederhauser et al., 2000).

After reading a given node, hypertext readers ought to viably pick which informational node to read next, given their interests and learning objectives on one hand, and the potential relational-linking options given by the interface links on the other. Through this procedure of selecting nodes and monitoring comprehension, readers take part in cognitive activity to consolidate ideas from spatially distinct nodes and metacognitive activity to consider distinctive ways open to them, and select some paths over other. The extra cognitive and metacognitive techniques incorporated into exploring and making meaning from linked hypertext nodes seems to increase cognitive demands on the reader (Antonenko & Niederhauser, 2010).

### **1.8 Influence of Digital Resources on Reading**

With the growing amount of computerised data accessible and the increasing amount of time that individual spend on reading electronic media; the digital environment has begun to affect students reading behaviour. Various researchers argue that the arrival of digital media, together with the fragmentary nature of hypertext, is threatening sustained reading (Cull, 2011; Birkerts, 1994; Saaid & Wahab, 2014). In the event that a Website does not load within three seconds, students click their way to another Website. Clicking is quick turning into a substitute for thinking. Clicking requires less effort than thinking and is in some instances less painful than thinking. Birkerts (1994) noticed that the youthful era experiencing childhood in the digital environment do not have the capacity to read deeply or profoundly and to maintain a prolonged engagement in reading.

In this digital transition, students are moving from a vertical to a horizontal information seeking model, which prompts them getting the opportunity to be viewers instead of readers. Their behaviour is best depicted as bouncing, flicking or skittering. They move quickly along the digital surface, generally with frequent light contacts or alter of direction. Multitasking is not a new issue in digital reading. While students are at their laptop or desktop, they will keep various browser windows open, blinking images on the Web, scrolling and turning of pages, check their e-mail and might also be on their mobile phone checking their twitter feed, also listening to the radio or television as well (Nicholas, 2011). This will lead to decrease in in-depth and concentrated reading.

Eveland and Dunwoody (2001) find that it is extremely troublesome for readers to devote full attention to reading, since they need to

## *Introduction*

choose which text to read, which hyperlink to follow, and whether to scroll down a page. For reading with full concentration or focus these issues need to be solved. The solutions for these problems are to take print out of the Web documents for reading or save them on computer and read offline. Opening of unwanted Websites providing access to pornographic material and information harmful to national integrity should be blocked with technological solutions like firewalls. While surfing, the students should likewise abstain from clicking on undesirable Websites, pictures that are blinking, attractive screen savers, irrelevant headings, etc to be more focused. Sometimes the students will browse the free portion of the Web where the subjects are not discussed deeply but rather broadly, this will also lead to decrease in in-depth reading. Moreover, they may not be aware about the deep Web and open access Web resources. The solution is to make the users mindful about the profound Web collection, qualitative Web resources through consortia and other means and its search tools (Loan, 2011).

Decline in literature reading is the other concern. Possible reasons are lack of awareness regarding literary collection, inadequate literary collection and difficulty for accessing it. So it is essential to create awareness about literary collection on the Web like Gutenberg book venture which gives free access to literary collection of well known scholars like William Shakespeare.

A Website is a more troublesome reading environment for some reasons. Firstly, hypertext is a nonlinear hyper textual environment and it removes text devices that ordinarily build coherence in learner texts, such as textbooks. Also, the content on Web pages is for the most part made from building blocks of a few shorter ones. It extends the amount of documents that must be coordinated and also placed increased cognitive demands or requests on the readers. At

## *Introduction*

last, even shallow examinations of the content on Web pages reveal inconsistencies among sources that must be accommodated by the readers. Therefore, reading hypertext is more troublesome than reading conventional texts (Tseng, 2010; Britt & Gabrys, 2001).

As a result reading behaviour of new generation students are in transition gradually shifting from sequential reading to non-sequential reading, passive reading to interactive reading, concentrated reading to superficial reading, in-depth reading to extensive reading, restricted access to unrestricted access, local sources to worldwide sources, print sources to online sources, local languages to English language and individual reading to participative reading (Loan, 2011).

### **1.9 Need and Significance of the Study**

In this era of instability, insecurity and steady change, the knowledge acquired by an individual during the formal education becomes obsolete at an exceptionally fast rate in the digital environment. Lifelong learning is the only way to survive and thrive in the rapidly changing environment (Jagtar Singh, 2004). Internet has reformed the concept of libraries and changed the way information is processed, stored, transmitted, retrieved and dispersed. It holds huge volume of electronic information in practically all fields of human knowledge. The library environment is currently undergoing a rapid and dynamic revolution leading to new generation of libraries with an emphasis on e-resources. These e-resources have fully or partially entered in the reading habits of netizens.

In the Internet age, with its proliferation of information needed for academic purposes, students are exposed not only to conventional text presentations, but also to electronic texts. Educational

## *Introduction*

practitioners are witnessing increased availability of academic and professional texts (both books and articles) on the Internet. Due to these developments, reading from a computer screen is generally assumed to be increasingly common and important for students. It is expected that digital literacy will largely supplant “paper” literacy for many academic as well as everyday purposes (Kol & Scholnik, 2000; Chou, 2012).

Readers today need to overcome old reading habits related to traditional print-based texts, while at the same time, acquiring and exploiting new, innovative approaches that take into account the nature of electronic texts. Researchers have argued that, although the young generations spend considerable time for reading electronic materials, they tend to skim and browse for information on the Internet rather than read intensively (Horton et al., 1996). This reading behaviour is suboptimal in light of the fact that people who are less engaged in intensive reading lack the ability to read deeply and to sustain a prolonged engagement in reading (Liu, 2005). The youth, especially students who have opened their eyes in full bloom of electronic revolution, adopt these sources most of all. This close association of students and e-resources is supposed to greatly influence their reading culture.

While new media bring unprecedented freedom for readers, they also induce a new form of constraint. In the print environment, the text is fixed and the author determines the order in which ideas are presented. In hypertext, however, the author provides options, but readers choose the order through activating links (Liu, 2012). The proliferation of hyperlinks has a profound impact on people’s reading behaviour such as nonlinear reading (e.g., jumping from page to page and from site). Even for readers who start reading from the same

## *Introduction*

page, what they read may be different depending on which link is activated.

Hyper reading may also reduce the sustained attention to any textual source and lead to more fragmented reading, since each page on the Web has to compete with many other pages for the user's attention. In terms of hypertext linking, the author's conception of the connection's relevance may not be the same as the reader's. Links imposed may not be logically associated with the original topic, which may send readers to a site for no discernible purpose and result in disorientation (Miall & Dobson, 2001).

Considering the advancement of electronic assets in universities during recent years, it is of significance to analyse reading behaviour in digital environment. In practice, reading on a computer screen is for the most part constrained to reference or citations and paragraph, and as a habit, longer printed records are favoured for reading. The rise of reading gadgets, changes and developments in screen technology and expansion in the number of electronic documents have all changed the reading behaviour of individuals. In the past, the low quality of screens had made it exhausting and harder to read for longer periods of time. The development of reader software, however, has now made reading on computer screen easier for a great majority of people and has turned out to be substantially more adaptable (Brown, 2001; Shabani, Naderikharaji & Abedi, 2011).

There are not much studies conducted about the reading behaviour in the digital environment. It is important to evaluate whether these e-resources has had any influence on the reading behaviour among the students in the digital environment. This study is considered relevant to assess the changes in reading behaviour in the digital

## *Introduction*

environment based on different elements such as reading pattern, digital reading competency, preference of reading print and digital resources, attitude towards digital reading, and also the influence of digital resources on reading culture of the students of universities in Kerala.

### **1.10 Profile of the Universities Selected**

At present there are seventeen universities in Kerala. Out of these only four major state universities are taken for the study. A brief profile of the universities chosen for the study is shown here. It is aimed at giving general information about the respective universities in Kerala. The facts showed were generally gained by means of university Websites, annual reports and individual observations.

#### **1.10.1 University of Kerala**

The University of Kerala was established as the University of Travancore, is an affiliating university situated in Trivandrum in the state of Kerala, India. The University of Travancore was built up in 1937 by a declaration of the Maharajah of Travancore, Sri Chithira Thirunal Balarama Varma who was the first Chancellor of the University. Sir C. P. Ramaswamy Ayyar, the then Diwan of the state was the first Vice-Chancellor. Just ten colleges inside the State of Travancore, which were around then affiliated to the Madras University, transformed into the affiliated colleges of the University of Travancore. In 1954, the unified state of Kerala appeared with the vast majority of Travancore and entire of state of Cochin and Malabar territory of Madras presidency turning out to be a part of it. The Kerala University Act (Act 14 of 1957) was brought into power and the University of Travancore was renamed University of Kerala. The univeristy had three campuses situated in three diverse parts of the state viz. Thiruvananthapuram, Ernakulam and Kozhikode.

## *Introduction*

University of Kerala was ranked 801-1000 in the world by the Times Higher Education World University Rankings of 2018 (<http://www.Keralauniversity.ac.in/history>).

### **1.10.2 University of Calicut**

The University of Calicut is the largest university in Kerala. Established in the year 1968, it is the second university to be set up in Kerala. The university aims to sustain perfection in education and research in its catchment territories of Northern Kerala, verifiably entrusted to the periphery of Kerala's academic map. The university lays its emphasis on encouraging quality human resource and advancing productive research that advantage both local communities and more extensive humankind. The university was made through a Government plan bifurcating Kerala University. According to the plan, the four post graduate departments of the University of Kerala working in Calicut were attached to the new university alongside fifty four constituent colleges spread across seven northern districts. With 'Nirmaya Karmana Sree' as its motto, the university has possessed the capacity to surmount all challenges and develop as the largest residential cum affiliating university in Kerala. As it is all set to celebrate its golden jubilee, the Calicut University has been awarded with 'A' grade with 3.13 CGPA by the UGC's (University Grant Commission) National Assessment and Accreditation Council (NAAC) in the year 2017 (<http://www.uoc.ac.in/ugsw/>).

### **1.10.3 Mahatma Gandhi University**

Mahatma Gandhi University otherwise called MG University (formerly Gandhiji University) was set up on 2<sup>nd</sup> October 1983 in Kottayam and has jurisdiction over the revenue districts of Kottayam, Idukki, and parts of Pathanamthitta and Alappuzha.



## *Introduction*

Hiving off the regional jurisdiction of the mother foundation-University of Kerala, according to the Mahatma Gandhi University act 12 of 1985, enacted by the Kerala State Legislature, the twenty two year youthful university caters to the advancement of higher education of central Kerala. The university that leads a range of projects and programmes at the undergraduate, postgraduate, M Phil and doctoral levels through its 18 university Departments, 1 international inter university centre, 6 inter university centres, 8 inter school centres, 36 self-financing departments, 75 aided affiliated colleges (of which five colleges have become autonomous), 220 unaided affiliated colleges and 273 recognised research centers. MG University has topped the list of universities from Kerala in the latest NAAC process netting 'A' grade with 3.24 points (<http://www.mgu.ac.in>).

### **1.10.4 Kannur University**

Kannur University was set up in 1996 to give advancement of higher education in Kasargod, Kannur, and Wayanad districts of Kerala, India. It was established after the passing of Act No. 22 of 1996 of the Kerala Legislative Assembly. A university by the name of "Malabar University" had appeared considerably earlier by the passing of an ordinance by the Governor of Kerala, on 9 November 1995. Kannur University was inaugurated on 2 March 1996 by the Hon, Chief Minister of Kerala. The objective of the Kannur University Act, 1996 was to establish in the state of Kerala a teaching, residential and affiliating university to accommodate the progression of higher education in Kasargod and Kannur revenue districts and the Mananthavady Taluk of Wayanad district. Kannur University is a multi-campus university, at Kannur, Kasargod, Mananthavady, Payyannur, Thalassery, and Kanhangad (<http://www.Kannuruniversity.ac.in>).

### **1.11 Statement of the Problem**

The amount of text-based information available online is steadily increasing. The widespread use of the Internet and alternative reading resources with hypertexts and multimedia resources has made drastic changes in reading patterns. People use the Internet to seek information, read news, to communicate, and for entertainment purposes. Gradual decrease in reading habit of individuals is a typical phenomenon in the developing nations as well as in the developed ones. Among the youngsters, this decline is most perceptible, since they are the population who are most influenced by the developing digital technologies and advancements, particularly the Internet and TV-based entertainment. Many university libraries are reporting a decline in the usage of print journals and magazines as more users, especially the younger generations are using more online media (De Groote & Dorsch, 2001).

Reading on screen is indeed different to reading on paper. Each medium provides its own benefits. Reading on the Internet and digital media presents numerous positive impacts; for example, improved user experience through media rich content, efficiency, increased reading capacity, flexibility, cost effectiveness, and comprehension; and also negative aspects such as impact on short and long term memory, lack of comprehension, inability of annotation, and absence of concentration.

A screen-based reading behaviour is emerging with an increasing amount of time spent on reading online. Skim reading, scanning and speed reading were evidence of less time spent on in-depth reading leading to less comprehension and content absorption/recall levels. Currently, the exponential growth of information and entertainment

## *Introduction*

created in a digital format is gaining importance particularly among younger people. In view of the development of online materials and the increased availability of devices that allow reading from the screen, there has been growing academic interest in research focusing on how people read in the digital environment. Consequently, the purpose behind this research is to study the reading behaviour of students with the goal that it will propel valuable solution for the conveyance and management of digital reading materials in higher education. However, the number of research that has been led to assess the changes to human reading behaviour in digital environment is limited (Liu, 2005).

There is a need to pay attention to the students' reading pattern, how they actually engage with different media, and their purposes or reasons behind choosing one format over another, their satisfaction with each format, digital reading competency, attitude toward digital reading; and furthermore, this study also tried to understand how the use of digital resources influences the reading culture of students in the digital environment. The study is entitled as "Reading Behaviour in Digital Environment: A Study among Students of Universities in Kerala".

### **1.12 Definition of Key Terms**

The key terms in the title of the study are defined and given in the following sub sections.

#### **1.12.1 Reading Behaviour**

Reading is defined as an interaction between readers, writers, and the text. Reading is thinking and can never be separated from the purpose, prior knowledge, and feelings of the person engaged neither

## *Introduction*

in the activity nor from the nature of the text being read (Smith, 1994).

Oxford dictionary defined behaviour “as the way in which one acts or conducts oneself particularly towards others” (Behaviour, n.d.).

Reading Behaviour refers to the way a person behaves or acts, or conducts; manners to interpret or understand (a printed message) as having a particular meaning. Growing collection of digital documents and the development of digital media have had a profound impact of reading in the digital environment. A screen-based reading behaviour has gradually begun to form and instead of doing in-depth and concentrated reading, readers spend more time browsing and skipping on the computer screen. Screen reading was also characterised as one time reading, keywords tagging, non-linear reading, and more selective reading (Liu, 2005).

### **1.12.2 Digital Environment**

Digital is a type of media that is easily changed and shared, therefore becoming interactive (Dresang, 1999). Cambridge dictionary defined the term digital as “an image, information, music, etc. that is recorded or broadcast using computer technology” (Digital, n.d.).

Oxford dictionary defined environment “as the surroundings or conditions in which a person, animal or plant lives or operates” (Environment, n.d.).

Digital environment refers to a simulated place made through the use of one or more computers. It is the conglomeration of all of those events, facts, realities into a tangible experience of a changed way of being. Records or evidence of an individual’s interaction with a digital environment constitute their digital foot print. Digital reading

## *Introduction*

involves eyes interaction, computer screen, texts presented in hypertext, and comprehension of verbal and non-verbal information.

Unlike traditional text forms, which typically include media such as print and two dimensional graphics, reading a digital text integrate a range of symbols and multimedia formats including icons, animated symbols, audio, interactive tables, virtual reality environments and many more (Leu et al., 2004). Although the drawbacks of computer screens are still formidable enough to make digital reading an option desirable to many, digital technologies have started to affect reading practice and behaviour as individuals are spending more time reading online. Digital environment provides the reader with a variety of embedded features that are designed to support the needs of readers, while being sensitive to the interactive nature of the reading process.

### **1.13 Objectives of the Study**

With the growing amount of digital information available and the increased amount of time that people spend on electronic media, the digital environment has begun to affect people's reading behaviour. The main aim of this study is to investigate the reading behaviour in the digital environment among the students of universities in Kerala. In order to accomplish the aim, the study incorporates the following specific objectives.

1. To understand the reading pattern of the students in the digital environment.
2. To assess the digital reading competency of the students.
3. To analyse the students' preference of reading print and digital resources.

4. To assess the attitude of the students towards digital reading;  
and
5. To examine the influence of digital resources on the reading culture of the students.

#### **1.14 Hypotheses**

The following hypotheses are framed and tested by applying appropriate statistics.

1. There is a significant gender difference in the reading pattern of the students.
2. There exists a significant gender difference in the level of competency of the students to use computer and other digital devices.
3. There is a significant discipline-wise difference in the level of competency of the students to use computer and other digital devices.
4. There is a significant gender difference in the digital reading competency of the students.
5. There is a significant discipline-wise difference in the digital reading competency of the students.
6. There exists a significant relationship between digital reading competency and level of competency to use computer and other digital devices.
7. There is a significant gender difference in the preference of reading print and digital resources.
8. There is a positive attitude towards digital reading among the students.

## *Introduction*

9. There is a significant gender difference in the attitude of the students towards digital reading.
10. There exists a significant discipline-wise difference in the attitude of the students towards digital reading.
11. There is a significant gender difference in the perception about the influence of digital resources on reading culture of the students.
12. There is a significant influence of digital resources on the reading culture of the students.

### **1.15 Scope and Limitations of the Study**

The research would highlight the reading behaviour in digital environment among the students of universities in Kerala. Out of seventeen universities, investigator selected four state universities in Kerala; namely, University of Kerala, University of Calicut, Mahatma Gandhi University and Kannur University. This study provides research on a population that has previously not got adequate core interest or focus. Post graduate students can be considered as a more homogenous collection than the population in general (at least when considering the academic level, and age), but major differences may still be seen in their reading behaviour in digital environment. The scope of the study extends to cover the regular full time post graduate students on the university campuses. Further the post graduate students from Science, Humanities, and Social Science disciplines only have taken for the study.

Dependent variables used in this study are reading pattern, digital reading competency, preference of reading print resources and digital resources, attitudes towards digital reading, and influence of digital resources on the reading culture of the students. Independent

## *Introduction*

variables used in this study are Gender (Male and Female), Discipline (Science, Humanities and Social Science), and University (University of Kerala, University of Calicut, Mahatma Gandhi University and Kannur University).

In spite of best of endeavors to minimise all limitations that might creep in the course of the research, the study was finished with certain constraints. The study covered a selected set of variables to describe the reading behaviour in digital environment. An examination on bigger scale needs to be done for more reliable and generalise results, with the consideration and inclusion of more variables like family background, reading exposure and availability of reading materials, and variables that are connected specifically with reading in the digital environment. Questionnaire is used for data collection. The responses students selected on their survey are used to calculate the reliability and validity of the questions. There is also the chance that the students selected random responses without regard to how they really feel, or without reading the items. The mood of the students can also affect their decision to read and how they describe their feelings about reading. The events in a student's life on the day of the survey could affect their responses either positively or negatively.

The characteristics of sample may limit the generalisability of findings. This study focused on the reading behaviour in the digital environment among the younger generation, who may be associated with many cognitive developmental tasks and challenges. Hence, the generalisability of results to other age groups is restricted. Considering the limitations, the investigator wishes to note that such limitations are not unordinary in the investigation of this kind. Regardless of the limitations, the investigator hopes that the study fulfills the objectives.



### **1.16 Organisation of the Thesis**

The thesis is organised under five chapters, as follows:

**Chapter I** introduces the problem of the study. It includes a brief description of the subject, the need and significance of the study, profile of the universities selected, statement of the problem, definition of key terms, objectives of the study, hypotheses, scope and limitations of the study, and organisation of the thesis.

**Chapter II** deals with literature survey of related studies conducted in India and abroad covering reading pattern, digital reading competency, preference of reading print and digital resources, attitudes towards digital reading, and influence of digital resources on the reading culture of the students.

**Chapter III** describes the methodology of research, variables used for the study, sampling design, data collection tools, data collection procedures and various tools and techniques used for data analysis.

**Chapter IV** includes the analysis and interpretations of data.

**Chapter V** gives a summary of the major findings, tenability of hypotheses, suggestions based on the study, conclusions and recommendations for further research.

#### **Citation Style Used**

References and bibliography are prepared on the basis of American Psychological Association (APA) style manual edition 6 which is broadly accepted in the Social Science and allied fields, such as Education, Management and so on. For more readability, citations with more than three authors are abbreviated to the first author name plus et al. in the intext citations. All references are given in hanging indent format with the first line flush to the left margin and

every single other line intended (American Psychological Association, 2010).

### **1.17 Conclusion**

In an inexorably digital environment, readers, particularly youth are prone to gradually build up the screen-based reading behaviour, and to increasingly utilise an assortment of strategies such as browsing, scanning, skimming and keyword spotting to adapt to the information abundant environment. Then again, readers will continue utilising print media for a lot of their reading activities, especially for in-depth reading. The practice of annotating and highlighting usually involves in in-depth reading. The preference of people for paper as a medium of reading, particularly in-depth reading additionally suggests that paper is unlikely to vanish in the computerised age.

Rather than deprecating digital technology as harming the reading quality in the digital environment, it ought to grasp its potential and expect technological advances will lessen the issues significantly further. While numerous individuals do not see digital media as a source for concentrated reading, it ought to remember that technology is always enhancing and reading practices themselves are evolving.

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## Chapter 2

# REVIEW OF LITERATURE

### 2.1 Introduction

The discussion of reading behaviour in digital environment is a growing area of interest for many researchers, yet it is a relatively unexplored area of research. The investigator conducted a survey of literature on the basis of same or similar topics available. Considerable amount of literature is available on reading behaviour, online reading and use of e-resources. It is not the purpose behind this study to review all the distinctive approaches and studies. In any case, an examination of the related literature reveals that there are some essential studies that deserve closer consideration. To gather relevant literature, LISA database, and other reference sources like bibliographies, online information resources, conference proceedings, journals etc., were examined.

In the course of recent years, particularly with the popularity of e-readers, digital reading has been a focus of various studies. The scholarly ferment going to this dramatic improvement has carried with an abundance of new studies and methodologies. But studies are relatively few regarding the changes that occurred in the reading behaviour of the youth in digital environment. An overview of the literature found that majority of the studies are reported from foreign countries and that such studies are not given due importance by the researchers in Library and Information Science. An attempt is made to present a survey of the literature available in India and abroad which are related to the problem. The literature reviews have been arranged under five headings.

- 1) Reading Pattern
- 2) Digital Reading Competency
- 3) Preference of Reading Print and Digital resources
- 4) Attitude towards Digital Reading
- 5) Influence of Digital Resources on Reading

## **2.2 Reading Pattern**

Reading is a way to deal with signs of better knowledge of one's own experiences and it can be an empowering journey to self-disclosure. Reading exchanges experiences to the individual with the goal that the individual may build up one's perspective, recognise widen and extend his or her interest and acquire significant comprehension of the world. It is a viable system of cognizant and discovering that impacts the exactness and precision of information, attitude, morals, beliefs, judgments, movement and activity of readers. Reading habits implies to the behaviour, which communicates the similarity of reading and taste of reading. It is a technique through which the reader arranges his or her reading.

Kala, Betageri and Chandrappa (2013) conducted a comparative analysis of reading habit amongst people in rural and urban areas of Bangalore District. Primary data was gathered from the residents of Bangalore district through questionnaire and secondary data acquired from books, magazines, journals, newspapers and Websites. The results demonstrate that 90 per cent of urban and 67 per cent of rural respondents possess reading habits. Twenty five per cent of the rural do not read because of laziness and rest of rural does not read due to shortage of time, lack of interest and non availability of books. Forty one per cent of the urban and 52 per cent of the rural opined that they find it easy to get information through



## *Review of Literature*

the Internet than from books. Sixty eight per cent of the urban and 50 per cent of the rural prefer hard copies over online contents. Majority of the respondents from urban and rural areas stated that modern technology has negative impact on reading habits. Education and awareness programs ought to be conducted on a regular basis. Government has to take initiative to give Internet connection to rural people at concession rate.

Instead of observing how people read electronic documents, Liu (2005) endeavoured to examine the reading behaviour in the digital environment by investigating how people's reading behaviour has changed over the past ten years in San Jose State University, USA. People who have broad experience in reading digital documents were chosen. With an increasing measure of time spent reading electronic documents a screen-based reading behaviour is rising. The screen-based reading behaviour is depicted by more time spend on browsing and scanning, keyword spotting, one time reading, non-linear and reading and reading more selectively, while less time is spent on in-depth reading and concentrated reading.

Understanding gender differences would enable a better understanding of the changing reading behaviour in the digital environment, and to grow more effective and progressed digital reading devices. Liu and Huang (2008) investigated the gender differences in the online reading environment among the undergraduate students and graduate students at Zhongshan University in Guangzhou, China from diverse disciplines. Survey results reveal that female readers have a more grounded inclination for paper as a reading medium than male readers, whereas male readers display a prominent level of satisfaction with online reading than female. Moreover, male and female contrast significantly on the dimension of selective reading and sustained attention. From this

### *Review of Literature*

study it can be concluded that the arrival of digital media brings both positive and negative potential outcomes.

Reading behaviour in digital environments among higher education students of Isfahan University in Iran was conducted by Shabani, Naderikharaji, and Abedi (2011). Distinctive aspects of reading behaviour were studied. To determine the significance of reading behaviour of student's, t-test, ANOVA (Analysis of Variance) and Shefeh Test was used. Results reveal that the amount of reading e-resources was highest among the students of Technical and Engineering subjects. In any case, the amount of printing out of electronic document was most elevated among the faculty of Science. PhD students regularly use the method of scanning for reading e-resources, whereas post graduate students for the most part take the print out of the electronic documents for reading.

Reading relies on situation. Boys and girls pick diverse materials to read as indicated by their age, mental level, home variables, classroom, and individual contrasts. Dilshad, Adnan and Akram (2013) explored the gender differences in reading habits of university students in Pakistan and determined the student's inclination, approach and attitude towards reading. Data was collected from 1050 male and female students through questionnaire method. Results reveal that depending upon their objective, liking, timing of study and other factors, reading habits of male and female students was different. As compared to their male counterparts, female students have comparatively more positive attitudes towards reading. Study suggests that the educators at universities must assume a dynamic part in motivating, guiding and supervising students for creating positive reading habits particularly among male students.

## *Review of Literature*

Mobile reading behaviour among Chinese college students was researched by Zhang and Ma (2011) and provides a statistical analysis of correlation between the user's educational level and their mobile reading behaviour. Survey received 479 responses in total and 314 valid responses. Findings reveal that mobile reading was in its initial phases of development and has gigantic business sector potential in China. Well educated users are more inclined to pay for academic papers, while other users lean toward online literature. By and large general mobile reading services have yet to become more and more popular by enhancing user segmentation, extending the scope of service and leading precise price marketing in China.

Thanuskodi (2011) reported the results of a survey of reading habits of Library and Information Science (LIS) students in the Directorate of Distance Education, Annamalai University, Tamilnadu. Results of the study demonstrated that majority of the LIS students (79.53%) are keen on reading LIS course material frequently. The outcomes additionally show that the work most often interfered with students reading and studying. Findings of the study prompts the conclusion that LIS students need to enhance their reading habits and furthermore helpful to have a record of their reading habits with a specific end goal to make predictions about their scholastic achievement in the study.

Readers today need to overcome old reading habits related to traditional print-based texts, while, in the meantime, acquiring and exploiting new, innovative methodologies that consider the nature of electronic texts. Chou (2012) assessed the on-screen reading behaviour of five English as second language graduate students of different academic disciplines in Taiwan. Questionnaire inquired about students on-screen reading preference and tendency with two reading purposes - reading to get ready or prepare for courses and

## *Review of Literature*

reading to write papers. Interview and observation techniques have been used for data collection. The results demonstrated that students had low preference and propensity toward reading texts that required careful reading on a computer screen, because they believed that reading screen-based texts constrained their use of strategies. Most students choose online articles when searching for references. Furthermore the outcomes also revealed that student's on-screen reading behaviour was affected by several factors such as their reading purposes, opportunity to read screen-based texts, use of reading strategies and second language proficiency.

Fabunmi (2010) evaluated the poor reading culture of selected secondary school libraries in ADO Local Government area of Ekiti state, Nigeria. Results of the analysis show that computer and other media, harsh monetary reality, societal demand for materialism, insufficient library materials among others were the reasons of poor reading culture of students in secondary schools. It also reveals that materials in secondary schools were not organised, deficient, and not pertinent. Study concluded that the libraries ought to be incorporated in all secondary schools in Nigeria with books and non books materials particularly audio visual materials. Professional librarian should be employed. Government should organise various courses, workshops and meeting to offer the honourable thought of good reading culture to students and all stake holders in the educational framework.

Nath and Razeena (2012) surveyed the various perspectives that influence the reading habits of school going girls in Calicut city, Kerala. Objective of the study was to find out reading habits, identify their insight towards free and voluntary reading factors influencing the reading habits, preference of reading materials, role of teachers, parents and other family members in advancing reading habits,

## *Review of Literature*

amount of time spend for general reading, reading source, major factors hinder leisure reading and measure required for improvement of reading culture. A survey was conducted on a sample of 702 school going girls. Results reveal that students have positive attitude towards reading habits. A large portion of respondents preferred short stories, jokes and magazines. However technological innovations like cable TV and Internet usage have brought out tremendous changes in the life style of adolescent children. Teachers and parents are prime source of inculcating good reading habits among children and making them enthusiastic, willing and responsive readers.

E-book reading devices open new potential in the field of reading. Among the professionals and students, Aaltonen et al. (2011) led a study with respect to the utilisation of e-book readers in the Helsinki University of Technology, now part of the Aalto University, Finland. E-book readers were given to students for one study period with all the course material in electronic format. Feedback from the students was gathered through discussions, study diaries and questionnaires. Results reveal that e-readers were at present awesome for reading novels, however lack the functionality required for academic reading, annotating and note taking. The long battery life and easy reading was the point of interest in any use and zooming make the devices slow to use in non-linear reading. Also e-readers were not appropriate for material with colour graphics, tables, pictures and equations.

Various issues and recommendations to improve the reading habits of college students in Tamilnadu were examined by Nattar (2010). Researcher has used stratified random sampling technique. Data was collected by structured questionnaire. Majority of respondents opined that the textbooks for reading were sufficient and cooperation

## *Review of Literature*

from library staff was satisfactory and computer knowledge to access was inadequate. Another finding was that the atmosphere prevailing in libraries were conducive in nature. The overall analysis focuses on the requirement for a lot of change and development in Arts colleges of Tamilnadu. Libraries need to endeavour special effort in consultation with the college authorities, administration, policy makers and educationists to promote reading habits.

With the popularity of e-readers, digital reading has been a focus of numerous studies. Liu (2012) in a paper tried to give a snapshot of major studies on digital reading over the past few years. This paper starts by introducing the background in digital reading, and after that outlines the significant research findings. It exhibits the growth of interest in Information Science and other disciplines in digital reading behaviour. Only major studies in North American and European countries were covered. Findings reveal that in an increasingly digital environment, readers particularly younger readers were likely to gradually develop the screen-based reading behaviour, and to increasingly use a variety of strategies (e.g., browsing and key-word spotting) to adapt with the information abundant environment. Then again, readers will keep on using print media for much of their reading activities, especially in-depth reading. In-depth reading usually involves annotating and highlighting. People's preference for paper as a medium of reading particularly in-depth reading likewise suggests that paper is unlikely to disappear in the digital age.

Two events in 2007 assessed by Coyle (2008) in an article reawakened the interest in and the inquiry regarding reading in the electronic age. The first was a study released by the NEA (National Endowment for the Arts) called "To read or not to read". The report demonstrates that there is a marked decline in both book reading as

## *Review of Literature*

an activity and of “reading for pleasure”. The other occasion was the announcement of Amazon’s e-book reader, The Kindle. Sony Corporation likewise produced a device using e-ink technology, the Sony reader. The presence of these new devices based on the e-ink screen technology indicates that at least some marketers assume that the screen technology has been the barrier to the acceptance of reading book on a device. A solution is expected to the issue of reading electronic text. The NEA study placed new technology as antagonist to reading, while Amazon and others are attempting to use new technology in the service of reading. With all those digitised formats, the clarity of text displays is a long way from crisp ink on paper experience, and actual reading of text is considerably more troublesome. The paper book is a perfectly good technology for reading, and it would be hard to improve upon it as a reading device.

Kol and Scholnik (2000) hypothesized that if students were instructed to use encouraging strategies, they would scan better from screen or from paper, moreover skim and close read as they do on paper. All through the semester, students were instructed to use the accessible online tools that are in the experimental group, and toward the end of the semester a reading comprehension test was coordinated to the students in the experimental and control groups. The outcomes demonstrated that students reading from both screen and paper performed similarly well in a wide range of inquiries on the reading comprehension test.

Effective utilisation of reading strategies has been seen as a fundamental intends to increase reading comprehension. Lin (2013) explored the college student’s use of electronic reading strategies in reading e-books and the elements and features provided by e-book systems. Subjects of this study were students at Fu-jen Catholic University in Taiwan. In total eight college students volunteered for

## *Review of Literature*

in-depth interview to express their strategy in reading e-books. A set of questionnaire items to evaluate electronic reading strategies and e-book features for both academic and leisure reading is used for gathering quantitative data. Pair-t is used among 201 respondents to determine differences between academic reading and leisure reading. Interview data reveal that students use different strategies in reading e-books. Their reading strategies were arranged in “use of prior experiences”, comprehension and decision making, self direction and self checking. From 26 questionnaire items for assessing student’s need of reading strategies, 16 were found significantly different between academic reading and leisure reading. The need level of numerous e-book features is significantly higher for academic reading than for leisure reading ( $p < 0.05$ ).

Goodwyn (2013) reported a survey of English teachers in England to gauge their responses to e-readers, both personally and professionally and depicts their speculations about the place of e-readers in schools in the future. An online survey with survey monkey was adopted for data collection. The collected data was analysed in SPSS with frequencies of responses and cross tabulations used to explore the data. There was a mixed reaction with some teachers concerned about the demise of the book and the potential negative impact on reading. Study also reported that majority of them welcome e-readers as a dynamic element within in the reading environment.

Tenopir et al. (2009) studied the information seeking and reading patterns of Science, Technology, Medical and Social Science faculty members of United States from 1977 to the present. This study tries to inspect how faculty members locate, obtain, read and use scholarly articles and how this has changed with the wide spread availability of e-journals and journal alternatives. Data was



## *Review of Literature*

assembled using questionnaire surveys at university faculty and other researchers periodically since 1977. From the analysis it was found that the average time spent for reading was diminishing. Electronic articles account for the majority readings; however, most readings were still printed on paper for final reading. Scientists report that they read a higher proportion of older articles from a wider range of journals titles and more articles from library e-collection. The study concluded that both the number of e-journals and the range of places where articles are made accessible have impacted the ways in which researchers find and read journal articles.

Student's perception of an e-book reading program was examined by Huang (2013). The participants were 67 first year university students drawn from two sections of an intermediate EFL (English as a foreign language) reading course in a National University in northern Taiwan. During the year long experiment, the researcher provided a reading list from which the students read at least one online e-book weekly. In questionnaire and interviews, students provided positive feedback on the programs strategy instruments and its learning impacts; they called attention to e-books potential to develop better reading habits and increase motivation; they also perceived e-books as being more accessible, portable and eco friendly than print based texts. Students likewise noted challenges with e-book reading in terms of eye fatigue and managing lengthy texts. This study conclude that readers interact with e-books, and their perceptions of e-books can serve as a model for the implementation of a more extensive scope of reading devices (such as ipads, Sony's reader digital books, and even some cell phones) into foreign language reading curricula later on.

### *Review of Literature*

Tveit (2012) discussed the reading and library habits among teenagers in Oslo, Norway using qualitative interviews and a survey. The target of this study were the components that influence teenagers reading choices, kind of text appeal to them, and the role of public library on teenagers reading habits and their school work. Interviews with four girls show individual variation in their literary tastes and in the role of reading they take on. The survey gives an outline of teenager's library use and their literature inclination, and identifies that girls and boys differ in preferences of reading media. Gender-based contrasts in literary tastes are also shown. The survey demonstrates distinctive patterns in reading frequency and reading materials in the sense that students from the schools with the closest association to the public library read more, as well as in an extensive range of reading materials than students from school with no such association.

Ravishankar et al. (2008) in their study sought to depict and explore reading habits of medical students during the first three semesters and acquire their perspectives with respect to inclusion of medical humanities in the course. The authors introduced a voluntary module in medical humanities to the fifth and sixth semester students. Respondent's gender, semester and nationality were noted. A commonly read non course book (fiction and nonfiction) was likewise noted. An aggregate of 165 of the 220 students (75%) were participated. Indians followed by Nepalese was the most widely recognised nationalities. Results of the study revealed that romantic fiction and biography was most commonly read. Commonly read books are "The alchemist" and "The Davinci code". Students support the inclusion of medical humanities in the curriculum. The study concludes that students read widely beyond their course.

### *Review of Literature*

Scales and Rhee (2001) examined the reading habits and patterns of white and Asian American adults. An analysis of 115 adult responses to a questionnaire was presented about their reading habits and patterns. Particularly, it was hypothesised that when grouped by demographic variables, participant's responses about their reading habits and patterns would not contrast. To test the significance of differences between subjects, t-test and Chi-square analysis was used. Difference was found between the groups for reading habits and for reading patterns. Pearson Y values were figured to decide relationship between participants reading habits and patterns. Both positive and negative relationship was found. Through multiple regression analysis, it was determined that gender, race and education were the predictors for participants reading habits, education and race were the predictors for reading patterns.

Lee (2012) tried to test the inquiry, whether foreign language reading strategies use among EFL College freshmen differ according to different gender and the differences of frequency in their use of different type of reading strategies. Participants in this study was daytime college freshmen from a University of Technology with varied majors, who were taking the freshman English course for 2 hours a week among 4 classes (Industrial engineering and Management, Electronics, Applied foreign languages and Cosmetology and Styling). Questionnaire was the tool used for the study which was distributed among 159 participants. Statement of questionnaire comprises of five types of reading behaviours such as memory, cognitive, compensation, meta cognitive items and social affective. Data was analysed by using SPSS method. T-test, ANOVA and Pearson correlation was additionally performed. Results indicated that the differences between male and female students on the type of reading strategies were significant, male students reported greater strategy

### *Review of Literature*

use than their female counter parts regarding memory, cognitive, compensation strategies, while fewer male than female used strategies of meta cognitive and social affective while reading.

Reading habits of B-school users like students and faculty members of JIMJ (Jaipuria Institute of Management, Jaipur) was investigated by Bajpai (2013). This study demonstrates that reading gets a serious consideration among the users. Almost all users were aware and satisfied with the services provided by the library. Sometimes the books required for study/teaching were not accessible in the library, because the JIMJ library has new collection of some rare reference books and back issues of important journals in management areas. Most of the users express that advanced technology lead to decrease in reading habits, yet in the mean time, they agree that it should be adopted in the library for quick retrieval of information.

Park and Kim (2011) inspected the adult English language learners' reading strategy use, when they read online texts in hypermedia learning environment. Participants were learners who joined the online IESG (Independent English Study Group) and they worked both co-operatively and independently. Three of the ten students actively participated in reading activities was selected and case study focused on three participants was directed. Qualitative case study was led which plans to evaluate college level ESL (English as Second Language) learners use of reading strategies for online second language (L2) texts and to inspect their use of hypertext and hypermedia resources while they read online L2 text. The findings revealed that hybrid online reading emphasised participants various reaction patterns and preferences in their hypermedia learning situations. Hybrid online readers effectively and imaginatively make

### *Review of Literature*

implications and build up their reading strategies relying upon the contexts regardless of their language proficiency.

Reading culture of students of RUGIPO, Owo was investigated by Hassan, Olaseni and Mathew (2012). Questionnaire method was used for data collection. This investigation examines the effect of new innovations on the reading habits of students relating to books, newspapers and electronic information. Their interests in reading as well as reading conditions at home and school were additionally reviewed. The new innovations not just impact students learning and studying in the class room, yet in addition influence their reading behaviours at home. The results of the study revealed that students read online information more frequently than offline information. In the mean time, the time students spent in certain regard, especially in reading e-mails and online information surpass the reading of paper based materials.

Mohamed et al. (2012) directed an exploratory study of reading behaviours and interest among students residing in a female residential college of KDSE (Kolej Datin Seri Endon), UTM (Universiti Teknologi Malaysia) and the use of RS (Reading Stations) set at strategic locations all through the main campus. Simple random sampling technique was used for selecting a sample of 187 students from population of 1300 female students and data was collected through a structured questionnaire. Fifteen RS has surveyed and inspected by a team of researchers. From the outcomes, it was found that student's assessment of the RS was positive. Students however lamented that the books found at the RS are obsolete, too much scholarly and not related to their particular interest. The study concludes that even though the RS have been generally welcomed by students, it called for many areas of change and improvement in order for the RS to be of benefit and vital to the campus community.

### *Review of Literature*

With regards to new reading literacy, Kang (2014) assessed the first language (L1) and second language (L2) reader's online reading patterns and comprehension to better understand fluent reading. Eye movement data from nine L1 readers and nine L2 readers were gathered, analysed and compared. Equal number of American readers and Chinese readers was enrolled to take part in the study. To obtain demographic and background information a post experiment interview was conducted. As per the result it was found that when language proficiency is considered L1 and L2 readers are heterogeneous. While L1 readers read much quicker than L2 readers, their attention dissemination and performance on reading comprehension test was like L2 readers. This study concludes that the fundamental online reading competency components are similar in L1 and L2's online reading.

Online course related reading habits and choices of 254 Royal Roads University school of business learners was overviewed by Spencer (2006) which incorporates both graduates and undergraduates. This study utilised a combination of an online survey and six selected telephone interviews to acquire more detailed data about their online and print reading habits and preferences. In view of their responses and anecdotal comments and the information from follow-up interviews with six of the participants, learners favoured print copies of content materials for reasons of portability, trustworthiness, adaptability and ergonomics. The study concludes with a proposal that give an option in all online courses to print electronic text files in a format appropriate for reading from paper.

Onovughe (2012) analysed the Internet use and reading habits of higher institution students in Ekiti state. Descriptive survey research method was conducted by the study. The population of the study comprises of one state university, one private university and a

## *Review of Literature*

federal polytechnic. Two hundred and Sixty Six higher institution first year students was randomly chosen, which incorporate all disciplines ranging from Arts, Science, Engineering and Social Science, inclusive of both male and female students. Findings revealed that a substantial rate of the respondents generally enjoys reading and it could be securely said that since the advent of the Internet, the reading culture of the students is favourable.

Ramesh (2012) explored the result of a study based on public libraries in Erode Corporation, Tamilnadu. An aggregate of 200 readers were reviewed with the help of structured questionnaire to know whether the public library users of Erode corporation have the reading habit or not. The study likewise intended to find out the reasons for reading books and how the electronic media like TV, CDs and DVDs have influenced the reading habits of people. Results of the study reveal that books still rule. People find books more convenient to read, as they require least reading aids. The study also found that companions, teachers and the parents have a great influence on readers by acquainting them with books.

Anderson (2003) evaluated the online reading strategies of L2 readers (second language) furthermore inspected, if there is any distinction with the digital reading strategies of ESL readers and EFL readers. In this study participants comprised of 247 L2 readers. Out of which 131(53%) of learners were contemplating English as a foreign language at Sanjose, Costarica. Remaining 116 (47%) was concentrating in an ESL domain at the ELC (English Language Center) at Brigham Young University in Provo, Utah. The SORS (Survey of Reading Strategies) was selected for this research project. Total items are subdivided into three characterisations, worldwide reading strategies, problem solving and supporting strategies. Findings reveal that greater part of the L2 top strategies utilised by

### *Review of Literature*

the online readers are problem solving methodologies, which include reading rate adjustment, rereading troublesome content, and stopping to consider what one is reading. Finding shows that learners in the EFL environment highly used the problem solving strategies than did the learners in the ESL environment. Likewise, there was no distinction in the utilisation of worldwide and support reading strategies between these two groups. From the findings it was concluded that EFL/ESL distinction is decreasing.

Loan (2012) inspected the reading habits of rural and urban academic college students of Kashmir valley, and also identified their attitudes, purposes, preferences and tastes of reading. Study covers the faculties of General Science, Social Sciences, Humanities, Business and Commerce and Computer Science. Questionnaire method was used for data collection. Results reveal that reading habits of rural and urban college students of the 21<sup>st</sup> century demonstrated that the reading culture is more developed in urban students than rural counterparts. The need is to connect the gaps in reading culture between regions for building up an incredible reading nation. Study infers that the education for all and information for all are the two fundamental pillars of reading society that need more emphasis.

Akanda, Hoq and Hasan (2013) investigated the reading habits of the students of Master of Social Science and the faculty of Arts at the University of Rajshahi, Bangladesh. Questionnaire was the instrument used for data collection. From the outcomes it was found that reading materials, especially books are the constant companions to all people especially students. Most of the students opined that reading gives them an approach to build up their life and to keep abreast of the changing times. Also a large majority of the respondents read newspaper regularly. Vast majority of the



## *Review of Literature*

respondents were regular users of the Web and they search the Web for the purpose of reading. Younger generations were encountering numerous adjustments in their likings and disliking, choices, in view of the great changes that are occurring in socio-economic, cultural and technological landscapes. Accordingly reading habit of youth is quite normally influenced by these changes.

By considering the social, cultural and instructive objectives of reading, it is felt that it is beneficial to know the reading pattern of student's community. A large portion of the above studies attempted to recognise the nature of the reading behaviour of individuals. It also includes the studies on reading that have been done on teenagers, college going students and adults. Present day innovation has empowered reading timely and to some degree non-linear by utilising devices, for example, computers, PDAs (Personal Digital Assistance) and wireless phones without the presence of any printed environment. A good amount of aforementioned studies looking for changes in reading patterns, because of the widespread use of the Internet and the use of alternative reading resources prominently with hypertexts and multimedia resources. It was comprehended that digital media introduced a transformative movement in the reading pattern of people.

### **2.3 Digital Reading Competency**

Today, the significance of reading literacy has reached out from traditional thoughts of reading and writing to incorporate the ability to learn, comprehend, and interact with technology in a critical way. Digital resources present new supports and also new challenges or difficulties that can have a significant effect on an individual's ability to grasp what he or she reads. Digital environment gives new text formats, new purposes for reading, and better ways to communicate

## *Review of Literature*

with data that can confuse and overwhelm people's thought to extract meaning from a traditional print. Proficiency in the new reading literacy will get to be crucial to the student's future (Coiro, 2003).

Shen (2006) examined whether computer technology had an impact on EFL college students' reading habits, and also demographic variables, such as gender, age, CJEE scores, employment status, and online hours are connected with student's online reading habits. Survey questionnaires were gathered from 124 college students in a university in southern Taiwan. The result indicated that college EFL students reading habits has changed from paper-based to Web-based reading. From the outcome it was found that 83.9 per cent of the students read online information often everyday and 69.3 per cent of them read emails every day. In contrast, only 31.4 per cent of them read newspapers, and 33.1 per cent of them read magazines often every day. Students read more online news, e-mails, sales information, movie review, and fashion news than any other data. With regards to the topics of interest, the positioning arrangement that students indicated is entertainment, news and media, computer and the Internet, recreation and sports, references, arts and humanities, and health. The result additionally showed that gender, age, education, CJEE scores, employment status, online hours, and college students reading habits are connected.

Saravanan and Mary (2007) assessed the college teacher's way to deal with the Internet and online information resources. Information was collected from 60 teachers who have participated in the orientation course and the refresher course in Engineering at Academic Staff College, Karyavattom, University of Kerala. Survey method was adopted for data collection. Findings reveal that majority of the college teachers use the Internet source for the preparation of

## *Review of Literature*

class room teaching. Teachers were depending more on traditional source rather than e-resource. Teacher's ways to deal with the Internet information resource were similar to conventional source. Order of accessing Internet information resource was abstracts, content summaries, judgment about content, bibliography and various links. Just 49 per cent of the college teachers have quality awareness towards Web information resources. Study was concluded with the suggestion that compulsory computer literacy and formal training on the best way to browse or download from the Internet must be given.

Shariman, Razak and Noor (2012) in their study tried to analyse the digital literacy competency of Malaysian students which is required so as to access and use digital contents for finding information required in academic undertakings. The study was done as a qualitative focus group study in which three groups was chosen; one from three universities in Malaysia, and interviews was directed, after each group had participated in a sequence of Internet based tasks. The result of the study revealed that the digital literacy competence of students relied upon a few elements, including English language proficiency and the design of multimodal forms in digital contents. Subsequently, the findings of this study will contribute to the improvement of a digital literacy education framework which will upgrade Malaysian student's digital literacy competence.

He et al. (2012) evaluated the opinions of under graduate students on the importance of Internet based information sources when they undertake academic tasks. In light of an arrangement of set of identified typical academic tasks for the students, three researches inquiries were outlined around the students use and perspectives of information resources for finishing these tasks. Web accessible

## *Review of Literature*

questionnaires were used to gather information from participants in two universities in the USA and China. The results confirm that the students use diverse information resources for different scholarly assignments. In their tasks, online e-resources including search engines was the most regularly used resources especially for complex academic undertakings. Social network sites were not used for student's individual academic assignments and conventional resources still play equivalent or more imperative part in certain specific academic tasks.

Flores, Gordillo and Rodriguez (2012) explored the relationship between students' extracurricular experiences online and their performance on the PISA (Program for International Students Assessment); focusing specifically on students competence in digital reading. The study utilises a descriptive, correlational, ex post facto design. The data was taken from Spanish students result on the PISA 2009, which was created by the OECD (Organisation for Economic Cooperation and Development) and in which 65 nations participated. A subsample of 4748 students who had taken the digital reading exam was extracted from the Spanish sample. In data analysis, Pearson's correlation has computed between digital reading performance and online reading experience. Linear multiple regression analysis facilitated evaluation of significance of online experience compared to other habitual factors in explaining digital reading performance. The result reveals that in explaining digital reading preference, online experience in information searching activities appeared to be more significant than online social activities. The need to reduce the risks connected with other types of online reading activities implies promoting this idea among students and empowering responsible use of ICT at home through activities to

## *Review of Literature*

raise awareness and give guidance to families with an eye toward increasing supervision of children's Internet use.

Pattuelli and Rabina (2010) investigated the use of portable e-book reader device, the Kindle among the Library and Information Science students and its impact on reading practices of individual and the potential applications for library services at the Pratt Institutes School of Information and Library Science in New York City. For data collection techniques of journal logs and diary interviews was utilised. Study examined the use of the Kindle over a one week period by a pool of 20 LIS students. Result shows that e-readers were closely and consistently coordinated into the everyday activities of participants. One major finding was that the portability of the device and its convenience of use at any place and any time is significant for enhancing the students reading experience and exceeds the restriction of the device usability.

Ilgar and Ilgar (2012) examined the relationship between teacher candidate's Internet usage and their habits of reading in Istanbul University. The result showed that there was no relationship between the number of book teacher candidates have read and the time they spend on the Internet and there is no significant relationship between the number of book teacher candidates have read and their purpose of Internet usage also. According to gender, the purpose of Internet usage varied. Female teacher candidates have utilised the Internet for information (36.7%), homework (28.3%), though male teacher candidates have used the Internet for information (56.9%), homework (24.6%). Hence it might be assumed that they have used the Internet for individual improvement.

Chaputula (2012) investigated the adoption and use of ICT by students and academic staff at Mzuzu University, Malawi. Survey

## *Review of Literature*

method was used for the study, and population included students academic and library staff. Results of the study revealed that the condition of ICT at Mzuzu University was poor. In spite of limitation in ICTs, the study established that the level of adoption and use of ICT at Mzuzu University was high. This was evidenced by the fact that computer literacy, ownership and access among both students and academic staff were high. Obstacle to the adoption and use of ICTs included poor network infrastructure, limitation in the number of computers, the high cost of the Internet access, persistent power outages, and the absence of relevant ICT skills. The study concluded with a recommendation that information literacy programs ought to be intensified and more reliable power back up system covering the whole establishment to be installed to guarantee continued use of ICT appliances in times of power outages.

Students in the digital environment are engaged in new literacy reading than in the past because of the wide spread accessibility of computers, Web access, and multimedia resources. For students to figure out how to adequately read and comprehend information through ICTs, they will require a new set of abilities and methodologies. From the above reviews it can be concluded that ICT skills and aptitude are required to read and comprehend texts that incorporate non-linear hypertext, multimedia texts and interactive texts.

### **2.4 Preference of Reading Print and Digital Resources**

The arrival and proliferation of e-resources and digital libraries have various noteworthy effects on the use of print resources. Students seem to expect a hybrid of print and e-resources, despite the fact that the reasons for supplementing another type of resources differ.

### *Review of Literature*

A comparative study of print versus digital issues among the UG, PG, Research Scholars and faculty members of JMI (Jamia Millia Islamia), New Delhi was conducted by Deval (2011). The sample of 60 users was chosen from the faculty members of Arts, Commerce, Science, Humanities and Social Sciences. Study was based on survey method and structured questionnaire. Findings of the study shows that print resources is the primary choice of users of JMI university, because of simplicity to use, quality and functionality, conduciveness, satisfaction while reading, physical comfort in handling, and best medium for conveying data and so forth., is concerned. More or less it can be said that in spite of the fact that print resources has not loosen its strong hold over the users choice, however, side by side digital resources has also made their strong presence in the information world.

Impact of reading e-journals on the research of aerospace scientists and engineers in Bangalore was examined by Guruprasad and Nikam (2010). Majority of scientists and engineers revealed that reading e-journals saved time, which helped them to acquire more scientific knowledge, resolved technical problems, brought about quicker completion of tasks, aided in turning out to be more organised in archiving papers, helped in obtaining information identified with specific experimental processes, and in exchanging (received, distributed) more journal articles with colleagues and so forth. ANOVA was applied for testing the significant difference among the 16 main scores obtained from the scientists and engineers of the aerospace organisations about their strong perceptions about e-journal access. It was watched that all the 16 organisations show a significant difference ( $p < 0.05$ ) in their mean scores.

Jeong (2012) in a study compared the influence of e-books and p-books (paper books) on reading comprehension, eye fatigue and

## *Review of Literature*

perception among the school students of Korea. An aggregate of 56 sixth year public school students participated in the study. This study was conducted in the order of pre-CFF (Critical Flicker/Fusion Frequency) measurements, pre/e-book reading, post-CFF estimations, quiz and questionnaire. A standard CFF device, a computer with a monitor for reading e-books and p-books, desks and chairs were given. It was found that there is a significant “book impact” on quiz scores, compared to e-books, p-books seem to empower better reading comprehension. With respect to eye fatigue, students had significantly greater eye fatigue after reading e-books than after reading p-books. Students were satisfied with the e-books, but they favoured p-books. This study suggests that students by and large are not yet ready to entirely give up p-books; e-books are progressively common. However, great challenges remain in terms of making e-book content more accessible and in empowering enhanced comprehension and reducing eye fatigue.

Rho and Gedeon (2000) conducted a survey to see whether researchers find research articles from the Web, which formats they were using and also attempted to identify their reading activities. Sample of the study was 50 academic staff researchers and the 80 post graduate research students in the school of Computer Science and Engineering at the University of New Smith Wales in Australia. Study results show that reader’s overview Web based academic articles from the screen, print them out and after that read the printed articles. Results also show that the structural formats employed by most papers in the Web are against reader’s preferences. The simple two frame format was most favoured by 47 per cent of the respondents as readers, yet the cascade format of page windows was regarded as the worst by 65 per cent. Results also



## *Review of Literature*

reveal that 26 per cent of the respondents chose as the worst style the paper like format that was widely used for Web based articles.

Saputra and Witten (2012) in their study portrayed a software book model, that shows a range of properties connected with physical books – simple page turning, visual area cues, book marks and annotation – and moreover, in corporate numerous advantage of digital environment-hyperlinks, multimedia, full text search, automatic identification of synonyms, cross referencing of key terms with an online encyclopedia, and an automatically generated back-of-the book index. To examine whether book models with realistic page turning offer quantifiable point of advantage over physical books and other electronic forms, a light weight Adobe-Flash based application, called Realistic book was constructed. Usability studies were led to compare performance using these books for different reading tasks with HTML (Hyper Text Markup Language), PDF and physical books. Findings reveal that subjects favoured realistic books over the other formats, and were found to finish tasks significantly quicker. Readers can navigate and annotate realistic books as easily as printed books while holding the benefit of an electronic environment such as searching, editing, accessing multimedia and automatic semantic enrichment. The personalisation tool implemented in realistic books gives a moderately consistent coordination between reading and annotating.

The usability of e-books was evaluated by Kang, Wang and Lin (2009). With target measures an experiment was designed to compare the distinction between reading an e-book and a c-book (conventional book). Twenty junior college students, aged sixteen to eighteen participated in the study. Reading performance and critical flicker/fusion frequency was included in the response measure. Nested factorial design was employed in this study. The outcome

## *Review of Literature*

shows that reading an e-book created significantly higher eye fatigue than reading a c-book. This was fundamentally because of the low contrast and resolution of the display for an e-book. Results also reveal that reading efficiency for an e-book was lower than that of c-book. Since the reading habit for c-book was built up in childhood, individuals were more used to reading c-books than e-books. Female exhibited better reading efficiency in both type of books than male.

Liu (2006) in a study measured the degree to which graduate students in a metropolitan university setting use print and e-resources. With the end goal of this study, e-resources incorporate both electronic only resources and materials that are available both electronically and in print. Tool used in this study was questionnaire. Digital library offer an extensive variety of new access opportunities that are absent in the traditional environment, including remote access, 24 hours access, and multiple users for single resources. The desire for physical browsing, the need for quick assistance from a 'genuine individual', and the desire for communal space for learning make a case for the vital of the traditional service environment. It can be concluded that hybrid library is likely to be a model for the foreseeable future.

Zha, Zhang and Yan (2014) investigated the impact of individual differences on user's perceptions of print and e-resources regarding ease of use, usefulness and usage. Information was gathered from 273 Chinese university library users. For data analysis independent samples t-test, one-way ANOVA and two-way ANOVA was used. Besides, the quantitative analysis is usefully supplemented by the qualitative interviews which present wealthier information about utilisation of particular sorts of print and e-resources. Findings assist the Chinese university libraries to recognise and meet the diversified information needs of their users all the more suitably.

### *Review of Literature*

Singh (2009) examined the extent to which users are aware and make use of online journals at the JMI Library, New Delhi. Questionnaire method was used to collect data. Questionnaire was distributed among the faculty members, research scholars, and PG students. Findings of the study reveal that majority of the users use online journals consistently. Frequency of usage of online journal is increasing. Male respondents have more interest on accessing online journals when compared to female respondents. But 62.67 per cent of the users confronted problems while using online journals. To find and search online journals 65.33 per cent of the respondents required training programmes. Study concludes with the proposal that authority must conduct training programme and awareness should be created for users to utilise online journals. Furthermore computer terminals should be installed, and also include more number of online journals in different discipline.

Malviya (2012) presented the citation analysis of research articles from scholarly online journal published in 1999-2000 in NCR (National Capital Region) libraries. The goal of the study was to investigate the scope of online journals and printed journals in Indian libraries, to study and elaborate the requirement for online publishing of journals in libraries and to analyse the online and printed journals usage pattern. Through questionnaire and personal interview method, selected libraries in New Delhi were surveyed. Survey results reflect a developing interest in online journals among users. Online journals and databases for the most part were utilised for research work followed by studying, coursework and updating sub knowledge. The result also demonstrated that there is a significant relationship between the time spent on reading online/offline and the frequency of use of online journals, and the most favoured format for online journals is PDF format.

### *Review of Literature*

Thanuskodi and Ravi (2011) assessed the e-resources usage by the faculty and research scholars of Manonmaniam Sundaranar University, Thirunelveli. Results reveal that most of the faculty members and research scholars (67.14%) were acquainted with the use of e-resources. Greater part of the research scholars opined that the e-resource can never replace printed resource. This study concludes that library and information science experts ought to be very much aware of the e-resources accessible in the field of study concerned and assess before subscribing these for their library users.

Ackerman and Lauterman (2012) analysed the impacts of time pressure on learning texts on screen in respect to paper among undergraduates who report only moderate paper inclination. Participants were eighty undergraduate students in the department of Industrial Engineering at the Technion Israel Institute of Technology. They were randomly assigned to one of 4 gatherings recognised by the medium, and time condition, time pressure or free regulation. The five texts, 1000-1200 words (2-4) pages each managed different subjects were utilised for practice. In test 1, test scores on screen were lower than on paper under time pressure, with no distinction under free regulation. In test 2, the time condition was controlled with in participants to incorporate time pressure, free direction, and an interrupted condition, where study was unexpectedly stopped after the time designed under time pressure. Paper learners who favoured this learning medium enhanced their scores when the time imperatives were known ahead of time. No such adjustment was found on screen regardless of the medium preference. The results fortify the inferiority of self regulation of learning on screen and content against technology related variables as the primary explanation behind this.

## *Review of Literature*

De Groote and Dorsch (2001) tried to determine the impact of e-journals on the use of print journals in the library of the Health Science, University of Illinois at Chicago. Results of the statistical analysis indicated print journal usage decreased significantly with the introduction of e-journals and interlibrary loan requests have also significantly decreased. The study conclude that, negative impact the e-journals have had on the utilisation of the journal titles accessible only in print suggests users may be compromising quality for convenience while selecting journal articles.

Potential effect of the reading methodology on specific aspects of reading comprehension was investigated by Mangen, Walgermo and Bronnick (2013). Seventy two tenth graders from two distinctive primary schools in Norway were the participants. They were randomised into two gatherings, where in print read two texts (1400-2000 words) by the main gathering, and read the same texts as PDF by the other gathering on a computer screen, additionally pretests in reading comprehension, word reading and vocabulary was coordinated. Findings of the study demonstrate that reading linear narrative and expository texts on a computer screen leads to poorer reading comprehension than reading the same texts on print format. If the texts are longer than a page, scrolling and the absence of spatiotemporal markers of the digital texts to help memory and reading comprehension may hinder the performance of reading. Results recommend that executing both reading assessment tasks (i.e., text reading and response tasks) in the same medium the computer prompts extra cognitive costs.

Smith (2003) explored the role of e-journals currently play in Science and Social Science faculties weekly scholarly reading habits in the University of Georgia. A questionnaire was designed to collect information. Findings revealed that around three fourth of

## *Review of Literature*

respondents read not less than one article from an online source every week. It was also noted that the faculties who took part in this survey currently read more articles from online sources than they do from print sources and it's a definite indication of the acceptance of journals in electronic format. Along this lines this study indicates that library resources assume an essential part in the academic communication continuum; a part that guarantees to be progressively imperative as the transition to electronic media proceeds.

Polonen, Jarvenppa, and Hakkinen (2012) in their study compared a small sized multimedia display and a hardcopy. Eighty seven respondents who have participated in this study from Finland read a digital book either from a near to eye display, a small size display or a printed version. Eye strain, visually induced movement disorder, changes in visual functioning, client experience, and essential optical parameters of the reading equipment were assessed. Every test session started with a visual screening (visual sharpness, Inter Pupillary Distance (IPD), stereo acuity colour vision, near horizontal phoria, and near point of accommodation). A questionnaire was then completed which contains background inquiries and questions related to eye strain. The outcome indicates that the most comfortable experience was reading from a printed copy. All near to eye readers shows induced eye strain and disorder symptoms, yet the greatness of these symptoms changed by device. The unfavourable symptoms were related to issues with the display optics and design, text layout headset fit, use context and individual contrasts. It can be reasoned that few upgrades in the optics and head set should be implemented.

Survey on the use of printed and electronic journals in a science library in Israel was conducted by Bar-llan and Fink (2005). The

## *Review of Literature*

purpose of this project was to examine the use, frequency, preference and perceived advantages and disadvantages of printed and electronic formats. A questionnaire based study was led among 161 faculty members and 238 doctoral candidates constituting the total population of institute of Physics, Chemistry, Life and Applied Science. From the results it was found that more than 80 per cent of the respondents frequently use and prefer an electronic format, regardless of their rank or age. The results additionally indicate that users of all ages changed to the electronic format not only in terms of utilisation as well as of preference also. Scholarly users are increasingly persuaded about the benefit of electronic format and are prepared to abandon the printed format for the electronic one.

Under active reading conditions, Eden and Eshet-Alkalai (2012) studied the comparison between print and digital reading. Dynamic reading abilities of 93 university students (83% female students) from Israel were analysed. On the topic of environmental awareness, members were requested to read, edit, recognise errors and enhance the quality of short papers (600 words each) in both print and in digital formats. The results reveal that in both the two format there is no significant distinction found between the performances of participants. Similarly, for all categories of text errors and for gender no significant differences were found. From the results it was also found that the digital readers finished their tasks faster than the print readers, but their performance was not lower as compared to print readers. Result of this study have vital implications for the present debate in advanced education concerning the use of digital text for learning and for designing, exploring and altering scholarly works.

E-resources utilisation of the engineering academics of Rajasthan state was evaluated by Bhatt and Rana (2011). It means to consider

## *Review of Literature*

the different variables of e-resources usage, such as purposes, impact, significance, issues, acceptance, and satisfaction with e-resources. Survey method was adopted with the help of a structured questionnaire and followed by an interview. Results reveal that different types of e-resources are using by the academic staff. By using e-resources their scholastic and expert competency also improved. Teaching methodology likewise includes the use of e-resources and the student's ability was also influenced in a positive way by this approach. Despite the fact that a few issues were also explored in the use of e-resources it can be presumed that majority of users was entirely satisfied with using e-resources.

Bellary and Naik (2013) attempted to inspect the use of e-journals and print journals. A sample survey was directed and a detailed and well structured questionnaire was designed and distributed to the selected 120 users of CRKIMR (Chetana's R.K Institute of Management & Research), Mumbai. From the results it was found that majority of the students refer to both e-journals and print journals from the library and computer centre. The primary point of consulting these journals is for recovering information for presentations, seminars and for knowledge updating. For making the better utilisation of resources, library personnel's must create more awareness about e-journals accessibility among the users and to provide a friendly environment. Training programs should be sorted out, so that the library personnel's can deal with e-journals, users need and procure more advanced searching and retrieving expertise. Therefore the study infers that even in the digitisation era, e-journals may not totally replace the existing print version.

Dadzie (2005) measured the utilisation of e-resources by students and faculty of Ashesi University, Ghana, so as to determine the level of use, the type of information accessed and the effectiveness and



## *Review of Literature*

adequacy of the library's communication tools for information research. Questionnaire was the tool used for the study. The study found that as a result of the university's state of the art IT infrastructure, the general computer usage for data access was high. Utilisation of some Internet resources was likewise high, but the scholarly database usage was very low. The study suggests the introduction of information competency over the educational programs and the introduction of a one unit course to be taught at all levels and the procurement of more PCs on campus.

Numerous researchers have examined the differences between conventional reading and hypertext reading processes. Vandenhoeck (2013) endeavored to examine the general perspectives of university students concerning screen reading compared to paper reading and in addition to assemble data on the use of conventional and digital means of annotation and different methods for interacting with a text. An online survey was directed among 630 students of University of Limerick, Ireland. A focal finding of the study was a clear preference for reading academic journal articles from paper instead of from a screen. Students in this study also report that they do not print more articles because of financial pressures. One of the most noteworthy results of the survey was the utilisation of separate paper to record notes. Majority of the students do not know how to use moderately simple annotation features. This proposes a gap in their knowledge that if tended to, could make them all the more ready or confident to read from computer screen.

Cull (2011) opined that reading online screen has a tendency to be fundamentally not quite as the same as reading printed texts as the Internet is a content saturated world. Author explored literature from a variety of disciplines on the technological, social, behavioural and neuro logic effects that the Web is having on the act of reading. A

## *Review of Literature*

specific focus was given to the reading behaviour of emerging university students, particularly with in Canada and the United States. A brief overview was given of the recent transformation of scholarly libraries into suppliers of online digital content in addition to printed books and other materials. Then again, it has some negative consequences on their reading habits. Rather than people reading books, they now listen to individuals chat on YouTube, Face book and so forth. So they do not feel the need to read more.

Agboola (2010) conducted a study to understand the utilisation of print and e-resources by Agricultural Science students in Nigerian universities. By using a questionnaire, data was collected from 912 students. Results revealed that among print materials, agricultural science students most prefer to use textbooks (42.1%). About 52.2 per cent of the respondents opined that the most preferred e-resources available in their libraries are TEEAL (The Essential Electronic Agricultural Library). Significant issues faced by the Agricultural Science student's include insufficient access to full Web availability and inadequate skills on their part to utilise the database properly that are accessible. The study concludes with a suggestion to rebuild the collections of library by expanding the quantity of agricultural textbooks and database to meet the information requirement and retrieval needs of Agricultural Science student's and furthermore set up Internet ready computer centers to complement teaching learning and research in the library.

Libraries and Websites are nowadays offer online access to textbooks, journals, news, and general information, which is also constantly increasing. Shaikh and Chaparro (2004) assessed the reading habits of the Internet users crosswise over document of five types. By utilising five conceivable choices, an online survey was finished by the Internet users showing whether they were likely to

## *Review of Literature*

read a document online or on paper. Types of documents that were assessed include journal articles, news, pamphlets, literature, and information about products. From the results it was found that based on type of documents there was differences in the reading habits. Journal articles were accounted for to be essentially printed, but documents such as online news, pamphlets, and reviews about product were reported to be read predominantly on the Web. Users tended not to use online sources for reading literature. Essential elements figuring out, if a document was printed or read online were size, significance, and proposed motivation behind the document.

Survey of 101 students in two undergraduate college courses regarding their use of required readings accessed by means of university administered electronic reserve framework was reported by Wookji, Michaels and Waterman (2014). For this two IUB (Indiana University at Bloomington) face to face under graduate courses i.e., Department of Telecommunications and Department of Biology was surveyed. In both of the surveyed courses all the required readings was presented on the IUB library e-reserve system, which permitted enlisted students password access to electronically scanned or directly uploaded reading materials. Results revealed that around two third of the respondents printed some readings, despite nearly half of the total pages were read on Web. Most students who printed incurred considerably lower total expenses than the anticipated cost of a printed and bound course pack with the greater part of the readings, hence recommending electronic provision to be cost effective for most students. An overall preference for electronically supplied readings was reported by respondents.

Young (2014) focused to observe, measure and record comparative cognitive procedures in print and online to clarify the distinctions, if any, in the information gathering forms of readers and their resulting

## *Review of Literature*

comprehension and maintenance of information. Standardised reading comprehension scores were likewise gathered. For measuring the capacity or ability of study group to read and retrieve information from the publications' print and Web version, coded writings collected from The Guardian Newspaper, The Economist and The New York were utilised in a media lab. Participants were scored based on their ability to retrieve the core information contained in the articles from print and digital media. Two sessions with each of three hours was conducted, and university students were the participants. The outcomes showed that the participants exhibited functional equivalency in both media, yet they had a preference for print. At the point when reading on the Web, the study group scrolls through the content to retrieve facts and after that goes to print sources to check the accuracy of the content and also they do not engage with the online content as they do with print.

Siegenthaler et al. (2011) analysed and compared the reading behaviour of ten participants on e-reader displays and on printed paper. They had given the direction about the experiments which comprises of three sections. Towards the starting and the end, a legibility test with eye tracking was performed. Participants were requested to fill the questionnaire and execute tasks between the two legibility tests. Two oculomotor parameters fixations (number and terms) and saccades (progressive, regressive and line sweeps) were analysed. On the basis of time codes from the eye movement recordings, reading time was ascertained. Results suggest that the reading behaviour on e-readers was similar to the reading behaviour on print. While reading on e-readers and print participants shared similar proportions of regressive saccades. Significant contrasts in fixation span propose that e-readers in some circumstance give better legibility.

### *Review of Literature*

Dundar and Akcayir (2012) compared elementary school 5<sup>th</sup> class student's electronic text reading performance, reading speed and reading comprehension with tablet PCs and printed books. A sample of 20 students from Toki primary school, Turkey was examined. They were randomly separated into two groups, a control group and a treatment group. Ordinary printed book was read by the control group students and students in the treatment group read the same content on an electronic tablet PC display. Qualitative and quantitative data collection tools were utilised for the study. Findings reveal that there was no noteworthy distinction in either reading speed or reading comprehension between the two groups. Findings also recommend that tablet PCs can be a successful solution for the ergonomic and physical issues of reading electronic texts.

Ibrahim (2004) conducted a study to measure the perception and use of e-resources among the faculty members of UAEU (United Arab Emirates University). Based upon the QUIS (Questionnaire for User Interface Satisfaction), questionnaire was designed for evaluating the frequency, satisfaction and hindrances to the use of e-resources and services. Results of the study reveal that frequency of use of e-resources was low. Principle reasons referred to were absence of time, on the grounds that the faculty members required time to focus on teaching, lack of awareness to e-resources provided by library, insufficient correspondence channels and language barrier. Medium of e-resources being English was an obstacle to faculty members who are conducting teaching and research.

Nadeem and Abdul Rahman (2014) tried to find out to what extent the university students prefer books/printed material to digitally available information through Internet, required both in their social and academic life in Pakistani context. Survey based research was conducted among two hundred male and female students. Results

## *Review of Literature*

show that in greater part of subjects, while utilising Internet male students are more comfortable as opposed to reading printed materials/books by considering it as time consuming, hard, uneasy source to gain knowledge. The study concludes with the comments that in present period Internet is giving all opportunities to seek information to overpower learning through books, which is a source of seeing instead of knowing, and is supporting present era to overlook printed materials/books exactly at the cost of agony the information seekers need to persist through visiting libraries which is time consuming however might be terrible for third worlds new generation.

The vast majority of the above mentioned studies were led in the scholarly environment with specific consideration given to surveying students and faculty members. It was found that reading on screen and reading on print differs significantly in an extensive variety of viewpoints. Research finds that readers decisions and preferences for reading medium are exceptionally various and contextual. Both the digital resources and print resources have their own advantages and limitations. The challenge is to decide the appropriateness of a specific medium in a given context or procedure. Despite the fact that individuals likely to read more from a screen than from a printed page in the future, it should likewise remember that reader's purposes and preferences are extremely assorted, because of differences in gender and age, and that there is not a single format that is perfect to all.

### **2.5 Attitude towards Digital Reading**

Attitude towards reading are portrayed as an individual's slant or feeling about reading. It makes learners to grasp or avoid from a reading condition. Reading attitude is characterised as a course of

### *Review of Literature*

action of feelings related to reading which causes the reader to approach or keep up a strategic distance from a reading circumstance and it is more essential and viable to discuss reading attitudes with reference to a particular sort of reading (McKenna, Kear, & Ellsworth, 1995).

Karim and Hasan (2007) observed the reading habits and attitudes of Bachelor of IT students and Bachelor of Arts students from the International Islamic University, Malaysia in the digital age. From the analysis it was found that the Website is seen as an undeniably essential reading source. There exist significant differences between academic programs and type of reading materials and reading resources especially on the Websites. Investigation on the distinction in gender reveals that male students read significantly more for resources other than the scholastic books. From the result it was found that high rate of reading time was occurring at night, the authority should consider opening more reading areas that work for longer hours and an entire 24 hours of computing service that permitted students to utilise the Internet at time more convenient to them.

Annamalai and Muniandy (2013) attempted to comprehend the reading habit and attitude of the students in a Malaysian polytechnic. A sample of 119 students from business and engineering departments was chosen as respondents. Study adapted ASRA (Adult Survey of Reading Attitude) based on Smith's (1991) reading habit questionnaire. Findings of the study revealed that the polytechnic students were not enjoying reading as much as other activities that include technologies and furthermore they have a low enthusiasm for reading and felt reading as troublesome and bringing anxiety. Likewise they think that there were diverse approaches to

## *Review of Literature*

learn new things than by reading, as find reading was exhausting and not motivating.

Lai and Chang (2011) reported the user attitude towards dedicated e-book readers for reading and the effect of convenience, compatibility and media richness. A questionnaire with 23 items involving six dimensions - perceived usefulness, perceived ease of use, comfort, compatibility, media richness and intention to use, was developed. Data analysis was performed with PLS (Partial Least Squares) technique. Data was collected through convenience sampling at National Ching Hsing University in Taiwan. The findings revealed how the dominant factors influence user's mentality towards adoption of the dedicated e-book readers for reading. Experts can provide dedicated e-book readers that customers will readily accept, by considering components such as ease of use, usefulness, comfort, compatibility, media richness and so forth in the phase of product development.

Akarsu and Dariyemez (2014) explored the reading habits and attitudes of university students, who were studying English Language and Literature at Ataturk University. Results revealed that reading habits of respondents were influenced by the media and technology. The vast majority of the members spend a really long time in front of their computer screens. Most of the respondents claimed that they regularly read online news, checking their messages, view the climate report and read funny strips. Study recommends that instructors ought to work on some pertinent strategies to develop the students reading habits, as well as the language aptitudes such as reading, composing, speaking and listening.



## *Review of Literature*

A case study was conducted by Seitz (2010) to investigate student attitudes toward reading at summer reading clinic through an urban teaching college in upstate New York. Attitude of the students was evaluated through class room observations, informal interviews, reading specialist candidate interviews and the ERAS (Elementary Reading Attitude Survey). Findings demonstrated that reading specialist candidate's consistent involvement in the learning procedure was very crucial for the achievement of student. Besides student attitudes toward reading were observed to be multidimensional and challenging to assess.

By acknowledging the complex process associated with reading online, Putman (2014) created the SORAB (Survey of Online Reading Attitude and Behaviours) which is a 71 item self report instrument developed for an overall assessment of student's attitudes and behaviours towards online reading. By representing the three primary demographic classifications (urban, suburban and rural), participants for the investigation were 1,068 5<sup>th</sup> and 6<sup>th</sup> grade students from schools. Factor analysis revealed the instrument which includes five elements (intellectual and behavioural engagement, self administrative behaviour, anxiety, value/interest and viability for online reading) that are hypothesised to add to students general dispositions for online reading. Extra analysis revealed SORAB scores were firmly correlated with general attitude toward technology and reasonably correlated with context for Internet use.

Attitudes of students towards reading and the texts they choose to read have impact on education accomplishment and readiness to engage with literacy-related activities in the primary years of schooling. Black (2006) led a study in an urban Catholic school in Queensland in years 1 to 7. Study examined the developing attitudes

### *Review of Literature*

of students towards reading and the perceptions of these attitudes held by their teachers. A redesigned version of the ERAS and Teacher Checklist was used. Results from the study demonstrate that there is no significant difference between the older students (in primary school) and younger student's attitudes towards recreational reading. More positive attitudes towards recreational reading were shown by female students than male students. Results also reveal that there is a negative attitude for older students towards academic reading, but female students indicated significantly more positive attitudes than their male associates.

Ashok Kumar, Saravanan and Balasubramanian (2008) conducted a study on user attitude measurement towards e-resources among the research scholars in Madras University library. The results revealed that vast majority of the research scholars know about e-resources and e-learning. Almost all the respondents like to utilise the Internet every day at least to check their e-mail and use e-journals frequently. The study inferred that few scholars were yet relying upon printed information sources, consulting indexes, abstracts and journals in the library, however they should adopt the current transformation of the scientific communication system, which is currently advancing at a speed they cannot easily escape.

Contingent upon purposes, inspiration, attitudes, interests and background information, different readers may process the same content in various ways. Zarra-Nezhad, Shooshtari and Vahdat (2015) discussed the effect of motivation and attitude on the utilisation of cognitive and metacognitive reading strategies among EFL undergraduate students who passed all reading comprehension modules. University of Ahvaz, Iran was picked as a contextual investigation. Results revealed that students who are highly motivated were supportive of utilising cognitive and metacognitive

## *Review of Literature*

strategies more than less motivated ones. Findings recommend that learners' individual differences, as far as their motivation and attitude levels are concerned, ought to be checked in their advancement of reading comprehension aptitude and reading strategy use.

By using cross sectional data (N=811) implemented by the Korea Information Society Development Institute, You et al. (2012) explored the impact of online users motivations (information seeking, entertainment, and social utility) for reading online news on their online news usage and utilisation in South Korea. For analysis 811 participants who consumed online news at least once a month was included in investigation. In-depth reading was affected by user's motivations for reading online news, which in turn prompt user's real consumption of online news. The result also shows that in-depth reading mediated the relationship between user's inspiration and their genuine use behaviours. Both directly and indirectly information seeking and entertainment motivations prompted an increase in the actual use of online news, although social utility diminished the amount of online news consumption both directly and indirectly. From these findings, it can be reasoned that the individuals who intend to read online news just for social utility are likely to skim the material and are subsequently liable to spend less time consuming online news.

Parents doing literacy practice with their children considerably influence their children's attitude developments towards reading and writing. Keskin and Bastug (2014) in a study intended to quantify the degree to which the reading frequencies of the mother, father and child influence the child's participation in reading situation or environment and the degree to which participation in reading environment affect the child's advancement of an academic and

## *Review of Literature*

recreational reading attitude. A sum of 550 eighth graders participated in the study. SARA (Survey of Adolescent Reading Attitude) was utilised for measuring their scholarly and recreational reading attitude and a reading frequency form was used to quantify their reading frequency. On the premise of structural equation modeling, the data was analysed through MIMIC (Multiple Indicators Multiple Causes) approach. Results reveal that reading frequency of guardians positively affected the child's participation in reading environment and ability to participate in reading environment was significantly correlated with scholarly and recreational state of mind of child.

Ertem (2013) examined the role of personalised and non personalised online texts on 47 fifth-grade students from a rural elementary school in North Florida. The subjects were randomly apportioned into two (personalized online texts and non-personalized online text) groups. By utilising various multiple choice questions, reading comprehension scores were measured and an attitude survey was administered to quantify subject's inspiration, enjoyment and interest. Despite the fact that the mean score of the personalised text group was marginally higher than non personalised text group and as opposed to patterns found within research on online reading environments. As indicated by attitude survey results, personalised text group showed higher inspiration, enjoyment and interest than the other group.

Huang, Liang and Chiu (2013) conducted two investigations to explore children's attitudes, reading behaviours and outcomes to determine if there exist any gender differences in the reading of e-books. The primary investigation was directed with 166 elementary school students to assess their attitudes towards reading with an IELS (Interactive E-book Learning System), an appropriately

## *Review of Literature*

customised e-book learning environment for children. Results reveal that gendered attitude as far as the satisfaction measurements and the expectation for the usable functions were distinctive. In the second investigation, 23 6<sup>th</sup> grade children have participated in which they read silently two e-books in the IELS with reading behaviour tracking technique. During the reading process, the results show that the girls for the most part had the behaviour of skimming during the reading procedure and they outscored the boys in the retrieval tests. Practically, the results of this study recommend that these distinction may make reading barriers for some children and therefore ought to be considered when e-book are used for formal learning.

The above mentioned reviews measure the student's attitude towards reading digital texts which rapidly turning out to be broader. Student's attitude has a vital part in their inspiration or ability to take part in academic activities such as reading. Student's attitudes to reading have been found to have an effect on both engagement and accomplishment in reading. From the above cited reviews, it can be concluded that positive attitudes toward reading can lead students to read all the more regularly, in this manner increasing achievement. Likewise, the degree to which students positively or negatively engage in reading is influenced greatly by the attitude they have towards reading.

### **2.6 Influence of Digital Resources on Reading**

Advanced digital media have served as a catalyst prompting new styles of printed books with design in new structures and configurations, nonsequential organisation, and different layers of meaning. Youth are spending increasing amounts of time and energy in discussions with others in this nonlinear, hyperlinked

## *Review of Literature*

environment which has significantly influenced the way youth read and interact with one another.

The impact of the Internet on reading habits of the net generation students in Jammu & Kashmir was reported by Loan (2011). The results of the study reveal that the Internet has increased access to information, use of foreign resources, and contact with worldwide readers and time spent on reading, and have decreased dependence on print sources, contacts with print sources, reading in local languages and reading of books. The overall analysis of the data shows that the reading habits of the net generation students are in transition gradually moving from restricted access to unrestricted access, local sources to worldwide sources, and print sources to online sources, local language to English language and individual reading to participative reading.

The indirect effect of online social entertainment and information seeking activities on reading literacy was assessed by Lee and Wu (2013). Based on knowledge of meta strategies in a mediation analysis the study investigated the effects of two genres of online reading activities on reading literacy. Using a two-stage stratified sampling scheme participants were drawn from the PISA 2009 data set. Participants were 87,735 fifteen year old students (49.8%) across 15 regions in the PISA dataset. In this study online reading activities was partitioned into social entertainment and information seeking activities and controlled for gender, socioeconomic status, and accessibility of ICT at home and at school. More frequent information seeking activities predicted better knowledge of meta cognitive strategies, which thus anticipated better reading literacy, while more successive social entertainment activities predicted poor knowledge of meta cognitive methodologies which in turn led to poor reading literacy. Proposals were made to guide students in taking part in

### *Review of Literature*

more online information seeking reading act, and incorporate guideline of meta cognitive strategies for both online and offline reading thereby enhancing students reading literacy in both printed and digital formats.

In a survey of online reading habits of rural secondary school students in Malaysia, Abidin, Pour-Mohammadi and Jesmin (2011) intended to determine whether online reading has an impact on Malaysian rural secondary school students reading habits. The sample comprised of 200 secondary school students selected by the method of purposive sampling. The findings revealed that online reading is an exceptionally strong strategy in enhancing reading habits among these students. Concerning gender and hours spent on online reading, male seemed to read more hours than female. Online reading for information purposes were not widely used in Malaysian schools, especially in rural areas. Some students have low English language proficiency and language barriers discourage them from reading English language reading materials.

Shehri and Gitsaki (2010) investigated the influence of split-attention and integrated instructional formats on student's cognitive load and how they may encourage second language online reading and vocabulary learning. In four conditions twenty English as a second language intermediate students studying at an Australian language institution were randomly assigned. Four conditions are SAND (Split-Attention No Dictionary), SAOD (Split attention with online dictionary), IFND (Integrated format No dictionary) and IFOD (Integrated format with online dictionary). Subjects were requested that they finish an online reading comprehension task in which subjects tested under the SAND & SAOD conditions were presented to typical reading text followed by comprehension questions, where as subjects in IFND & IFOD conditions were presented to a reading

## *Review of Literature*

text where the comprehension inquiries were physically embedded inside the reading text. Under the SAOD & IFOD conditions, subjects had admittance to an online dictionary. Results showed that the integrated reading format was found to encourage students reading comprehension more than the split attention format. Likewise, students who had entry to the online dictionary in the SAOD and IFOD groups performed better on the vocabulary test however spent more time on the vocabulary test, yet invest additional time in the reading task than the other two groups. Besides, members in the split attention format group gazed upward a larger number of words than their counter parts in the coordinated format group. The result of this study has certain ramifications for multimedia instructional creators and ESL educators.

Tseng (2010) assessed the factors that influence online reading and EFL student's perceptions in northern Taiwan. The participants were 88 students enrolled in the first year freshman English course at a comprehensive university in northern Taiwan. Result shows that students disliked reading from computer screens. The variables that influence the students hypertext reading was background colour of Web Pages and font size. The significant difficulties included eye fatigue, inability to take notes, or underline text, and skipping lines when reading hypertext on computer screens. Results likewise claim that students found reading hypertext to be more troublesome than linear reading. It can presume that it is essential for instructors and researchers to analyse the distinction and characteristics of hypertext and tailor the findings to the importance of creating projects and programs or Websites suitable for students who are studying English as a foreign language.

Chowdappa, Chandrashekhara, and Ramasesh (2009) examined the impact of electronic information sources on the academic users in



## *Review of Literature*

Mysore. To render valid findings and suggestions the responses of 1000 users and the critical assessment of 24 subject experts under Delphi study have been assembled. The attempt clearly demonstrates the level of the utilisation of digital information resources and the traditional print media. Findings of this study show that the information users of higher education in Mysore city vigorously depend upon conventional books and journals on one hand and digital resources, particularly Internet and CD's on the other. The advantage of digital technology is a boon for getting current and essential information anyplace at whatever time in an economical way. Majority (83.3%) of the subject specialists opined that there is a high effect of digital technology on information users of higher education in Mysore. It is valid according to the some respondents that the e-resources will supplement the conventional print media in getting exact, precise, relevant and timely information.

Destefano and Lefevre (2007) in their paper discussed the role of cognitive load in hypertext reading. A procedure model of hypertext reading was utilised to create predictions about the impact of hypertext components on cognitive processing during text navigation and comprehension. Between 1990 and 2004, 38 studies published in refereed journals and edited books comprise the sample. Reliable with the predictions, the increased demands of decision making and hypertext visual processing impaired reading performance. Readers with low working memory and low earlier knowledge were typically impeded in hypertext. This paper additionally studied the viability of auxiliary features intended to decrease cognitive load, including graphical overviews, limited access to links, and visible link types. Complex graphical overviews and visible link types was helpful. This study concludes that at least some components of hypertext can prompt poorer performance contrasted with traditional linear

## *Review of Literature*

presentation and the reduced performance was connected to cognitive load.

Shaikh and Chaparro (2005) inspected the effect of line length on reading speed, comprehension, and user satisfaction of online news articles. College students from a Midwestern University read news articles displayed in 35, 55, 75 and 95 characters per line from a computer monitor. The passages used Arial 10-point font with 12 point interlinear spacing between lines. Demographic information as well as computer and Internet usage patterns were collected by using a background questionnaire. Results showed that passages formatted with 95 characters per line brought about faster reading speed. No impact of line length was found for comprehension or satisfaction; however users showed a strong inclination for either the short or long line lengths.

Akyel and Ercetin (2009) explored the hypermedia reading methodologies utilised by advanced learners of English while reading a hypermedia document. Through think aloud protocols data was gathered from 10 advanced learners of English in an ELT (English Language Teaching) department at Turkish University. Then compared the methodologies used by high prior knowledge and low prior knowledge participants. Both qualitative and quantitative analysis was conducted. Results indicate that processing methodologies used by advanced learners of English in hypermedia reading was not unique in relation to printed texts. Certain processing strategy was not used in hypermedia reading. Results also revealed that certain cognitive and meta cognitive strategies were frequently used by readers with high prior knowledge. Low prior knowledge readers could make up for their absence of prior knowledge by utilising annotations that give foundation data about the topic and by exploring through the text in an intelligent way.

### *Review of Literature*

Perceived use of the online reading strategies of Omani EFL university first year students and senior student teachers was investigated by Amer, Albarwani and Ibrahim (2010). Participants comprised of 123 first year student teachers and 97 fourth year student teachers studied at college of education at a government university in Oman. Online survey of reading strategies was the survey tool used. This survey characterises reading methodologies into three classifications: worldwide, problem solving and support strategies. Result shows that only in global strategies there is a statistically significant difference between fourth year students and first year students. Result also revealed that global strategies were used by high proficient readers than low proficient readers. Also, support strategies were used highly by first year students than senior students did and no statistically significant difference with reference to gender in either group.

Garcia and Caldera (1996) discussed, whether there is an effect of colour and type face on the readability of online text. An application prototype using tool book has been developed by researchers in order to test the effects of colour and typefaces when reading onscreen information. By using a fractional factorial design, ANOVA test was created to test for main effects and communication impacts. Randomly a group of subjects was selected and assigned task incorporates several repetitions. The outcomes indicated that for some combinations of colour, a strongly significant test was yielded, while effect of typefaces was not always significant. On account of colour main effects, there is not a significant impact on the time to finish the task given by the foreground and background colour utilised.

Fortunati and Vincent (2013) in their article sociological insights on the comparison of writing/reading on paper with writing/reading

## *Review of Literature*

digitally tried to examine the impact of digital technologies on writing and reading with in an educational rather than business environment. An exploratory study was conducted with a class of Masters students in multimedia communication and technologies of information at the University of Udine, Italy who was requested to compose an essay on this theme. It investigates the affordances of writing and reading on paper and those of writing on a keyboard and reading on a screen. Qualitative content analysis of the essays produced by the students was the methodology embraced in this study. Results of the study revealed that with the utilisation of digital technology reading and writing competencies are changing, however that paper and digital interactions are not mutually exclusive. It creates the impression that rather than using the keyboard or screen, chirographic writing and paper is more multisensorial and meta communicative.

Student's expectation, confirmation and continuance intention to use electronic text books at a university in the western United States was assessed by Stone and Eveleth (2013). Using a student listserv, a Web based questionnaire was distributed. Sample comprises of 469 students who had used the electronic text books previously. Using structural equations modeling, the theoretical model was dissected and maximum probability estimation was applied to the sample. To assess the psychometric properties of the measures for the constructs in the theoretical model, a confirmatory factor analysis was likewise performed. Both the psychometric properties of the measures and the fit of the measured theoretical model to the data were good and all the paths in the estimation and a structural model was statistically significant. The basic model shows that confirmation influences perceived usefulness and satisfaction with electronic text book. The empirical results showed that student's e-textbook reading

## *Review of Literature*

duration expectations are specifically and genuinely influenced by their satisfaction with e-texts. Thus student's confirmation of pre and post selection desires influence perceived usefulness and satisfaction with e-texts.

Yussof, Abas, and Paris (2012) conducted a study to distinguish the background colour that offers affection to remedial students in the reading environment using digital story telling. Inspiration and feeling towards background colour were the affective areas studied. The strategy provides details regarding, requirement analysis (which incorporate the interests of remedial students, behaviour and level of troubles during reading process) and digital story telling contents design (which includes colour, background colour, graphics, interface and interaction design). Five remedial students were recruited from a government school in Bandar Baru Bangi, Selangor for data collection. They were requested to do various activities like to read short stories, spell five simple words with different level of syllable patterns and colouring activities. Digital storytelling and affective engineering were combined in order to build a better teaching and learning experience. The development of digital story telling incorporates the feeling and emotion through colour into the product design. It has the potential to provide a fun and engaging experience in literacy learning with the help of learning theories, good design, syllabus matching and a good balance of edutainment.

Olle and Borrego (2010) directed a qualitative study on the impact of e-journals on the information behaviour of academic researchers at Catalan Universities, which demonstrates that academic researchers now read more, and all the more generally. Their reading has turned out to be more superficial. They were constrained to enhance their discrimination aptitudes keeping in mind the end goal to choose what to read in more depth. The electronic accessibility of journals

## *Review of Literature*

implies that researchers now make less library visits, Web browsing and table of contents. E-mail alerts are supplanting by physical browsing, and searching is an exceptionally well known choice for staying up with latest improvements.

YunFei-Du (2009) surveyed the librarian's responses to the NEA (National Endowments for the Arts) report on "reading at risk". Utilising census data, the NEA reasoned that there has been an exceptional decrease in "literary" reading in United States and it is most pointedly pronounced in the most youthful group surveyed. Delphi study was directed to figure out if librarian's perceptions of reading, particularly among youth, were consistent with the NEA findings. Eleven youth library experts and teachers recognised as specialists, responded to survey questions examining, whether digital media impact recreation time reading for both grown-ups and young people; whether reading is at danger, and whether the decrease in literary reading hints disintegration in cultural and civic participation. Library specialists had a tendency to agree with the effects of digital media on recreation time reading for children. Experts were split on how digital media impact recreation time reading among adult readers. They were firmly adjusted against the affirmation that participation in literacy reading foreshadows participation in cultural and civil participation.

By the installation of the Brows/Reader in the children room of a library, Liu et al. (2012) evaluated the enhancing childrens activity in browsing/reading together. By gathering around the Brows Reader, the children can browse picture books and after that pick and read a book by flipping pages on it. After recreating each printed, digitised or Web picture book as a surrogate picture book comprising of the front cover image followed by the page images, two fundamental notions were presented. First, an abstracted book rack, which

## *Review of Literature*

introduce the front cover images of the surrogate picture books in the structure where all are directly arranged, with a portion of the pictures bundled in places and second, a unified view, which shows every page of any surrogate picture in a structure that appears like a printed books page. Taking into account these notions the enhanced version of the Brows Reader was introduced in every children's room so that children together with families and/or friends can without much of a stretch browse countless picture books as if they were browsing the physical book shelves of the children's room and can read a wide assortment of surrogate picture books as though they are reading ordinary printed picture books on a table.

Nicholas et al. (2007) attempted to portray and clarifies an emerging form of digital information seeking behaviour among information consumers, which the creators have called 'bouncing'. The proof for this conduct has risen up out of five years of DLA (Deep Log Analysis) studies-a progressed form of transaction log analysis-of an extensive variety of clients of digital information resources. Site penetration and return visits were the two main bouncing measurements applied in the log studies. Site penetration is the number of items or page viewed in a session. The evidence demonstrates that a high extent of individuals visits only a couple of items or pages amid a visit to a site and a high extent of visitors either do not return to the site or they did as such occasionally. Commonly the individuals who penetrated a site slightest tended to return least frequently; there individuals are termed as bouncers. They bounce into the site and after that bounce out again apparently to another site, as a high extent of them do not seem to return once more.

The impact of format and text size on the readability of computer displayed Times New Roman and Arial Text was compared by

## *Review of Literature*

Bernard et al. (2003). Thirty five undergraduate students and graduate students from a Midwestern city in the USA volunteered were taken part in the study. For this study a Pentium 2 based PC computer utilising a 60 Hz, 96dpi, 17-in high resolution RGB screen with a resolution of 1024x768 pixels was used. The conditions was compared by having participants read 8 passages as precisely and as fast as could reasonably be expected for substitution words that were randomly presented all through the passages. Among the combinations the result did not reveal any significant differences in objective readability, with the exception of contrasts in reading time in that the 10 point anti-aliased Arial text was read slower than each of the 12 point text and all dot matrix text. Preference has by and large served as a good pointer of the perception of readability. Sans Serif typefaces will be more favoured in light of the fact that they were perceived as more readable on computer screens. The result demonstrates that 12 point dot matrix Arial is prevalent, as far as the judgment of readability and preference and is prescribed for both dot-matrix and anti-aliased text.

In an experiment, Dyson and Kipping (1997) tested the ease of reading particular format that could be used for online publications, such as magazines. A solitary scrolling column with a generally long line length, the format in which browsers much of the time show Web pages, was compared with a three column paged format. Eighteen subjects participated in the experiment. Questionnaire was used for collecting subject details. Ten subjects fell inside the age range 18-24, 6 were somewhere around 25 and 34 and 2 were between 35 and 44. In reading rate no differences were found, yet compared with slower readers, faster readers had better comprehension scores when reading the three column format. A single paged column that was acquainted to separate the effects of



## *Review of Literature*

the number of columns from the method of movement demonstrated that paging is quicker than scrolling. Moreover with paged movement, a single wide column is read quicker than 3 columns, this outcome was attributable to subjects inside the age range 18-24 years. Rather than reading performance, subjective judgment of ease of reading appraised the three column format as simpler to read. From the study it can be concluded that viability of various techniques for reading may be influenced by display format.

Bias et al. (2010) in their three studies examined the visual and psychological connects of people's preferences towards various onscreen text enhancements such as clear type created by Microsoft. Each of the three studies analysed the same version of sub pixel-positioned clear type with various gray scale, colour, or special variables set up for assessment. For three studies the total sample population taken was 450. For this study, students, faculty and staff at the University of Texas at Austin with standard or corrected vision and persons do not have reading disabilities or colour blindness was recruited. To this two factor design, ANOVA was applied to explore conceivable impact of font and colour filtering on participant's inclination of clear type versus black and white text. Findings proposed that individual's acuity and hue sensitivity were two central points that influence their inclinations to clear type's colour filtering of sub pixels on fonts and particular personality traits such as offensiveness additionally could correlate with individual's impressions of various onscreen text improvements that were utilised.

An experiment was conducted by Buchner, Mayr and Brandt (2009) to test whether the positive polarity advantage is because of the way that overall display luminance is typically higher for positive than for negative polarity displays. To the experimental group 124 volunteers

### *Review of Literature*

(81 women) whose age extended from 18 to 56 were randomly assigned. The content materials were exhibited using an Apple 17-inch TFT (Thin Film Transistor) 'Studio Display' which was controlled by an Apple power Macintosh computer. By using a Minolta colourmeter CS-100, luminance value was determined. The results reveal that, no positive polarity advantage was watched when general display luminance of positive and negative polarity display was proportional. There was just an impact of display luminance, with better performance for the higher luminance displays. This suggests that the positive polarity advantage is in fact due to the regularly higher luminance of positive polarity displays. Readability of content presented on computer screen were better when the general display luminance level is high, as in positive polarity shows.

Sahin and Alsancak (2011) analysed the effect of page lengths of hypertexts which were set up for reading and learning in Turkish language teaching on the reading and comprehension aptitude of primary schools fifth year students. Experimental method was completed with 60 students in two areas which were randomly picked among the fifth grades of primary schools in Kirseher province. The students in these two segments were randomly assigned as experimental and control groups. Then the students was requested to read 4 texts (two of them were narrative and two of them were informative) that was resolved to be proper for the grade levels by the method of scrolling down the page strategy for the experimental group and page by page technique for the control group. As the post test, a comprehension test that was made up of 25 comprehension questions about the assigned texts was executed to the students in both groups. The results reveal that the students in group with longer pages have higher comprehension tests scores than the ones in group with shorter pages.

## *Review of Literature*

Bowman et al. (2010) examined the effect of instant messaging while reading a text book on the Web. Researcher anticipated that the students who occupied with instant messaging while reading an ordinary scholastic psychology passage online would take more time to read the passage and would perform all the more inadequately on a test of comprehension of the passage. Eighty nine college students were taken part in the investigation. One of three conditions participants was randomly allocated (Instant messaging before reading, instant messaging amid reading or no instant messaging). The results reveal that students took significantly more time to read the passage when they instant messaging amid reading (excluded time taken to Instant messaging) than in other condition. Students who are engaging in busy lives may think they are fulfilling more by multitasking, and findings propose that they require more time to accomplish the same level of execution on a scholastic assignment.

For learning paragraph structure Lo, Yeh and Sung (2013) proposed an intuitive approach and built an online annotation framework, paragraph annotator, to help EFL students of Chung Hua University in Northern Taiwan. It permits readers to dissect paragraph of text on Web pages by taking note of any paragraph component like topic sentence, controlling idea or supporting details in the paragraph. Also users can utilise annotation tools to add their own thoughts to the highlighted component. SPSS was used for analysing the experimental data. The results reveal that in both the cued recall test and free recall test the students who were using paragraph annotator had significantly better performance. Most notably, the impact of the framework was clearer when tested with the free recall test and when the students were not given any cues. Participants utilising the framework reacted positively to paragraph annotator, with respect to perceived ease of use, perceived usefulness, attitude and intention to

## *Review of Literature*

use. The aftereffect of this study recommends that online annotation technology permits EFL readers the adaptability to associate with the text in ways impractical with books alone.

The impacts of leads (or hypertext node previews) on cognitive load and learning was evaluated by Antonenko and Niederhauser (2010). Dependent variables included measures of cognitive load, self-report of mental exertion, reading time, occasion-related desynchronization percentage of alpha, beta and theta brain wave rhythms, learning execution, a recall task, and test of domain and basic knowledge. Participants included 22 teacher education students from a large Midwestern university. Results of the study indicate that utilisation of leads decreased brain wave activity and that may reflect split consideration and incidental cognitive load, and enhanced domain and basic information acquisition. Discoveries likewise give bits of knowledge into separating the sorts of cognitive load evident in hypertext assisted learning environment. Use of EEG (Electro Encephalo Gram) measures permitted examination of instantaneous cognitive load, which demonstrated that leads might impact germane load – diminishing mental burden connected with making coherence between two connected nodes.

Grzeschik et al. (2011) conducted an experiment to find out whether and how reading behaviour might be influenced by reading gadgets. In all out three experiments, the first more free from second and third, research how European Library and Information Science students respond to electronic reading gadgets, new as they are with then. The participants were nine students from the Berlin school of Library and Information Science at the Humboldt University, Berlin. Implications such as reading rate, concentration and symptoms of fatigue in conjunction with electronic reading devices were explored in the second and third experiments. Sony e-book reader, the IREX

## *Review of Literature*

iLiad, LCD computer screen, laptops and smart phones HTC Touch HD were the test items in comparison with printed documents and books. In opposition to basic assessments, the outcomes show a trend that concentration and/or reading rates do not suffer from reading on electronic reading gadgets. Further it was found that impacts on reading rates and concentration are postured rather by the individual reading behaviour of a person, and in addition by the nature of a text (academic or novelistic) than by the reading gadgets utilised.

The impacts of the visual configuration and position of intra-article navigation schemes on Website users reading comprehension and user experience was inspected by Euddihy and Spyridakis (2012). Through a link on the university of Washington orthopedic surgery and sports medicine Websites and through online arthritis message boards and arthritis e-mailing lists, 171 participants were enrolled. Utilising an instructive medical Website, four treatments of an intra-article route plan were differed, in their level of visual distinctness from the site's other navigation gadgets and in their position on the Web page. Regarding the reading comprehension and perceived knowledge gained, significant differences were found. Reading comprehension was most noteworthy with an intra-article navigation scheme that was most visually distinct as an article table of contents and that replaced the sites navigation in the Web page format. The study generally shows that readers advantage from intra- article navigation as long as they perceive it to be distinct from the world wide site navigation.

Numerous hypertext designers ensure that hypertext will encourage reading and writing in light of the fact that unlike linear texts, hypertext eagerly take after the associational organisation of information in human memory. Abdi (2013) attempted to explore the

### *Review of Literature*

viability of using hypertext materials on reading comprehension capacity of learners as compared to the normally written materials. An aggregate of 49 Iranian EFL learners were randomly assigned to two experimental and control groups. In view of their scores on a proficiency test the homogeneity of the group was confirmed. The experimental gathering worked with hypertext materials, while the control group was given and taught through ordinarily written materials for four weeks. For both groups as the post test, the TOEFL (Test of English as Foreign Language) reading comprehension test was given. The findings indicated that as a result of working with hypertext materials, participants in the experimental groups assumed more gain in reading comprehension capacity when contrasted with non-digital materials.

Field study was conducted by Marshall and Ruotolo (2002) to investigate whether individuals can and will read digital library materials on handhelds through a technology intervention in a scholarly environment. The technology intervention focused on a deployment of pocket PCs (HPJomadas) including reading software (Microsoft reader) and exceptionally arranged digital library materials (class reading assignments and foundation materials from course syllabus). The innovation was utilised on a deliberate basis in two different humanities classes. From the results it was found that a handheld device was a better stage for reading optional or secondary materials, portions and shorter readings. It was additionally important in grouping of circumstances where portability is basic, including collaborative circumstances such as class room. The outcomes likewise reveal that the structure of the electronic materials and the route managed by this structure in conjunction with the proper usefulness (for example, search and hypertext links)

## *Review of Literature*

profoundly affected how the handheld was used, both independently and in a class room situation.

For enhancing reading performance in collaborative digital reading environments, Chen and Chen (2014) presented CRAS-RAIDS (Collaborative Reading Annotation System with a Reading Annotation and Interactive Discussion Scaffold). For this study, a quasi-experimental design was used. From two classes of an elementary school in Taoyuan County, Taiwan, 53 grade 5 students were selected. One class was randomly designated the experimental group, and for collaborative reading and utilised the proposed CRAS-RAIDS support. Alternate class was assigned the control group and used the conventional paper based reading annotation technique and face to face discussions. In an active reading context, the two gatherings were then compared in terms of reading attitude, reading comprehension and use of reading strategy. Analysed results show that in immediate and explicit comprehension, inferential comprehension execution and utilising reading strategy the experimental group significantly outperformed the control group and experimental group additionally demonstrated positive interest and high learning fulfillment.

Soroya and Ameen (2016) explored the reading trends of young Pakistani students and the impact of digital resources on their reading behaviour. Findings reveal that reading behaviour of students has been significantly changed during the last five years and their overall reading time and digital reading time has been increased due to the availability of digital devices and digital resources.

Reading is influenced by a few components like environment, background, age, subject, and so on. Saaid and Wahab (2014)

## *Review of Literature*

analysed the impact of digital based materials with respect to reading habits of undergraduate students of UITM (Universiti Teknologi MARA). The study results indicated that of the 103 respondents, larger part of respondents (69.2%) read digital based materials for leisure instead of research (18.1%) and study (12.7%). In looking for the respondents greatest effect of digital emergence, a good number of them indicated that their reading habits have changed and their enthusiasm for reading have created, because of the development of digital materials such as e-newspapers, e-books and e-zines. To assess these digital based materials majority of users used laptop and none of the respondents used e-readers. By and large from the study, it can be reasoned that digital based materials has an impact on the students. It affected especially on viewpoints such as their reading materials, reading interest and reading time.

Ali et al. (2013) assessed the impacts of Serif and San Serif font in the class of screen fonts and print fonts with respect to Malay text readability on Websites. Four textual styles such as Georgia (Serif) and Verdana (San Serif) were selected for the primary respondents and Times New Roman (Serif) and Arial (San Serif) were selected for the second respondents. Readability test on computer screen was conducted on 48 undergraduates. Results showed that there was no significant difference between the readability of Serif and San Serif font of both screen display classification and print display classification. Results furthermore recommend that Verdana followed by Georgia as the better decision in displaying long text on Websites.

Chen et al. (2011) evaluated the viability of the configuration of utilising QRcodes (two dimensional barcode used to encode data) to provide students direct access to pre-designed digital materials and the use of scaffolded questioning in providing students reading comprehension. QR codes were adopted in relationship with mobile



### *Review of Literature*

technology to convey supplementary materials and inquiries to support students reading. Smart phones were used to filter the printed QR codes to get pre-outlined digital resources and scaffolded questions over the Internet. A class entitled “Advanced Business English and Communications” in a public University in Southern Taiwan, a quasi experiment was directed. A sum of 77 students participated in the experiment. Results proposed that immediate access to digital resources using QR codes does not significantly impact students reading comprehension, however the reading strategy of scaffolded questioning fundamentally enhances students understanding about the text. Study demonstrated that most students agreed that the print and digital materials integrated based learning framework benefits English reading comprehension however may not be as proficient obviously.

Ajayi, Shorunke and Aboyade (2014) inspected the effect of e-resources use on reading culture of students in Nigerian universities. Survey method was adopted for data collection. From the results it was found that the most ordinarily used e-resources among the students were e-books, e-journals and e-newspapers. It additionally reveals that students are frequently using the e-resources. With respect to reading pattern of the students, results demonstrates that a large majority of the students read less than two hours daily and most students have lacking the ability or skill on the best way to utilise e-resources. Poor Internet facility was the main component that hinders the effective use of e-resources in the library was also additionally opined by respondents.

Majority of the reviews cited above shows that there is a transformation in the reading behaviour of people, particularly among youth because of the effect of digital media made accessible through the Web. Numerous studies additionally demonstrate that

reading a digital content prompts lower comprehension compared with a printed content. Successful utilisation of reading strategies has been perceived as an imperative intends to increase reading comprehension. It has additionally been noted in numerous studies that the rise of advanced media and the nature of hypertext have changed reading behaviour. Advancement of computerised libraries and electronic assets has brought about individuals tendency to do less in-depth and in addition more inconsequent and non-concentrated reading.

## **2.7 Conclusion**

Reading is inseparably linked to learning. Learning prompts a general mental, expert and human advancement. Reading not just gives individuals new thoughts, data, and bits of knowledge, it moreover, helps them to become more complete in every perspective. The review of related literature has given an insight into the research that directed in the related fields of study. It also helped to understand the various tools and methods that are pertinent for the study. Greater part of the above mentioned studies adopted survey, questionnaire and personal interview as the method for data collection and statistical method for analysis. Further, from the literature survey, it has also been revealed that most of the online reading related studies are conducted abroad.

In India there are comparatively few studies related to online reading. But numerous studies have been carried out regarding reading behaviour, with some research having been undertaken related to changes in reading patterns because of using the Internet and e-resources. Reading has dynamically been the object of definite and theoretical investigations. Studies in the region of reading originate from different scholarly disciplines including LIS, Education, Social

## *Review of Literature*

Science, and recently information systems. Findings about reading contributes in a general sense to how library gives its services, how instructing students to read can be made more effective, and how Website and framework outline can be made more valuable and simple to utilise.

The rise of new digital environment has moreover caught the interest of numerous researchers. Nowadays young adults are investing more time on reading electronic materials (Liu, 2005). An increasing amount of reading time is spent more on skimming and searching for information on the Internet. On the other hand, the nature and purpose of reading seems to deviate from conventional reading methods which are brief, straight and less organised.

Some researchers also argued that the advancement of electronic media may give negative suggestion to the way that individuals are less engaged with intensive reading. The influence of digital resources on reading has progressively been the object of observational and hypothetical investigation by specialists from extensive variety of disciplines, notably Psychology, Education, Computer Science, and Library and Information Science. Each discipline has developed its unique research focuses and methodology. From the review it was found that, the increasing amount of digital data accessible and the expanding measure of time that individuals spend reading electronic media, the digital environment has started to influence the individuals reading behaviour.

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## Chapter 3

# **METHODOLOGY**

### **3.1 Introduction**

Digital environment has started to influence how individuals read. A great part of the previous research studies have endeavored to investigate reading in the digital environment by examining the evolution of reading, observing how individuals read electronic documents, analysed the eye movement and furthermore assess the cost vs. benefits of utilising print resources and digital resources. These sorts of research approaches are valuable in finding how individuals read, however they are limited in giving insight into the influence of digital environment on people's overall reading behaviour. Exponential development of information and the adoption of the Internet have changed the reading behaviour of individuals, particularly the younger generation.

Despite the fact that the drawbacks of computer screens are still sufficiently enough to make digital reading an option undesirable to many, digital technology have now started to influence reading practice and behaviour as individuals are spending more time on reading digitally. As a result, depth and concentration in reading has declined. Only a few studies have explored the changes of reading behaviour in the digital environment. Along these lines, this study aimed to explore reading in the digital environment from a different perspective.

Rather than watching how individuals read online materials, the primary goal of this study was to identify the changes in the reading behaviour of students in digital environment. The way to deal with this study was a quantitative research method. This chapter gives a

description of the variables selected for the study, sampling design, data collection tools, procedures of data collection, and also the tools and techniques used for data analysis.

### **3.2 Variables**

The variables used for the study are broadly divided into two, namely independent variables and dependent variables.

#### **3.2.1 Independent Variables**

Independent variables of the study are gender, discipline and university.

##### **3.2.1.1 Gender**

In spite of the fact that screen-based reading is turning out to be better known and has changed the reading behaviours of digital natives, gender differences in reading still exist. Gender differences in Web information seeking have attracted significant interest. Gender has been distinguished as a solid demographic that impacts information behaviour. Furthermore gender has been recognised as a strong indicator of attitudes and behaviour in Web information seeking (Liu & Huang, 2008). In respect of gender, male and female read in an unexpected way or differently and they have diverse reading behaviour contingent on their goal, preference, timing of study and different elements. Understanding gender differences would enable a better understanding of the changing reading behaviour in the digital environment, and to develop more advanced digital reading devices.

##### **3.2.1.2 Discipline**

Whatever their subject background students cannot achieve their potential, if they do not read widely. Their general knowledge and the



standard of their composed work remain low. Reading behaviour of students in digital environment among Science, Humanities and Social Science disciplines is compared.

### **3.2.1.3 University**

Here the researcher tried to identify the university-wise differences in reading behaviour of the students in the digital environment.

### **3.2.2 Dependent Variables**

Dependent variables of the study are reading pattern, digital reading competency, preference of reading print and digital resources, attitudes towards digital reading and influence of digital resources on the reading culture of the students.

#### **3.2.2.1 Reading Pattern**

Reading is not a static demonstration, but rather always shows signs of change and adjusts or adapts itself to the social environment in which it is practiced. Digital readings are inevitable real facts that have penetrated the people's daily lives at home, at office, and in libraries (Brown, 2001). This has vastly affected the reading patterns. Reading pattern for the purpose of this study covers, the type of the reading materials the students read, the time they read, their main purpose of reading, factors that encourage them to read more, reading style, methods used for reading digital resources and their frequency and various devices used for reading digital resources.

#### **3.2.2.2 Digital Reading Competency**

It includes the ability to choose data and to analyse it innovatively, critically, constructively, confidently and responsibly. In a knowledge-based society, for both social and financial reasons students will require computer and communication technology skills

## *Methodology*

to live successfully. Competence is characterised as the capacity to consolidate and apply significant attributes to specific tasks in specific contexts. Attributes incorporate high amount of knowledge, qualities, expertise, individual dispositions, sensitivities and capabilities, and the ability to put those combinations into practice in an appropriate way. With the accessibility of e-resources through online and in different format, may increase the goal of the ICT proficient average library users to read more content and perpetually increasing their level of knowledge and enhancing their reading habits. Successful digital reading requires a high level of ICT competency to empower the student to assess both text and non-text (graphics and multimedia).

### **3.2.2.3 Preference of Reading Print and Digital Resources**

Reading on screens tends to be essentially unique in relation to reading printed text. Students have distinctive perceptions and preferences in their choices of print and digital resources. This prompts the inquiry concerning whether reading a digital text just as effective as reading a document on printed media. Considering the advancement of digital resources, it is vital to analyse reading in this environment with the end goal of perceiving which resources, procedures and strategies are utilised as a part of this environment and which elements of e-resources are of interest to readers.

Students' choice of media for reading depends on their topic of interest, reading skill or ability and the reason for engagement. The investigator examining the students' preference of reading traditional print-text mode with the digital resources and the reason they sometimes read from computer screen and sometimes print out digital resources for reading. Contemplating these issues would empower us to better understand the changing patterns of

information use in the increasingly intensive digital environment (Liu, 2006).

#### **3.2.2.4 Attitude toward Digital Reading**

In spite of current advances in Information Technology and the improvement of a range of communication tools in the present day world, learning and maintaining interest for reading stay essential. Attitude has been characterised as a perspective, accompanied by feeling, emotions and sentiments that make digital reading much likely. Reading attitudes are learnt qualities that influence whether students take part in or abstain from reading activities and they can be affected by societal, familial, and school-based elements (Baker, 2003; Miller, 2003).

Attitude and enthusiasm toward reading can be associated in relationship with feeling and with reader's spirit to learn or their circumstance or spirit to read. Positive reading attitudes prompt positive reading experiences, which lead to higher academic performance (Karim & Hasan, 2007). Attitude of students towards reading can be affected by their recreational and scholarly experiences. There will be change in these experiences and may differ for both male and female students. How significant a part attitude plays in students reading pattern and activities is unverifiable, however attitudes are assumed to manage and guide behaviours to some extent.

#### **3.2.2.5 Influence of Digital resources on Reading Culture**

Emergence of digital media and the nature of hypertext have altered reading behaviour. Young generation are spending increasing amounts of time in discussions with others in this nonlinear, hyperlinked environment which has essentially impacted the way in

## *Methodology*

which youth read and collaborate with each other (Saaid & Wahab, 2014). Development of digital libraries and e-resources has resulted in tendency of people to do less in-depth as well as more inconsequent and non-concentrated reading (Levy, 1997). Here the investigator endeavors to examine how the utilisation of digital resources influences the reading culture of the students.

### **3.3 Sampling Design**

It was not practical to study the whole population to arrive at generalisation through the results of the research for universal application. The potential population of study comprises of post graduate students of universities in Kerala. There are around 17 universities approved by UGC in Kerala state. They are University of Kerala, University of Calicut, Mahatma Gandhi University, Kannur University, Cochin University of Science and Technology, Kerala Agricultural University, Sree Sankaracharya University of Sanskrit, Kerala University of Fisheries and Ocean Studies, Kerala University of Health Sciences, Kerala Veterinary and Animal Science University, National University of Advanced Legal Studies, Malayalam University, APJ Abdul Kalam Technological University, Central University of Kerala, Kerala Kalamandalam, Indian Institute of Space Science and Technology and Chinmaya Vishwavidyapeeth (<http://www.ugc.ac.in/stateuniversitylist.aspx?id=13&Unitype=2>).

Out of the 17 universities, four state universities were selected based on their geographical locations viz. south, centre and north of Kerala and also on the basis of their year of establishment and the similarity of the nature of courses. They are University of Kerala, Mahatma Gandhi University, University of Calicut and Kannur University.

## *Methodology*

The aggregate number of the students in the departments of these four universities was obtained from respective university authorities and cross checked with annual report and diaries of universities concerned. Likewise, the investigator led discussions with the department staff wherever any clarification was required. The sample size was decided by utilising US National Education Association Statistical table as expressed by Krejcie and Morgan (1970). This is an exceptionally accepted strategy in Social Science to decide the sample size and it needed to be representative of a given population. Research division of National Education Association in an article entitled “Small Sample Techniques” has published an equation to decide the sample size which is as per the following.

The formula was  $s = \frac{\chi^2 NP(1-P)}{d^2(N-1) + \chi^2 P(1-P)}$

Following is the description of the formula

Where

- S = required sample size
- $\chi^2$  = the table value of chi-square for 1 degrees 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)

### *Methodology*

Krejcie and Morgan (1970) pointed out that there is no need of estimation by utilising the above equation. With a specific end goal to determine the sample size of a given population, just the table has to be considered. As per Morgan table sample size for population up to 1,00000 is 384. Here the investigator selected a representative sample from the population by using two-stage stratified random sampling method. For selecting the sample, the researcher first considered university-wise strata for taking the sample and distinguished the subject wise categories of the students, which has taken proportionately from three disciplines (Science, Humanities, and Social Science) making the sample 700. Classification of the students on the basis of gender has also done for taking the sample. In this study, researcher has taken Colon Classification (6<sup>th</sup> edition) as the base for the subject categorisation of disciplines into Science, Humanities and Social Science. Table 1 demonstrates the population and the sample selected for the study.

**Table 1**  
**Population and Sample of the Study**

<b>Universities</b>	<b>Population</b>	<b>Sample Size</b>
University of Kerala	1378	214
University of Calicut	1179	183
Mahatma Gandhi University	743	115
Kannur University	1207	188
Total	4507	700

Total number of the students in campus of four selected universities was 4507. Subsequent to determining the sample size of the students by taking into account the Krejcie and Morgan table, 700 questionnaires were distributed to the students of University of Kerala (214), University of Calicut (183), Mahatma Gandhi University

## *Methodology*

(115), and Kannur University (188). Out of which 634 questionnaires were returned. Due to deficiencies existing in the answers, properly filled 588 questionnaires were taken as sample for the final study, constituting 84 per cent return rate.

General profile of the respondents is given in Table 2. By observing the gender wise distribution of the respondents, it was found that female students are dominated in number in all the selected universities compared to male students. Out of 588 students, the number of male students responded was 262 and that of female students was 326.

**Table 2**  
**General Profile of the Respondents (n=588)**

<b>Variable</b>	<b>Category</b>	<b>Frequency</b>	<b>Per cent</b>
Gender	Male	262	44.6
	Female	326	55.4
Discipline	Science	191	32.5
	Humanities	191	32.5
	Social Science	206	35.0
University	University of Kerala	175	29.8
	University of Calicut	140	23.8
	Mahatma Gandhi University	111	18.9
	Kannur University	162	27.6

Out of 588 respondents, 191 respondents each are from discipline Science and Humanities, and 206 respondents from Social Science. About 30 per cent of the respondents are from University of Kerala, 24 per cent are from University of Calicut, and 28 per cent of the

respondents are from Kannur University. Compared to other universities, respondents from Mahatma Gandhi University are minimum (19 per cent) as its population seems to be low.

### **3.4 Data Collection Tools**

The research method applied to carry out the study was survey method. For collecting the data, the investigator used fully structured questionnaire. A draft questionnaire was designed based on discussions with supervising teacher, professional colleagues, points obtained from theoretical foundations and the literature review. Based on the suggestions, comments and observations of the experts, some of the items were removed and substituted while others were modified before final application. The questions formulated were based on the research questions and were designed as close-ended along with an open-ended question, which requires respondents to choose from a list on answers given in the questionnaire.

A 33-item questionnaire (appendix A) was formulated with a suitable presentation format. The questionnaire with a covering letter briefly explained the research topic and assured the respondents that the information provided would be confidential and used for research purpose only. Questionnaire consisted of five sections which contained a mixture of Likert-Scale, multiple-choice, and yes/no questions.

In line with the objectives of the study, first section of the questionnaire deals with the reading pattern of the students in the digital environment which includes the questions related to the time spent for reading, types of reading materials used, their purpose of reading, factors that encourage them to read more, reading style, methods used for reading digital resources, how often they read



## *Methodology*

digital resources, and also the various devices used for digital reading. This, in turn, helped to build a conceptual framework for reading pattern of both printed and digital materials among the students. A total of nine items covered in this section where the respondents were required to tick as applicable to them.

Second section of the questionnaire was intended to collect information about the digital competency of the students for reading, which covers the computer related course attended by the students, their competency to use computer and other digital devices and also their digital competency for reading in digital environment.

Third section deals the students' preference about reading print and digital resources. This section intended to collect data about the preference among print and digital resources, various techniques which are followed while reading print and digital resources, and how often the students make annotations, their level of comprehension, concentration, absorption and their comfortable level, while they are reading print and digital resources. It also includes their choice of reading media under various circumstances and the advantages and disadvantages of print and digital resources.

Fourth section deals with the attitudes of the students towards digital reading. For measuring the attitude towards digital reading, the study adopted the Adult Survey of Reading Attitude (ASRA) from the work of Smith (1991) with modification which includes 23 statements related to their enjoyment, anxiety, modality and difficulties they feel when reading digitally. Prior to the descriptive analysis of the construct, the reliability analysis of the variables utilised in the study was conducted. The Cronbach Alpha value is 0.715 and it is acceptable in light of the suggestion made by Bryman and Cramer (2001). The response to the items in this part followed a

## *Methodology*

five point Likert Scale ranging from 1 (strongly disagree) to 5 (strongly agree). Higher score indicated higher values.

Final section measured the items related to the influence of digital resources on the reading culture of the students. This section includes questions such as, whether or not the facilities like laptop, mobile phone, open access resources, Internet, etc, made any change in the reading of the students, distraction while reading digitally, various features and factors that influence the digital reading, changes occurred in their reading practice by digital reading, obstacles that hinder the effective use of digital resources for reading, and the perception about the influence of digital resources on reading practice of the students. Last item has been included to get an open response from the students regarding their opinions and suggestions for improving or promoting reading in digital environment.

### **3.5 Data Collection Procedure**

To determine the validity of the questionnaire, pilot study was conducted to find out the appropriateness and applicability of the scales and to ensure that students had no difficulty in understanding the questionnaire. Pilot study also assisted the researcher in instituting measures and constraints, clarity of directives and to decide the correct level of the independent variable. Overall the participant did not show much signs of difficulty in answering the questions on the questionnaire. After conducting the pilot study, some questions were modified to make them more understandable to the respondents. On a very basic level, this preliminary study was useful to understand the possible difficulties and challenges to be expected during the main data collection phase of the study.

Investigator visited the selected universities and sought permission from the heads of the departments for distributing the

## *Methodology*

questionnaires among the students of the departments. After making necessary copies of the questionnaire, the investigator met the students in person from their concerned departments and distributed the questionnaires. Necessary instructions were given for filling the facing sheet of the questionnaire. The majority of the students responded positively by filling the questionnaires. The responses were encouraging. After the completion of the survey, collected data was taken for editing, coding, classification and tabulation.

### **3.6 Tools and Techniques for Data Analysis**

Data collected from the respondents were evaluated and analysed to find the results. The data collected were segregated and consolidated with Microsoft Excel. SPSS version 21 was used to do the required statistical analysis. Firstly the coding was made in Excel, and imported the data from Excel to SPSS. The data analysed were presented through tables and graphs. Along with tables the interpretations were also provided. The graphs used were pie diagrams and bar charts. The objectives and hypotheses of the study demand the use of the following statistical techniques for the analysis of data.

- Simple percentage method – To condense the whole data
- Arithmetic mean – It is the value of the variable obtained when the values of all the observations are added and the sum is divided by the number of observations
- Standard deviation – It is an average distance from the mean of the observations in a data set (Iversen, 1997).
- Chi-square – It is symbolically written as  $X^2$  is a common test for analysing data from surveys. Chi-square test is based on chi-square distribution and as a parametric test is used for comparing a sample variance to a theoretical population

## *Methodology*

variance. It is an inferential statistical test that is used to examine relationship between two variables with nominal or ordinal data. The Chi-square value measures the discrepancy between the observed frequencies and the expected frequencies. The larger the Chi-square score, the larger the discrepancy, and the more likely that the two variables being studied are related. If the calculated value of Chi-square is less than the table value, it indicates that the difference between actual and observed frequencies is due to chance of variation and can be ignored (Kothari, 2004).

- ANOVA – ANOVA is used when multiple sample cases are involved. It is an inferential statistical test used to determine if the differences among three or more sample means are statistically significant. The essence of ANOVA is that the total amount of variation in a set of data is broken down into two types, that amount which can be attributed to chance and that amount which can be attributed to specified causes. ANOVA test can be applied only if : a) the sample groups are randomly and independently selected, b) the data are of interval or ratio type, c) there is normal distribution in the population from which the sample is selected and d) the variability within groups are fairly similar (Vaughan, 2009).
- Kruskal Walli's test – It is a nonparametric (distribution free) test, and is used when the assumptions of one-way ANOVA are not met. It can be used on more than two groups of scores that are independent of research of each other.
- Kolmogorov-Smirnov test – It is a nonparametric test of the equality of continuous, one-dimensional probability distributions that can be used to compare a sample with a reference probability distribution (one-sample K-S test), or to compare two samples (two-sample K-S test).

## *Methodology*

- Mann-Whitney U-test – It is a nonparametric test that is used to compare two sample means that come from the same population and used to test whether two sample means are equal or not.
- Z-test – It is based on the normal probability distribution and is used for judging the significance of several statistical measures, particularly the mean. Z-test is generally used for comparing the mean of a sample to some hypothesised mean for the population in case of large sample, or when population variance is known (Kothari, 2004).
- Spearman's Rank Correlation – A correlation is a single number that describes the degree of relationship between two variables. The Spearman's rank correlation coefficient is used to discover the strength of a link between two sets of data which are in ordinal scale or the set of variables are not following normal distribution.

### **3.7 Conclusion**

In this section the research methodology of the study has been deployed in detail. The geographical area where the study was conducted, the study design, and the population and sample are described. Details regarding the questionnaire and the pilot study conducted were also explained. It also provides an explanation of the statistical procedures used to analyse the data collected from students in the selected universities among different disciplines for understanding the reading behaviour in digital environment with appropriate statistical techniques.

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## *Methodology*

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## Chapter 4

# **ANALYSIS AND INTERPRETATIONS**

### **4.1 Introduction**

In the digital age reading is not the same as the past and this study tries to give some insight about the reading behaviour of the students and their preferences and differences based on gender, discipline and university. Data collected were tabulated with MS Excel. SPSS was used to analyse the data. Depending upon the nature of hypotheses and type of study, the strategy and depth of analysis are determined. The collected data was subjected to various statistical tests such as Simple Percentage analysis, Chi-square test, Mean, Standard Deviation, Spearman's Rank Correlation, ANOVA, Kruskal Walli's test, Kolmogorov-Smirnov test, Mann-Whitney U-test and Z-test.

### **4.2 Reading Pattern**

In the means of communication, there is a tremendous change with the rapid developments in Information Technology. A great amount of information is accessible from digital media when compared with conventional resources. A paradigm shift in information conveyance from just information to infotainment has likewise influenced the reading pattern of the information seekers. Teenagers are demographic groups under transition and they are not untouched by these quick changes in innovation and technology and its impact on their reading pattern.

A good amount of research can likewise be found searching for changes in reading patterns, because of broad utilisation of the Internet and the use of alternative reading resources eminently utilising hypertexts and multimedia resources. Pattern of reading as



### *Analysis and Interpretations*

is known from the past, may not be the same as it is known today or later on. Pandian (2000) in a review detailed that ethnicity, home environment, reading models, gender and scholarly environment are essential indicators of reading. Students would spend more time on reading, if reading activities are effectively advanced and a good reading atmosphere is created in colleges, universities and learning establishments.

#### **4.2.1 Time Spent for Reading Print and Digital Resources**

An individual's reading interests are determined to a considerable extent by the amount he/she will read and the intensity with which they will pursue their reading activity. By reading, one gets confirmation or rejection of one's own ideas, which in turn increases the knowledge level of the reader. In addition, reading provides people with a sense of values, which enable them to discriminate between what is acceptable in the society and what is not. Findings on reading pattern were investigated through the amount of time spent on reading, type of reading materials read, preferred reading time, purpose of reading, factors encouraged for reading, reading style, methods and frequency of reading digital resources and various devices used for digital reading. Table 3 demonstrates the distribution of the students as per the time spent for reading print and digital resources.

**Table 3**  
**Time Spent for Reading Print and Digital Resources**

<b>Time</b>	<b>Responses (n=588)</b>	
	<b>Print Resources</b>	<b>Digital Resources</b>
Less than 1 hour	155 (26.4%)	243 (41.3%)
1-2 hours	292 (49.7%)	212 (36.1%)
3-4 hours	103 (17.5%)	98 (16.6%)
More than 4 hours	38 (6.5%)	35 (6.0%)
Total	588 (100%)	588 (100%)

It is evident from the table that the students spent a considerable amount of time on reading both the resources. This result is somewhat expected due to academic activities that require a significant amount of time for reading in order to perform scholastically. Regarding the amount of time spent on reading, the result is somewhat higher than the study conducted by Mokhtari and Sheorey (1994) on university students in the USA, where the average reading time per week was 4.75 hours. But time spent for reading print resources is high as compared to digital resources as it is shown in the results. Two hundred and forty three (41.3%) students are spending less than one hour for reading digital resources.

As per the study conducted by Liu (2005) it was reported that students tend to skim and browse for information while reading digitally as opposed to reading intensively. This reading behaviour is

### *Analysis and Interpretations*

suboptimal in light of the fact that individuals are less engaged in intensive reading and do not have the capacity to read deeply and to maintain a prolonged engagement in reading. Similar to this result, Ramirez (2003) announced, concerning the time allocated to reading text on screen display, a good number of the students (63%) read less than one hour and a little number of the respondents spend more than one hour to read from screen. Further it is watched that dominant part of students are spending a high quantum of time for reading print resources.

O'Hara and Sellen (1997) through their perception assert that significant advantages which printed text offer include supporting annotation while reading as well as quick navigation through the flexibility of spatial format. These permit readers to extend their comprehension of the text, extract a sense of its structure, get ready or planning for writing, cross-refer to different documents and interweave reading.

Gender has been distinguished as a solid statistic that influences information behaviour. It is observed from table 4 that fifty per cent of the students are spending 1-2 hours and nearly 20 per cent of them spending 3-4 hours for reading print resources. Further the variables are subjected to Chi-square test to understand the association between gender and time spent for reading print resources. The Chi-square value of 15.664 and the p-value of 0.001 make it clear that there is a significant association between the variables at 0.01 level. Striking differences as for time for reading print resources were seen amongst male and female students, which generally reflected a good amount of time spent on reading print resources among female, when contrasted with male students.

**Table 4**  
**Time Spent for Reading Print Resources (Gender-Wise)**

Time	Responses (n=588)		
	Male	Female	Total
Less than 1 hour	90 (34.4%)	65 (19.9%)	155 (26.36%)
1-2 hours	116 (44.3%)	176 (54.0%)	292 (49.6%)
3-4 hours	40 (15.3%)	63 (19.3%)	103 (17.51%)
More than 4 hours	16 (6.1%)	22 (6.7%)	38 (6.46%)
Total	262 (100%)	326 (100%)	588 (100%)
Chi-square = 15.664** ; p-value = 0.001			

\*\* Significant at 0.01 level

It is observed that 34.4 per cent of the male students spent just less than one hour for reading print resources. Consequently, more than fifty per cent of the female students agreed that they are reading print resources for 1-2 hours and 19.3 per cent of them are reading for 3-4 hours. Likewise compared to the male students, female students are spending more time for reading print resources.

With a tremendous and rapid amount of digital information accessible, the young generations are spending more time on reading digital resources. As indicated by Liu (2005) the age factor contributes to the digital reading behaviour of students. Table 5 outlines the gender wise difference in the time for reading digital resources among the students. In any case, it is noticed from the table that the students are not spending a lot of time for reading digital documents. Opposed to these results, Liu (2005) revealed that the younger generation spent an increasing amount of time for reading screen-based materials, because of the availability of an

extensive choice, efficiency, accessibility, low cost and progressive or up to date nature.

**Table 5**  
**Time Spent for Reading Digital Resources (Gender-Wise)**

Time	Responses (n=588)		
	Male	Female	Total
Less than 1 hour	100 (38.2%)	143 (43.9%)	243 (41.32%)
1-2 hours	98 (37.4%)	114 (35.0%)	212 (36.05%)
3-4 hours	43 (16.4%)	55 (16.9%)	98 (16.6%)
More than 4 hours	21 (8.0%)	14 (4.3%)	35 (5.95%)
Total	262 (100%)	326 (100%)	588 (100%)
Chi-square = 4.77 <sup>ns</sup> ; p-value = 0.189			

*ns non-significant at 0.05 level*

By applying Chi-square test to understand the association between gender and the time spent for reading digital resources, the p-value of 0.189 indicate that there is no significant association between the variables since it is greater than 0.05 level. It is revealed that both the male and female students indicate almost an equivalent reaction with respect to the time spent on reading digital resources. Generally speaking there is no sharp gender difference in reading time of digital resources. These findings are reflective of the study as reported by Large, Beheshti and Rahman (2002) that regarding the time for reading digital resources, significant differences between genders were not identified. However, online resources are easily accessible and give up to date information, it may not be the most efficient source for the students to acquire critical information. Be that as it

may, students should be encouraged and motivated to read these online resources.

#### **4.2.2 Types of Reading Materials Used**

Another important matter to look at in terms of student's preference of reading materials is the distinction based on genders. Over the past few years, people's perception and preferences for print and digital resources have been the focus of numerous studies and larger part of them were directed in academic environment. Gaining information through reading is vital for learning process of a student. In light of the particular needs, the students make choice with respect to what to read. So the students were asked to indicate the types of reading materials they read most, which led to the results provided in table 6.

From the table, it is found that vast majority (92.3%) of the students likes to read newspapers in print format and majority (78.2%) of them like to read e-newspapers. Journal in print format is favoured by less than 40 per cent of the students. In the meantime majority of the students (70%) prefer to read e-journals, and more than 50 per cent of them are keen on reading e-books. Increasing number in reading e-journals as compared to print journals is probably due to the accessibility factor where journals are easily available in a digital form, particularly through online. Confirmed to this result, Liew, Foo, and Ramaiah (2000) directed a survey of 83 graduate students to study their utilisation and perceptions of e-journals. They found that majority (73%) of the students lean toward e-journals over print journals. Commonly cited reasons include links to additional resources, searching capability, availability, and ease of access.

**Table 6**  
**Types of Reading Materials Used**

<b>Types of Reading Materials</b>	<b>Male (n=262)</b>	<b>Female (n=326)</b>	<b>Total (n=588)</b>	<b>Chi-square value</b>	<b>p-value</b>
Newspapers	248 (94.7%)	295 (90.5%)	543 (92.3%)	3.57 <sup>ns</sup>	0.059
Academic books	183 (69.8%)	274 (84.0%)	457 (77.7%)	16.92 <sup>**</sup>	< 0.001
Magazines	178 (67.9%)	246 (75.5%)	424 (72.1%)	4.086 <sup>*</sup>	0.043
Journals	94 (35.9%)	128 (39.3%)	222 (37.8%)	0.709 <sup>ns</sup>	0.400
Literatures	121 (46.2%)	211 (64.7%)	332 (56.5%)	20.31 <sup>**</sup>	< 0.001
Blogs	101 (38.5%)	60 (18.4%)	161 (27.4%)	29.65 <sup>**</sup>	< 0.001
E-Journals	187 (71.4%)	233 (68.4%)	410 (69.7%)	0.607 <sup>ns</sup>	0.436
E-Books	146 (55.7%)	166 (50.9%)	312 (53.1%)	1.347 <sup>ns</sup>	0.246
E-Newspapers	212 (80.9%)	248 (76.1%)	460 (78.2%)	2.00 <sup>ns</sup>	0.157
E-zines (E- Magazines)	139 (53.1%)	144 (44.2%)	283 (48.1%)	4.590 <sup>*</sup>	0.032
E-theses & Dissertations	93 (35.5%)	114 (35.0%)	207 (35.2%)	0.018 <sup>ns</sup>	0.894
Others	1 (0.4%)	--	1 (.2%)	--	--

*\*\* Significant at 0.01 level; \* Significant at 0.05 level; ns non-significant at 0.05 level*

Concerning e-theses and dissertation it is clearly observed that 35 per cent of the respondents preferring it. The use of journals in print format and e-theses and dissertations seems not to be popular among the students. In the above said reading resources, the Chi-square value and p-value indicate that there is no significant gender

### *Analysis and Interpretations*

difference in the preference of reading materials like newspapers, e-newspapers, journals, e-journals, e-books and e-theses and dissertations at 0.05 level of significance.

However, the Chi-square test results also shows that there is a significant gender difference in their choice of reading materials like academic books, literature and blogs since the p-value is less than 0.01 level of significance. It is clear from the table that compared to male students, majority (84%) of the female students are more interested in reading academic books and a good number (64.7%) of them are interested in reading literature. Not surprisingly, compared to female students, male students tend to be actively engaged in reading blogs, 38.5 per cent of the male students read blogs compared to 18.4 per cent of the female students.

Further the p-value of 0.043 and 0.032 retrieved as a result of Chi-square test clearly shows that there is a significant gender difference at 0.05 level in their choice of reading materials like magazines and e-zines for reading. Results clearly shows that dominant part of female (75.5%) are more engaged with printed magazines and more than fifty (53.1%) per cent of male incline toward e-zines when contrasted with female. So it can be concluded from the results that female students were significantly more likely to read academic books, magazines and literature than male. By contrast, male students were significantly more likely to read blogs and e-zines than female students.



**4.2.3 Preferred Time for Reading**

The reading schedule analysis focuses on the time the students prefer to read, whether they have regular reading times and whether the schedule changes based on gender. So the students were asked about the time they would typically spend to read and the results are displayed in table 7. Nearly fifty (47.4%) per cent of the students are interested to read at morning. Meanwhile more than 40 per cent of them preferred to read at evening and before going to bed. Only a few per cent of the students are interested to read at mealtime (5.6%), free time (4.8%) and on their basis of mood (.9%).

**Table 7**  
**Preferred Time for Reading**

<b>Reading Time</b>	<b>Male (n=262)</b>	<b>Female (n=326)</b>	<b>Total (n=588)</b>	<b>Chi-square value</b>	<b>p-value</b>
Morning	132 (50.4%)	147 (45.1%)	279 (47.4%)	1.630 <sup>ns</sup>	0.202
Evening	92 (35.1%)	151 (46.3%)	243 (41.3%)	7.521 <sup>**</sup>	0.006
Afternoon	38 (14.5%)	37 (11.3%)	75 (12.8%)	1.299 <sup>ns</sup>	0.254
Before going to bed	120 (45.8%)	129 (39.6%)	249 (42.3%)	2.310 <sup>ns</sup>	0.129
Mealtime	20 (7.6%)	13 (4.0%)	33 (5.6%)	3.645 <sup>ns</sup>	0.056
Free time	14 (5.3%)	14 (4.3%)	28 (4.8%)	0.352 <sup>ns</sup>	0.553
Mood	1 (0.4%)	4 (1.2%)	5 (.9%)	--	--

<sup>\*\*</sup> Significant at 0.01 level; <sup>ns</sup> non-significant at 0.05 level

### *Analysis and Interpretations*

By conducting the Chi-square test, there found no significant gender difference in their preferred time for reading at morning, afternoon, before going to bed, mealtime and free time, since the p-value is greater than 0.05. These results almost supported Braslavski et al. (2016) finding which stated that there are only very subtle differences in the male and female reading schedule or time throughout the day.

In the meantime, the Chi-square value of 7.521 and the p-value of 0.006 indicate a significant gender difference in their preferred reading time in the evening, which reveals that the female students are spending more time for reading in the evening. Compared to male students a considerable number of female students (46.3%) are interested to read in the evening. It is clear from the analysis that majority of the students prefer to read in the morning, and at night. The reading not only requires silence but calm and quite atmosphere as well, it is potentially the essential reason that the students mostly prefer to read in the morning and at night. The classes that the students need to attend during the day may influence the reading time, which naturally take place more at night.

#### **4.2.4 Purpose of Reading**

Readers read for different purposes. Sometimes they read for pleasure, some other time they read for information. Their reason or explanation for reading impacts the way they read. They may skim or read carefully depending upon why they are reading. At the point when the text does not meet their purposes, they may switch to another text. Readers expect what they are reading to make sense. They utilise a collection of strategies, such as re-reading or reading on to clear up thoughts, to ensure they comprehend what they read keeping in mind the end goal to achieve their purposes. Reading

### *Analysis and Interpretations*

purposes were influential in deciding the student's level of engagement in reading. Reader has a purpose for reading, regardless of whether it is for entertainment, information, awareness, and so on.

Attempt made to reveal the purpose of reading by the students and the responses received are tabulated in table 8. The results pinpointed that majority (76.2%) of the students read for examination purpose. This could be because of pressure from their parents and teachers to enhance their academic performance that they do not have much time to spare their time for reading other purposes. Steps ought to be taken to encourage them for recreation reading also.

Morni and Sahari (2013) likewise supported the claim that most Malaysian readers are just extrinsically motivated driven to read to pass examination and accomplish higher evaluations. Many of them do not read for the sake of self-enhancement and actualisation. Subsequently, they fail to appreciate the idea of reading for pleasure. In contrast with this Sonaike (2004) found that students in developed countries read for relaxation, while a majority of the students in developing countries read for examination. From the foregoing results, it can also be inferred that more than 70 per cent of the respondents are reading for obtaining current information (75.2%), followed by assignments and seminars (70.9%) and for the purpose of awareness (70.7%). But a minute number of the students are reading for relaxation and to getting inspired.

**Table 8**  
**Purposes of Reading**

<b>Purposes</b>	<b>Male (n=262)</b>	<b>Female (n=326)</b>	<b>Total (n=588)</b>	<b>Chi-square value</b>	<b>p-value</b>
Awareness	198 (75.6%)	218 (66.9%)	416 (70.7%)	5.314*	0.021
Current information	206 (78.6%)	236 (72.4%)	442 (75.2%)	3.024 <sup>ns</sup>	0.082
Entertainment	138 (52.7%)	199 (61.0%)	337 (57.3%)	4.161*	0.041
Preparing notes	119 (45.4%)	214 (65.6%)	333 (56.6%)	24.19**	< 0.001
Assignments and seminars	169 (64.5%)	248 (76.1%)	417 (70.9%)	9.428**	0.002
Project works	117 (44.7%)	178 (54.6%)	295 (50.2%)	5.746*	0.017
Examination purpose	187 (71.4%)	261 (80.1%)	448 (76.2%)	6.043*	0.014
Free time	1 (0.4%)	--	1 (0.2%)	--	--
No purpose	1 (0.4%)	--	1 (0.2%)	--	--
Relaxation	--	1 (0.3%)	1 (0.2%)	--	--
To get inspired	1 (0.4%)	--	1 (0.2%)	--	--

\*\* Significant at 0.01 level; \* Significant at 0.05 level; ns non-significant at 0.05 level

Chi-square test conducted to determine the gender difference in the purpose of reading. The Chi-square value of 5.314, 4.161, 5.746 and 6.043 and p-value of 0.021, 0.041, 0.017 and 0.014 indicate that there is a significant gender difference in their purpose of reading for awareness, entertainment, project works and examination respectively, since the p-value is less than 0.05. Further the Chi-square value of 24.19 and 9.428 and p-value of <0.001 and 0.002

### *Analysis and Interpretations*

indicate that there is a significant gender difference in the purpose of reading for preparing notes assignment and seminar, as the p-value is less than 0.01. It is noted from the table that female students are dominant in the purposes like reading for project works (54.6%), examination purposes (80.1%), for preparing notes (65.6%), entertainment (61%) and for assignment and seminars (76.1%) compared to male students. The above analysis also reveals that the male students are dominant in the purpose of reading for awareness compared to the female students.

At the same time, the purpose of reading for current information the test produced a p-value of 0.082 which indicate no significant gender association, since it is greater than 0.05. From the above interpretation it is clear that there is a significant gender association in their purpose of reading for awareness, entertainment, for preparing notes, assignments and seminars, project works and for examination purposes. Moreover, the students should always spend time on academic and non-academic reading without any fall. Reading is a fundamental skill for lifelong learning and lifelong reading can be set up through leisure reading.

#### **4.2.5 Factors Encouraged to Read**

Students who reliably read for their own particular interest are often quite competent and are typically high achieving readers. Wigfield and Guthrie (1997) documented that students who are motivated intrinsically spend 300 per cent more time reading than students who have low intrinsic motivation for reading. To determine the factors that encouraged the students to read more, table 9 provides detailed results. Survey results demonstrate that interested subject is the key motivator for reading, being chosen by majority (77.7%) of the students.

**Table 9**  
**Factors Encouraged to Read**

<b>Factors</b>	<b>Male (n=262)</b>	<b>Female (n=326)</b>	<b>Total (n=588)</b>
More free time	85 (32.4%)	90 (27.6%)	175 (29.8%)
Free availability of materials	79 (30.2%)	110 (33.7%)	189 (32.1%)
Interested subjects	201 (76.7%)	256 (78.5%)	457 (77.7%)
Easy availability of materials	90 (34.4%)	118 (36.2%)	208 (35.4%)
Influence of parents & relatives	26 (9.9%)	53 (16.3%)	79 (13.4%)
Interest in reading	156 (59.5%)	211 (64.7%)	367 (62.4%)
Influence of friends	60 (22.9%)	60 (18.4%)	120 (20.4%)
Encouragement from teachers	73 (27.9%)	119 (36.5%)	192 (32.7%)
For academic achievements	148 (56.5%)	225 (69.0%)	373 (63.4%)
others	2 (0.8%)	--	2 (.3%)

Studies in light of reading habits have especially centered on the significance of the advancement of specific strategies to: capitalise on their interest, make reading materials accessible, build conducive environment, allow time to read, give noteworthy adult models and utilise motivational techniques to encourage reading. The following most exceedingly encouraging factor for reading is academic achievement and interest in reading which is reported by more than 60 per cent of the students .

Easy availability of reading materials is one of the vital factors developing reading habits in students, which is reported by nearly 40

### *Analysis and Interpretations*

per cent of the students. Well-trained teachers assume a critical role in encouraging students to read. It is also noticed that more than quarter per cent of the male (27.9%) and nearly 40 per cent of the female (36.5%) students are inspired by their teachers for reading. How students spend their free time can actually have a big impact on their success in the academic life. Thirty per cent of the students consider getting more free time is the encouraging factor for reading.

Reading is not just a solitary activity. Actually the social aspect of reading, such as discussion with friends, guardians and relatives can be an intense motivator. Encouraging informal discussions about reading and books ensure students can express opinions freely, openly and safely. A sum of 120 respondents agreed that influence of friends motivate them to read. On the off chance that parents participate less in their children's reading activities, students tend to spend less time on reading. From the examination it is obvious that just a less number of the students are influenced by their parents for reading.

An imperative implication of this result for encouraging factors or motivation for reading is that when students trust themselves that they are skilled and efficacious at reading, they should be more likely to engage in reading. So the parents, teachers, and librarians must hold hands to develop reading habits in students at this more youthful age. Once the reading habit is shaped at the early age, it is probably going to keep going for a long time.

#### **4.2.6 Reading Style**

Reading is a complex and verbal behaviour. It includes diverse purposes and requires distinctive abilities in handling documents. In the digital environment there was a dramatic change in the reading style of people. In the days prior to this, they had just a few printed books to read and they read them again and again. In today's information intensive environment, browsing or scanning is turning

### *Analysis and Interpretations*

into an important reading style. In spite of the fact that reading pattern can be determined by the material they choose to read, the question clearly indicated that it aimed to acquire a general view. Here the researcher endeavors to understand the different reading styles followed by the students while reading print and digital resources and table 10 illustrates the summary of responses.

**Table 10**  
**Style of Reading**

<b>Reading Style</b>	<b>Print Resources</b>	<b>Digital Resources</b>	<b>Both</b>	<b>No Response</b>
Start from beginning and read to the end	324 (55.1%)	43 (7.3%)	52 (8.8%)	169 (28.7%)
Read quickly	75 (12.8%)	281 (47.8%)	134 (22.8%)	98 (16.7%)
Scan the content and read only the content that interests me	50 (8.5%)	312 (53.1%)	187 (31.8%)	39 (6.6%)
Read the first part and skip to the last part	32 (5.4%)	190 (32.3%)	4 (0.7%)	362 (61.6%)

Printed resources have more clear topography than digital content. A reader can focus or concentrate on a single page of a printed content without losing sight of the whole content. Moreover the reader can feel the thickness of the pages read in one hand and pages to be read on the other. Here, more than fifty per cent (55.1%) of the students opined that they read the printed resources by starting from beginning and read to the end and just a little per cent (7.3%) of the students read the digital resources in a similar style. Nearly fifty per cent (47.8%) of the students specify that they read the digital resources as quickly as possible.

People have a tendency to be selective when they confront an overwhelming amount of information. More than fifty per cent of the students (53.1%) mention that they scan the content in digital text



### *Analysis and Interpretations*

and read only the part that interest to them. Levy (1997) in a study states that in the information abundant world, attention becomes a scarce resource and approximately 78 per cent of the participants report that they read more selectively by scanning the whole content.

The entry of hypertext empowers more non-linear reading (eg. jump). The more links encountered, the more prominent the potential contrasts in reading style. An aggregate of 190 students read the first part and then skip to the last part while engaged in reading digital resources, and only 32 students are following this style while reading print resources. Similar to these findings Tseng (2010) states that printed document encourages readers to begin at the upper left-hand corner and finish at the bottom right-hand corner, however digital resources encourages a completely different reading style. The eyes of readers move in a circular motion as opposed to in a straight line. However in such a nonlinear reading setting, it stays fundamental to sort out the true from the false, reality from fantasy, and to observe cause and effect and to apply critical thinking abilities.

#### **4.2.7 Methods Used for Digital Reading**

The reading procedure is influenced by the medium of presentation though it is extremely hard to evaluate and demonstrate such contrasts empirically. Reading on a digital device is a comfort and convenience, yet for a long while it was dependent on having an active Internet connection. With an expanding number of ways to take content offline, unreliable data connections are less annoying; particularly with regards to activities like reading. It is evident from table 11 that vast majority (97.6%) of the students is likely to read through online. Substantiating these findings, Eden and Eshet-Alkalai (2012) examined the active reading activities of students in a print and digital format, and no significant differences are found between the performances of students in the two configurations.

**Table 11**  
**Methods Used for Digital Reading**

<b>Methods</b>	<b>Male (n=262)</b>	<b>Female (n=326)</b>	<b>Total (n=588)</b>	<b>Chi-square value</b>	<b>p-value</b>
Offline	152 (58.0%)	212 (65.0%)	364 (61.9%)	3.031 <sup>ns</sup>	0.082
Online	258 (98.5%)	316 (96.9%)	574 (97.6%)	1.484 <sup>ns</sup>	0.223
By taking print out	231 (88.2%)	306 (93.9%)	537 (91.3%)	5.952*	0.015

\* Significant at 0.05 level; ns non-significant at 0.05 level

Findings recommended that today's young readers are proficient in digital reading as much as their reading from print, on the grounds that digital reading has turned into an everyday practice among them. Further these variables are subjected to Chi-square test to understand the association between gender and the methods used for digital reading through online and offline mode. The test produced a p-value of 0.223 and 0.082 which indicate no significant association between the variables, since p-value is greater than 0.05.

Chi-square test results also stated that there exists a significant gender difference in the method of taking print out of digital resources for reading, since the p-value is less than 0.05. It is also noticed that compared to male students vast majority of the female (93.9%) students are reading by taking print out of the digital resources. This result is in accordance with the findings provided by Liu (2008), who studied the gender differences in the online environment and found that female students printed out the digital resources more than the male students. Similar findings are reported in a study of gender differences in the online reading environment done by Liu and Huang (2008), which reveals that female readers tend to take print out of electronic documents for reading more frequently than male. But this result is not consistent with the

### *Analysis and Interpretations*

results provided by Shabani et al. (2011) in their study, reading behaviour in digital environments among higher education students of Isfahan University, Iran. Their survey results reveal that both the male and female students are identical towards the frequency of taking print out of digital documents for reading.

Mangen, Walgermo and Bronnick (2013) in a study about reading linear texts on paper versus computer screen conducted among students in Norway, revealed that the students who read on paper scored significantly superior to anything the individuals who read the content on the Web. It was easier for those who read on paper to recall what they had read and furthermore paper gives spatio-temporal markers while reading. Touching paper and turning pages aid the memory, making it less demanding to recollect when something is read. Scrolling on the computer screen makes remembering more troublesome. A survey regarding the reading practices on online academic articles by Rho and Gedeon (2000) revealed that the readers 'overview' the Web based scholastic articles from the screen yet print them out to read.

#### **4.2.8 Frequency of Reading Digital Resources**

Advancement of digital technologies and the growth of the Internet have empowered quick reproduction of information and its worldwide distribution, and have led to the proliferation of information resources, accessible in an awesome assortment of types and formats. As a result, in recent years, information consumers confront a quick development in the availability of digital text in lieu of the printed one, as evident from the proliferation of e-journals, e-books, e-newspapers, and blogs as well as the expansion of e-book readers (Birkerts, 1994; Vaughan, 2002). These digital resources assume prominent role in facilitating access to obliged information to the users in a simple and expeditious manner.

### *Analysis and Interpretations*

The shift towards digital text is likewise clear in the scholarly community, where most texts are read in a digital format these days (Liu, 2005; Ramirez, 2003). Students were asked to indicate the frequency of reading the digital resources and the results are depicted in table 12. It is clear that nearly 40 per cent of the students are always and often read e-journals compared to other digital resources.

**Table 12**  
**Frequency of Reading Digital Resources**

Digital Resources	Responses (n=588)					Index
	Always	Often	Sometimes	Rarely	Never	
E-journals	24 (4.1%)	203 (34.5%)	172 (29.3%)	157 (26.7%)	32 (5.4%)	51.28
E-books	14 (2.4%)	83 (14.1%)	203 (34.5%)	197 (33.5%)	91 (15.5%)	38.61
E-newspapers/ news sites	32 (5.4%)	157 (26.7%)	254 (43.2%)	118 (20.1%)	27 (4.6%)	52.08
E-zines (Electronic magazines)	10 (1.7%)	143 (24.3%)	118 (20.1%)	240 (40.8%)	77 (13.1%)	40.18
E-theses and Dissertations	1 (0.2%)	41 (7%)	152 (25.9%)	277 (47.1%)	117 (19.9%)	30.10
E-research reports	1 (0.2%)	18 (3.1%)	78 (13.3%)	213 (36.2%)	278 (47.3%)	18.15
Databases	3 (0.5%)	132 (22.4%)	266 (45.2%)	168 (28.5%)	18 (3.1%)	47.19

Supporting these findings, Rogers (2001) studied graduate students' use of e-journals, printed journals and databases at Ohio State University (OSU) during the years 1998-2000. Findings of the survey demonstrated that since 1998 there has been a significant advancement in the acceptance and use of e-journals at OSU. High utilisation was attributed to various factors including the freely available access, the ease of use and its currency.

At the same time majority of the students are rarely and never used the e-resources like e-research reports (83%) and e-thesis and

### *Analysis and Interpretations*

dissertations (67%). Similarly, in a study related to the types and frequencies of use of digital resources, Harter and Kim (1996) found that the rate of digital resources use was extremely low, only 1.9 per cent and 0.2 per cent respectively. Inconsistent with these findings, in an earlier study conducted by Knutson and Fowler (2009), e-texts received mixed reviews from students. But still, 75 per cent of college students said they would prefer print to digital texts. It is also noted that half of the students never or rarely used e-books. Interesting enough, Gunter (2005) in a survey about the users in the UK reported that lack of awareness was the top reason cited by students for not using e-books. Meanwhile, going through the results it can be seen that nearly 45 per cent of them sometimes prefer to read e-newspapers (43.2%) and databases (45.2%) respectively.

For each digital resource, a score of 0, 1, 2, 3, and 4 were given to the response never, rarely, sometimes, often and always respectively. Then the index to each resource is calculated by using the given formula

$$Index = \frac{(0f_1 + 1f_2 + 2f_3 + 3f_4 + 4f_5)}{4} \times 100$$

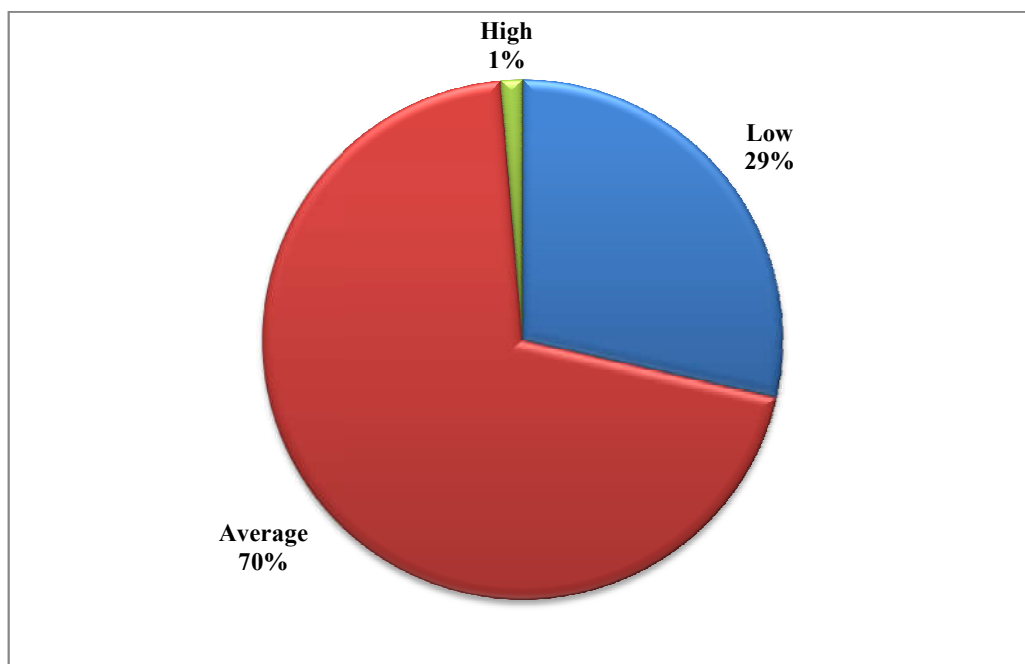
Where

- f<sub>1</sub> = number of respondents responded as never
- f<sub>2</sub> = number of respondents responded as rarely
- f<sub>3</sub> = number of respondents responded as sometimes
- f<sub>4</sub> = number of respondents responded as often
- f<sub>5</sub> = number of respondents responded as always

Based on the index for each resource, frequency of reading each digital resource are assessed as low level with scores less than 33.3, average level in between 33.3 and 66.7 and high level with score greater than 66.7. A total score for frequency of reading digital

### *Analysis and Interpretations*

resources is calculated by adding the scores of statements related to each resource. Then the total score is divided by the maximum expected score (number of statements x 4) and multiplied it by 100 to get index corresponding to the frequency of reading of digital resources. Then this index is classified into three equal classes as mentioned below in the figure 2.



**Figure 2**  
**Level of Frequency of Reading Digital Resources**

It can be inferred from figure that the level of frequency of reading digital resources among the majority (70%) of the students is at an average level. According to Shuling (2007), electronic information has step by step moved toward becoming a major resource in every university library. The development of e-resources has immensely changed information handling and management in scholarly environment and in university libraries in particular.

### *Analysis and Interpretations*

Gakibayo, Ikoja-Odongo and Okello-Obura (2013) argued that though the Internet has given a more extensive access to global information resources such as online databases, e-journals, e-prints and other sources of digital information, these resources are not viably used due to varying factors. For students to utilise the growing range of e-resources they should acquire and practice the skills important to exploit them. Index for frequency of reading digital resources were subjected to Kolmogrov-Smirnov test to test the normality of the variable. Test statistic Kolmogrov-Smirnov Z (2.146) found to be significant, as the p-value is less than 0.01 level. Hence the index subjected to non parametric test for testing the significant difference among the sub samples based on gender and discipline.

Mann-Whitney U-test carried out for comparing the frequency of reading digital resources among the gender and the results are portrayed in table 13. As the p-value is less than 0.01, Z-value is significant, hence rejected the null hypothesis and concluded that there exists a significant gender difference in the frequency of reading digital resources. Mean score for frequency of reading digital resources is higher in male (42.08) than female (37.71) students.

**Table 13**  
**Frequency of Reading Digital Resources (Gender-Wise)**

<b>Gender</b>	<b>N</b>	<b>Mean</b>	<b>Std. Deviation</b>	<b>z-value</b>	<b>p-value</b>
Male	262	42.08	11.32	4.379**	< 0.001
Female	326	37.71	10.46		

\*\* Significant at 0.01 level

Hence it can be concluded that the frequency of reading digital resources is high among the male students than the female students. This finding substantiates past research studies that male are heavier users of digital resources and the Internet and make use of the more complicated services than the female (Teo, 2001; Chong,

### *Analysis and Interpretations*

2002). Contrary to these results, Bar-Ilan, Peritz and Wolman (2003) found that gender have only a minor influence on the use of digital resources.

Kruskal-Walli's ANOVA conducted for comparing frequency of reading digital resources among the three disciplines. From the table 14 given below, it is found that p-value for the test is 0.989 which is greater than 0.05. Hence the test statistic Chi-square is non-significant. Hence accepted the null hypothesis and concludes that there is no significant difference in the frequency of reading digital resources among the students of difference disciplines.

**Table 14**  
**Frequency of Reading Digital Resources (Discipline-Wise)**

<b>Discipline</b>	<b>N</b>	<b>Mean</b>	<b>Std. Deviation</b>	<b>Chi-square value</b>	<b>p-value</b>
Science	191	39.85	12.56	0.023 <sup>ns</sup>	0.989
Humanities	191	39.90	11.55		
Social Science	206	39.25	8.95		

*ns non-significant at 0.05 level*

This finding, in any case is contradicted to the research finding by Bar-Ilan, Peritz and Wolman (2003), and they identified that discipline has a major influence on the use patterns and preferences, and that respondents in Science tend to use the digital resources more intensively than the respondents in the Humanities or Social Science. The skill or ability to find and retrieve information effectively is a valuable ability for future life and for empowering the positive and successful use of the digital resources for students at university (Gakibayo et al., 2013).

Along these lines, libraries must accomplish a position where the acquisition of information aptitude and skills is recognised as one of



### *Analysis and Interpretations*

the key objectives for every student entering the university. Digital resources have many capacities and advantages which can be of immense use to students in university. There is need to outfit end-users with abilities and skills such as information literacy skills, information retrieval skills, and computer skills among others as a strategy to advance reading of digital resource usage especially among the students for effective utilisation of digital resources. On the off chance that students are not motivated and encouraged to read and use the digital resources by their lecturers, and if training to obtain information skill occur outside the curriculum, students will be less likely to make use of digital resources for academic purposes. This requires the university library to set up more effective strategies in its sensitisation and training of end-users (Gakibayo et al., 2013).

#### **4.2.9 Devices Used for Digital Reading**

One can read digital resources or articles on a physical device used primarily for that purpose, for example the Amazon Kindle DX or Apple ipad or one can read digital articles on one's laptop, mobile phone, net book or desktop computer. In a study about electronic versus traditional print textbooks, Rockinson et al. (2013) reported that almost 90 per cent of the students reported accessing their electronic text through a mobile device such as an e-reader, laptop or tablet. There are various advantages to use digital reading devices such as Amazon Kindle DX or the Apple iPad as a supplement or substitute for reading in an academic setting. Most obvious benefit is to lessen the amount of printing and photocopying required as a result of the use of these devices. Another advantage to use digital reading devices is the capacity to carry significantly more material in an extremely reduced package or device. Here the researcher solely

focuses on the devices which are utilised by students for reading digital resources and the results are shown in table 15.

**Table 15**  
**Devices Used for Digital Reading**

<b>Devices</b>	<b>Male (n=262)</b>	<b>Female (n=326)</b>	<b>Total (n=588)</b>	<b>Chi-square value</b>	<b>p-value</b>
Desktop Computer	112 (42.7%)	145 (44.5%)	257 (43.7%)	0.177 <sup>ns</sup>	0.674
Laptop Computer	208 (79.4%)	228 (69.9%)	436 (74.1%)	6.768 <sup>**</sup>	0.009
Tablet	42 (16.0%)	31 (9.5%)	73 (12.4%)	5.681 <sup>*</sup>	0.017
Mobile Phone	200 (76.3%)	246 (75.5%)	446 (75.8%)	0.061 <sup>ns</sup>	0.805
E- Reader	10 (3.8%)	10 (3.1%)	20 (3.4%)	0.248 <sup>ns</sup>	0.618
Net book/Notebook Computer	9 (3.4%)	19 (5.8%)	28 (4.8%)	1.834 <sup>ns</sup>	0.176

*\*\* Significant at 0.01 level; \* Significant at 0.05 level; ns non-significant at 0.05 level*

On the whole, it is revealed that for digital reading, majority of the students use mobile phone (76%) and laptop computers (74.1%) which indicate that electronic publication devices such as, e-reader, iPad or tablet are still not popular among them for digital reading. This is consistent with the findings by Saaid and Wahab (2014), who found that majority of students, used laptop to read digital-based materials.

It is clear from the analysis that more than 40 per cent of the students use desktop computer for reading digital resources. Further it is also noticed that only a small per cent of the students use e-book reader and net book computer for digital reading. The general

### *Analysis and Interpretations*

consensus among the current literature is that e-readers such as Kindle DX or Apple iPad do in fact have constrained specific advantages in an academic setting when utilised exclusively as a substitute for conventional printed version. The literature supports the notion that e-reader technology is not appropriate for university students to use as a textbook substitution (Tees, 2010).

Further these variables are subjected to Chi-square test to evaluate the significance of answers given by the students. The Chi-square value and p-value in the table indicate that there exists no significant gender difference in the use of digital reading devices like desktop computer, mobile phone, e-book reader and net book computer, since the p-value is greater than 0.05. Further the results also reveal that there exists significant gender difference in the use of laptop computer for digital reading, since the p-value is less than 0.01.

It is additionally seen that, there also exists a significant gender difference in the use of tablet for reading digitally, since the p-value is less than 0.05. Compared to female students more than three fourth of male students (79.4%) use laptop for digital reading and in the case of tablet also male students prefer it more than female students. The digital world of reading is developing at a fast pace and the benefits and uses of these reading devices in an academic setting are as yet being revealed. The current literature claims that e-readers and the use of digital reading devices is not exactly a worthy substitute for reading conventional scholastic books and “hard copy” articles. Consistent with these Nielsen (2010) in a study reveals that compared to print, iPad readers were 6.2 per cent and Kindle readers were 10.7 per cent slower. Indeed, even with the current limitations of these devices in an academic setting, there are unquestionably numerous positive results associated with the use of these devices.

### **4.3. Digital Reading Competency**

Tremendous advancements in Information Technology and its inculcation into almost all spheres demand an advanced level of computing skills among individuals. The computer provides flexibility, speed and accuracy, and it improves effectiveness and efficiency. In advanced societies, basic computing knowledge is currently viewed as essential for all citizens. Computers have turned out to be so strongly integrated into the social infrastructure of these societies that a person without sufficient computing skills would feel an alien in that society. The stunning technological advancements have opened new horizons for information, creation, duplication, storage, access, distribution, and presentation.

Digitisation of information is bringing about access to a mind blowing volume of information. Obviously information from electronic sources cannot be accessed in the same manner as printed sources were consulted previously. Adequate knowledge about computers and retrieval techniques are desirable to adequately and effectively search these electronic information sources.

Reading on the screen is turning into an absolute necessity as a result of the rapidly developing information technologies; because the texts are transferred to the computer pages and they are published through computers. Consequently, it could be asserted that hypertexts will take place more in educational settings in the next years. As indicated by Lee and Tedder (2003) hypertext technology help the readers to control the presentation of information. Hypertexts, in the meantime, are recommended as they let the students to navigate and make the reading comprehension easier. With expanding rapid knowledge transfer and technological diversity becoming a worldwide phenomenon, it is fundamental to analyse

### *Analysis and Interpretations*

whether students have similar digital literacy skills, similar to those expected of digital natives, to perform task effectively in a knowledge based society with digital information and meanings represented in multimodal forms.

From this perspective, the researcher tried to analyse the digital literacy competence of the students for reading and to effectively access and use digital texts for obtaining information. Students who possess higher education and digital literacy skills will most likely have the capacity to retrieve more pertinent and useful information, which will then be translated into academic, commercial, political and social advantages.

#### **4.3.1 Experience of Use of Computer**

Computer literacy has been a subject of educational research since personal computers were introduced to the classroom, either as teaching aids or as tools for self-study. Profoundly experienced and skilled students are supposed to possess general knowledge about structures and functionalities in computer environments that helps the students in locating, accessing, and managing information while reading from screen. In a study led by Kol and Schcolnik (2000) to determine the applicability of students reading skills and strategies when reading from the screen, it was found that inexperienced computer users could neither scan nor skim texts effectively on the screen. Researcher here tried to understand the student's experience to use computer in the context of gender differences and the results are displayed in table 16.

**Table 16**  
**Experience of Use of Computer**

<b>Experience (in years)</b>	<b>Male</b>	<b>Female</b>	<b>Total (n=588)</b>
Less than one year	10 (3.8%)	20 (6.1%)	30 (5.1%)
1-3 years	81 (30.9%)	113 (34.7%)	194 (33.0%)
4-6 years	85 (32.4%)	102 (31.3%)	187 (31.8%)
7-9 years	46 (17.6%)	41 (12.6%)	87 (14.8%)
More than 9 years	40 (15.3%)	50 (15.3%)	90 (15.3%)
Total	262 (100%)	326 (100%)	588 (100%)
Chi-square = 4.645 <sup>ns</sup> ; p-value = 0.326			

*ns non-significant at 0.05 level*

It is revealed that, a total of 33 per cent of the students have a computer experience of 1-3 years and 32 per cent of them have an experience of 4-6 years. In the mean time, about 15 per cent of the students have a good experience in the use of computer, i.e., 7-9 years and more than 9 years. To test the significance of variable comprising gender and their experience of use of computer, Chi-square test done and found that there is no significant association between the variables.

Substantiating to these results, Sacks, Bellisimo and Mergendoller (1993) in a study of high school students found that there was a significant gender difference in their attitudes towards computer and their computer use and this difference however tended to diminish with computer experience. Other studies have found similar results: Dyck and Smither (1994) mentioned in their study that when the

### *Analysis and Interpretations*

effects of computer experience were controlled, there were no gender effects.

Many studies have recommended that use of electronic information sources could upgrade effectiveness, efficiency, and the quality of education. In this respect, computer literacy of students and their ability to quickly access vital information can assist them in benefiting from this gigantic volume of digital information. It might enhance the quality and furthermore encourage the students to use these e-resources for their assignments and projects (Majid & Abazova, 1999). Probably the long duration of computer use helped to improve the computing skills of students. So the researcher tried to understand the discipline-wise analysis of experience of computer use and the tabulated results are shown in table 17.

**Table 17**  
**Experience of Use of Computer (Discipline-Wise)**

<b>Experience (in years)</b>	<b>Science</b>	<b>Humanities</b>	<b>Social Science</b>
Less than one year	11 (5.8%)	12 (6.3%)	7 (3.4%)
1-3 years	52 (27.2%)	71 (37.2%)	71 (34.5%)
4-6 years	71 (37.2%)	49 (25.7%)	67 (32.5%)
7-9 years	30 (15.7%)	30 (15.7%)	27 (13.1%)
More than 9 years	27 (14.1%)	29 (15.2%)	34 (16.5%)
Total	262 (100%)	326 (100%)	588 (100%)
Chi-square = 9.942 <sup>ns</sup> ; p-value = 0.269			

*ns non-significant at 0.05 level*

### *Analysis and Interpretations*

Chi-square test statistics results reveal that there exists no significant discipline-wise difference in the experience of use of computer, since the p-value is greater than 0.05 (Chi-square=9.942;  $p=0.269 > 0.05$ ). This suggests that the students from three disciplines have almost equal experience of use of computer.

#### **4.3.2 Computer Related Course Attended**

Today, computer technology is integrated into relatively all aspects of learning in advanced education. While the world keeps on progressing with smarter, faster technology, the need to be computer literate turns out to be more imperative. As Leu (2000) pinpointed, literacy is rapidly and persistently changing as new technologies for information and communication over and over again appear and new situations for exploring these technologies are constantly created by users. End users with better computing aptitudes will probably benefit from the ever increasing volume of digital information.

As Kern (2006) emphasised, computers not only offer instruction, feedback, and testing in grammar, vocabulary, writing, pronunciation, and other dimensions of language and culture learning, additionally provide ready access to written, audio, and visual materials as well as references. These new advancements not only influence students' learning and studying, it affects their reading behaviours as well. Attempt made to find out whether they have attended any computer related courses and the responses received from the respondents are tabulated in table 18.



**Table 18**  
**Computer Related Course Attended**

<b>Computer Course Attended</b>	<b>Male</b>	<b>Female</b>	<b>Total (n=588)</b>
Yes	175 (66.8%)	213 (65.3%)	388 (66.0%)
No	87 (33.2%)	113 (34.7%)	200 (34%)
Total	262 (100%)	326 (100%)	588 (100%)
Chi-square = 0.137 <sup>ns</sup> ; p-value = 0.711			

*ns non-significant at 0.05 level*

However, Chi-square test results shows that there is no significant gender difference in attending the computer courses, since the p-value is greater than 0.05. This reveals gender did not have a significant relationship with the attendance of computer related courses.

Variations in computer skills can create disparities in educational development. It can infer that students with a high self-efficacy in regard to computers would also be more likely to explore new technologies, software or databases. They would probably explore a Website and find specialised resources, and they may even attempt some inquiries on those resources, without or with less, prompting from professors and/or librarians and without necessarily taking library workshops (Waldman, 2003). From the result exhibited in table 19, it is found that a good number of the students from three disciplines have attended the computer courses.

**Table 19**  
**Computer Related Course Attended (Discipline-Wise)**

<b>Computer Course Attended</b>	<b>Science</b>	<b>Humanities</b>	<b>Social Science</b>
Yes	129 (67.5%)	121 (63.4%)	138 (67%)
No	62 (32.5%)	70 (36.6%)	68 (33%)
Total	262 (100%)	326 (100%)	588 (100%)
Chi-square = 0.889 <sup>ns</sup> ; p-value = 0.614			

*ns non-significant at 0.05 level*

Through Chi-square test it is clear that there is no significant association between the variables, since the p-value is 0.614 which is greater than 0.05. Thus it can be concluded that, since the percentage of difference between three disciplines is small, indicating no differences in discipline with regard to computer course attended.

#### **4.3.3 Level of Competency to Use Computer and other Digital Devices**

Information Technology is developing quickly and the world relies upon computers and other digital gadgets in the surge toward globalisation and it has equally penetrated the field of education. Students have changed to engage the recent technologies. Computer, Internet and digital devices assume a noteworthy role in the way readers are reading around the world and serve perhaps as the most comprehensive source of input (Leu, 2002). Sufficient knowledge and skill about computer and other digital devices are desirable to effectively search these electronic information sources.

### *Analysis and Interpretations*

Students asked to indicate their level of competency in the following computer and digital devices and the results are given in table 20. According to the assessment, 44.9 per cent of the students have high competency in desktop computer and nearly fifty per cent of them have high competency in laptop computer. Not surprisingly nearly 50 per cent of the students have very high competency in mobile phone. Nearly 40 per cent of the students stated that they have moderate competency in devices like scanner (39.6%), LCD/multimedia projector (39.3%), net book computer (39.1%), tablet (37.9%) and iPad (35.5%). More than 40 per cent of them have moderate competency in the use of printer (45.2%) and low competency in the use of e-reader (41.5%).

**Table 20**  
**Level of Competency to Use Computer and other Digital Devices**

Devices	Responses (n=588)				
	Very Low	Low	Moderate	High	Very High
Desktop Computer	--	6 (1.0%)	237 (40.3%)	264 (44.9%)	81 (13.8%)
Laptop Computer	--	12 (2.0%)	211 (35.9%)	278 (47.3%)	87 (14.8%)
Net book/ Notebook Computer	80 (13.6%)	177 (30.1%)	230 (39.1%)	82 (13.9%)	19 (3.2%)
Tablet	56 (9.5%)	127 (21.6%)	223 (37.9%)	146 (24.8%)	36 (6.1%)
Mobile Phone	1 (0.2%)	5 (0.9%)	43 (7.3%)	260 (44.2%)	279 (47.4%)
E-Reader	114 (19.4%)	244 (41.5%)	182 (31%)	39 (6.6%)	9 (1.5%)
I-Pad	116 (19.7%)	197 (33.5%)	209 (35.5%)	54 (9.2%)	12 (2%)
Printer	50 (8.5%)	135 (23%)	266 (45.2%)	118 (20.1%)	10 (3.2%)
Scanner	61 (10.4%)	182 (31%)	233 (39.6%)	95 (16.2%)	17 (2.9%)
LCD/Multimedia Projector	57 (9.7%)	167 (28.4%)	231 (39.3%)	113 (19.2%)	18 (3.1%)

### *Analysis and Interpretations*

Goldhammer, Naumann, and Keibel (2013) found solid positive relations between basic computer skills and digital reading for the German sample of the PISA 2009 field test. Basic computer skills accounted for 38 per cent of the variance in digital reading. Technological progressions have therefore made new opportunities and in addition posed new challenges for individuals, forcing them to acquire the essential skills to benefit from these advancements.

#### **4.3.3.1 Score for Level of Competency to Use Computer and other Digital Devices**

A score for level of competency to use computer and other digital devices is calculated by adding the scores of level of competency to each digital device. For each device, a score of 0, 1, 2, 3, and 4 were given to the response very low, low, moderate, high and very high respectively. As there are 10 devices total score of competency ranges in between 0 to 40. This expected range is divided into three groups. Low level with scores ranges in between 0 to 12, medium level with scores ranges in between 13 to 26 and high level with scores ranges in between 27 to 40. Classification according to the level of competency is given below in Table 21.

As far as the level of competency to use computer and other devices are concerned, it clearly shows that majority (73.1%) of the students have a medium level of competency in computer and digital devices. According to Bennett, Maton and Kervin (2008) majority of youths today are digital natives due to their constant exposure to digital technologies like computers, mobile phones, video games and the Internet. However, studies indicate despite the students' reliance on technology to collect information and communicate, a significant number of them do not appear to use or possess the skills that expect the digital natives to have. Going through the results, a high level of competency is noted only among 106 students and

### *Analysis and Interpretations*

comparatively a small per cent of the respondents stated low level of competency to use computer and other digital devices.

Brown (2001) stated that, methods and skills being used in reading printed texts may become ineffective during on-screen reading. That is why methods and skills that affect on-screen reading comprehension positively are needed. Gender has become a significant issue identified with the use of computer and other digital devices. From this viewpoint, the researcher attempted to identify the gender wise difference in the level of competency to use computer and other digital devices and the results are depicted in table 21.

**Table 21**  
**Level of Competency to Use Computer and other Digital Devices**  
**(Gender-Wise)**

Level of Competency	Responses (n=588)		
	Male	Female	Total
Low	6 (2.3%)	46 (14.1%)	52 (8.84%)
Medium	176 (67.2%)	254 (77.9%)	430 (73.12%)
High	80 (30.5%)	26 (8.0%)	106 (18.02%)
Total	262 (100%)	326 (100%)	588 (100%)
Mean ± SD	23.30 ± 5.73	18.20 ± 5.51	
Chi-square = 66.246** ; p-value < 0.001			

\*\* Significant at 0.01 level

The Chi-square value is found to be significant, since the p-value is less than 0.01. Hence null hypothesis is rejected and accepted that there is significant gender difference in the level of competency to use computer and other digital devices. As per the results, compared to male students, majority of the female (77.9%) students reported that they have medium level of competency to use computer and other

### *Analysis and Interpretations*

digital devices. A high level of competency is reported by more number of male students than female students.

These findings are consistent with the study results of Chen (1986), Campbell (1989) and Shashaani (1994), they claimed that male students compared with their female peers, had more access to computers, felt more confident with their computer skills and showed more positive attitude toward computers. Meanwhile it is revealed that compared to male students a good number of the female students have low level of competency in digital devices. Mean score for level of competency in digital devices is higher in male (23.30) than female (18.20). Hence it can be concluded that the competency in computer and digital devices is higher in male students compared to female students.

Use of technology can upgrade and enhance the acquisition of knowledge and skills, and learning with and about technology is essential for students to gain the skill and competencies to function well in a 21st century society and workforce (Moeller & Reitzes, 2011). Here the researcher tried to compare the discipline-wise difference in the level of competency to use computer and other digital devices and the results are given in table 22.

**Table 22**  
**Level of Competency to Use Computer and other Digital Devices**  
**(Discipline-Wise)**

<b>Level of Competency</b>	<b>Science</b>	<b>Humanities</b>	<b>Social Science</b>
Low	17 (8.9%)	21 (11%)	14 (6.8%)
Medium	141 (73.8%)	135 (70.7%)	154 (74.8%)
High	33 (17.3%)	35 (18.3%)	38 (18.4%)
Total	191 (100%)	191 (100%)	206 (100%)
Mean $\pm$ SD	20.54 $\pm$ 6.14	19.73 $\pm$ 6.41	21.10 $\pm$ 5.87
Chi-square = 2.309 <sup>ns</sup> ; p-value = 0.679			

*ns non-significant at 0.05 level*

### *Analysis and Interpretations*

By applying the statistical Chi-square test, here the researcher found that there is no significant association between discipline and level of competency to use computer and digital devices (Chi-square=2.309;  $p=0.679>0.05$ ). Mean score for level of competency to use computer and other digital devices in three discipline is almost equal, (Science=6.14, Humanities=6.41, Social Science=5.87). Thus it can be concluded that association between discipline and level of competency to use computer and other digital devices is statistically non-significant. Opposed to these findings, Margaryan, Littlejohn and Vojt (2011) found that the younger digital native students and students from technical disciplines have high expertise and used more technology tools compared with older digital immigrant students and students from non-technical disciplines.

The knowledge, expertise and confidence with computer and other advanced digital devices are currently a benefit for students whose aim is to utilise an assortment of information sources in the digital environment. Today the university provides a platform for excellence in learning, teaching and administration. Information Technology is broadly utilised as a part of university contributing to the development of well-trained graduate, post-graduate and doctoral students to fulfill the manpower need of the corporate world. Table 23 shows the result of university-wise comparison of level of competency to use computer and other digital devices among the students.

The Chi-square value of 14.073 and p-value of 0.029 makes it clear that there is a significant association at 0.05 level between the universities and the level of competency to use computer and other digital devices.

**Table 23**  
**Level of Competency to Use Computer and other Digital Devices**  
**(University-Wise)**

Level of Competency	Responses (n=588)			
	Kerala	Calicut	M.G.	Kannur
Low	16 (9.1%)	5 (4.5%)	17 (12.1%)	14 (8.6%)
Medium	122 (69.7%)	77 (69.4%)	104 (74.3%)	127 (78.4%)
High	37 (21.1%)	29 (26.1%)	19 (13.6%)	21 (13%)
Total	175 (100%)	111 (100%)	140 (100%)	162 (100%)
Chi-square = 14.073* ; p-value = 0.029				

\* Significant at 0.05 level

Results clearly shows that compared to other universities more than quarter of the students in the University of Calicut have high competency to use computer and other digital devices. Majority (78.4%) of the students in Kannur University and 69 per cent of the students of Kerala and Calicut University have a medium level of competency in digital devices. Low level of competency is stated by 12.1 per cent of the students in Mahatma Gandhi University.

#### **4.3.4 Level of Competency in Digital Reading**

Literacy practices mediated by digital technology include interaction with resources in a wide range of methods of representation which requires multiple literacy skills. Users are engaged in interpreting varied contexts of meaning and need to rely on different competencies. This implies meaningful information is not displayed in a single way, but rather introduced in multimodal ways (Shariman, Razak & Noor, 2012). The skill or ability to read and write in today's digital environment incorporates encoding and decoding digital texts.



### *Analysis and Interpretations*

In light of this view a person who is digitally competent must have the awareness, attitude and ability to identify access, manage, integrate, evaluate, analyse and synthesise digital resources and contents, construct new knowledge, create media expressions, and communicate with others with regard to particular life situations. According to Coiro et al. (2008), what it means to be literated has evolved from having the competence to access, evaluate and understand static printed texts to being able to access, locate, evaluate, understand and utilise a powerfully rich variety of digital texts accessible through the Internet.

To become competent in the new literacy skills, methodologies and dispositions, it is important for today's readers to succeed in their digital reading activities. At first, digital texts in the form of e-readers may appear like a representation of traditional texts on a screen; in any case, e-readers have various functions that allow students to interact and manipulate the text which requires an alternate arrangement of strategies than reading conventional print texts. Four tools accessible on e-readers are: the ability to adjust font size, the text-to-speech feature, a built-in dictionary, and the ability to take notes. These components are accessible, however, students need to be taught how and when to use the tools to enhance their reading experience (Larson, 2010). The study here attempted to find out the level of digital reading competency among the students and the results are displayed in table 24.

From the results, it is noticed that more than 40 per cent of the students have high level of competency in the digital skills like changing the monitor brightness and contrast, font size and style, to copy, cut, paste or delete text, for searching information online using search engine, for sending and reading e-mails, to download and save files, to use social networking sites and for tracing on screen with finger or mouse to identify titles or words.

**Table 24**  
**Level of Competency in Digital Reading**

Digital Reading Competency	Responses (n=588)				
	Very Low	Low	Moderate	High	Very High
To create a basic text document	9 (1.5%)	196 (33.3%)	225 (38.3%)	157 (26.7%)	1 (0.2%)
To change monitor brightness and contrast	1 (0.2%)	28 (4.8%)	173 (29.4%)	240 (40.8%)	146 (24.8%)
To change font size and font style in a document	--	14 (2.4%)	138 (23.5%)	242 (41.2%)	194 (33%)
To copy, cut, paste or delete text in a document	--	13 (2.2%)	109 (18.5%)	239 (40.6%)	227 (38.6%)
To transfer files between computer and other digital devices	3 (0.5%)	55 (9.4%)	157 (26.7%)	224 (38.1%)	149 (25.3%)
To use a web browser	1 (0.2%)	41 (7.0%)	155 (26.4%)	223 (37.9%)	168 (28.6%)
To search for information online with search engines	2 (0.3%)	11 (1.9%)	131 (22.3%)	256 (43.5%)	188 (32%)
For sending/reading e-mails	2 (0.3%)	20 (3.4%)	110 (18.7%)	245 (41.7%)	211 (35.9%)
To download and save files from the web	1 (0.2%)	16 (2.7%)	137 (23.3%)	237 (40.3%)	196 (33.3%)
To use storage devices (CD,DVD, flash memory)	--	50 (8.5%)	203 (34.5%)	215 (36.6%)	120 (20.4%)
To convert documents to PDF format	16 (2.7%)	145 (24.7%)	260 (44.2%)	133 (22.6%)	34 (5.8%)
To use comment/highlight function when reading PDF files	22 (3.7%)	158 (26.9%)	275 (46.8%)	110 (18.7%)	23 (3.9%)
To use search/find function when reading PDF files	15 (2.6%)	101 (17.2%)	268 (45.6%)	167 (28.4%)	37 (6.3%)
To use Social Networking Sites (eg. Face book)	7 (1.2%)	29 (4.9%)	106 (18%)	244 (41.5%)	202 (34.4%)
To use social bookmarking (eg. Delicious, Diigo)	98 (16.7%)	244 (41.5%)	193 (32.8%)	46 (7.8%)	7 (1.2%)
To locate and read blogs	68 (11.6%)	174 (29.6%)	216 (36.7%)	115 (19.6%)	15 (2.6%)

### *Analysis and Interpretations*

To use Really Simple Syndication (RSS) and feed readers (Google Reader, Blog lines) to manage feeds	107 (18.2%)	256 (43.5%)	173 (29.4%)	43 (7.3%)	9 (1.5%)
To use any kind of anti-virus and anti-spam software	27 (4.6%)	111 (18.9%)	214 (36.4%)	183 (31.1%)	53 (9%)
For scanning, scrolling, searching--using menu bars and keywords	2 (0.3%)	39 (6.6%)	178 (30.3%)	231 (39.3%)	138 (23.5%)
To use hyperlinks in Websites and online interfaces for navigation	13 (2.2%)	108 (18.4%)	228 (38.8%)	162 (27.6%)	76 (12.9%)
For tracing on screen with finger or mouse to identify titles or words	1 (0.2%)	26 (4.4%)	149 (25.3%)	246 (41.8%)	166 (28.3%)
To use online dictionaries	5 (0.9%)	69 (11.7%)	206 (35%)	196 (33.3%)	112 (19%)
For relating and comparing one digital content site to other known digital content site	30 (5.1%)	178 (30.3%)	257 (43.7%)	100 (17%)	23 (3.9%)
For identifying main ideas and background knowledge of digital content site	23 (3.9%)	173 (29.4%)	264 (44.9%)	111 (18.9%)	17 (2.9%)
For downloading e-books and audio books and performs troubleshooting on e-readers and other handheld reading devices	66 (11.2%)	261 (44.4%)	187 (31.8%)	63 (10.7%)	11 (1.9%)
To evaluate web -based content sites for quality and credibility	34 (5.8%)	184 (31.3%)	256 (43.5%)	105 (17.9%)	9 (1.5%)
To manipulate and store information and content for easier retrieval	9 (1.5%)	86 (14.6%)	270 (45.9%)	191 (32.5%)	32 (5.4%)
To use variety of search strategies (keyword, Boolean operators, phrase searching)	11 (1.9%)	65 (11.1%)	244 (41.5%)	229 (38.9%)	39 (6.6%)

Meanwhile it is revealed that nearly 40 per cent of the respondents have high level of competency in the skills like transferring files

### *Analysis and Interpretations*

between computer and other digital devices, to use a Web-browser, storage devices and also for scanning, scrolling, searching using menu bars and keywords.

From a cognitive view on the use of ICT, students require skills in assessing the online information to be successful in digital reading. Evaluating digital information depicts students' abilities to use structural and message-based features of hyperlinks and their corresponding Web pages to judge the relevance, credibility, and utility of sources when looking for information on the Web (Goldhammer et al., 2013).

It shows that a medium level of competency is reported by more than 40 per cent of the students in the digital skills like converting documents to PDF format, to use comment/highlight function and search or find function when reading PDF files, for relating and comparing one digital content site to other known digital content site, identifying main ideas and background knowledge of digital content site, to evaluate Web-based content site for quality and credibility, to manipulate and store information and content for easy retrieval and also to use a variety of search strategies. A noteworthy issue however identified by Egberongbe (2011), are lack of information retrieval skills for exploiting digital resources, accordingly making the level of usage of resources by students extremely low. Hypertexts oblige readers to settle on efficient decisions about which information could possibly add to their reading goal and should therefore be processed.

Coiro and Dobler (2007) observed that students applied a set of strategies particular to reading digital texts and these strategies include scanning and skimming pages in search of relevant information and using hyperlinks to predict upcoming text material. Evaluating online information comprises strategies with respect to decisions, such as whether a certain hyperlink ought to be clicked

### *Analysis and Interpretations*

upon or whether the content of an accessed Web page should be processed in-depth. Giving guidance on following particular hyperlinks can enhance their hypertext comprehension.

Similarly nearly 40 per cent of them also have medium competency in the activities like creating a basic text document, to locate and read blogs, to use any kind of anti-virus and anti-spam software, to use hyperlinks in Websites, and to use online dictionaries. A low level of competency is also found among nearly 45 per cent of the students in the skills to use social book marking, to use Really Simple Syndication (RSS) and feed readers and also for downloading e-books and audio books and to perform trouble shooting on e-readers.

Hahnel et al. (2016) demonstrated that both linear reading and essential computer skills predicted digital reading significantly. Also they stated that basic computer skills were identified with students' navigation behaviour. As indicated by them the probability of students' accomplishment in digital reading tasks ascended with higher values in basic computer skills, however, increased significantly more when students also visited more task-relevant pages. This interaction may likewise interpret in that students showed more effective information management when they possessed better basic computer skills.

Index of competency for each aspect is worked out with the formula given below

$$Index = \frac{(0f_1 + 1f_2 + 2f_3 + 3f_4 + 4f_5)}{4N} \times 100$$

Where

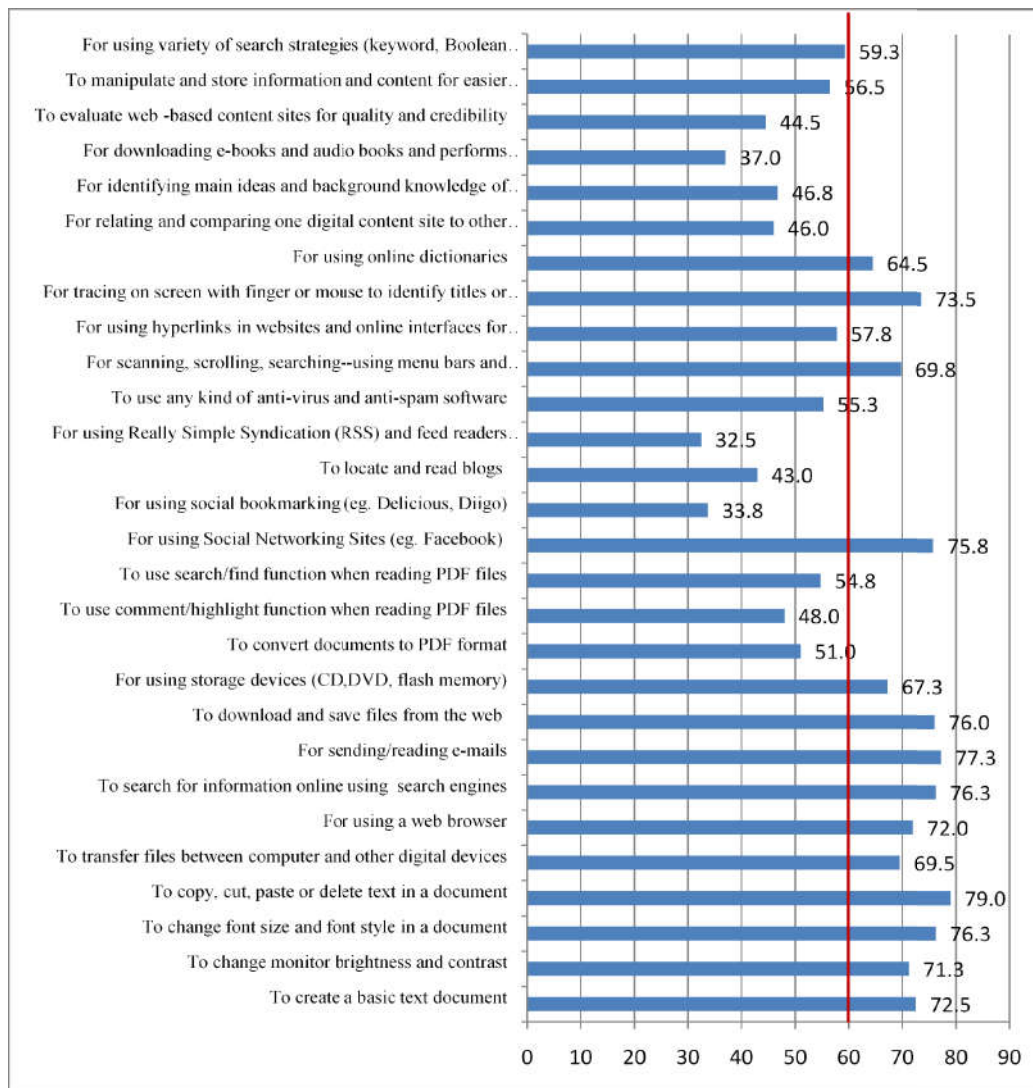
f<sub>1</sub> = number of respondents responded as very low

f<sub>2</sub> = number of respondents responded as low

*Analysis and Interpretations*

- f<sub>3</sub> = number of respondents responded as moderate
- f<sub>4</sub> = number of respondents responded as high
- f<sub>5</sub> = number of respondents responded as very high

Figure 3 shows the digital reading competency of the students in the four selected universities.



**Figure 3**  
**Level of Competency in Digital Reading**

### *Analysis and Interpretations*

From the figure it can be clearly seen that the digital reading competency of the students is at an average level. Figure also gives an outline of how students score on all 28 measures of skills. The red line in the figure shows average digital skills in the population (60.2%).

The population all in all scores highest on to copy, cut, delete or paste text in a document (79%), followed by sending/reading e-mail (77.3%), for searching information online by using search engine and to change font size and font style in a document (76.3%). As regards to use comment/highlight function when reading PDF files (48%), for identifying main ideas and background knowledge of digital content site (46.8%), for relating and comparing one digital content site to other known digital content site (46%) and to evaluate Web-based content sites for quality and credibility (44.5%), competency appears to be more limited. Students need to know how to sort through the vast amount of available information and figure out what is reliable.

Notwithstanding having the ability to distinguish between reliable/nonreliable and useful/nonuseful information, students additionally need to learn how to decode Internet text. Educators of reading traditionally utilise the term “decode” to refer to using knowledge of phonics, letter and sound relationships, to sound out words. In new literacies, decoding takes on a new meaning; students must figure out how to explore and navigate the Internet sites and decode the strategic use of colour; different clues that indicate hyperlinked texts and graphics; the possible actions of meaning-bearing icons and animations; pictures, maps, charts, and graphics that are not static, but rather that can change to address questions that an interactive reader can pose to informational text during the reading act (Leu et al., 2004). These tasks may be great degree troublesome for students who struggle with reading print text since

### *Analysis and Interpretations*

they may not have the “reading speed and critical reading habits that are essential for effective reading on the Internet” (Leu et al., 2008).

As a whole, the students have the least experience in downloading e-books and audio books (37%), to use social bookmarking (33.8%), and to use RSS (32.5%). Student’s engagement with digital media in their day-to-day life is turning into a focal part, which gives more open doors in the form of informal learning. Reading skills measured with linear text are supposed to influence student’s navigational decisions and subsequently their comprehension of digital text. Linear reading enables readers to distinguish and relate essential thoughts in texts, and to monitor their own comprehension progress. In this manner, readers who are competent in reading linear text are relied upon to interpret and connect critical thoughts displayed on nodes in the hypertext, and to reread particular pages in the event that they recognise gaps in their comprehension. In contrast, less skilled readers may have issues in extracting important facts from Web pages, relating fundamental ideas between different pages, or making inferences based on the connections between text information, background knowledge, and their reading goal. Subsequently, they might select pages less adequately and effectively than able readers, leading to restricted hypertext comprehension (Hahnel et al., 2016).

Past studies, reviews and stereotypes argue that gender difference exist in digital competency. Male are heavier computer users and they tend to be more inspired and interested in ICT, Consequently, male outperform female in their digital competence (He et al., 2016). Earlier research revealed that digital competence assumes an imperative role in adopting digital technologies for reading. But few studies research the role of gender on student’s digital reading competency.



### *Analysis and Interpretations*

Table 25 sought to determine, whether there exists any gender difference in the digital reading competency of the students. Index of competency is compared between male and female with Mann-Whitney U-test, a non-parametric statistical test. Z-value is found to be significant either at 0.05 level or at 0.01 level. This shows that there exists a significant gender difference in the level of competency in digital reading. It is worth mentioning that the male students are comparatively more competent than the female students in all the activities related to digital reading competency. On whether there was equality in between the male and female in their competency related to activities in computer for digital reading, Houtz and Gupta (2001) found significant gender differences in the way female and male rated themselves in their ability to computer technology skills.

**Table 25**  
**Level of Competency in Digital Reading (Gender-Wise)**

Aspects	Index of Competency		Z-value	P-value	Overall
	Male	Female			
To create a basic text document	81.58%	68.48%	5.61**	<0.001	74.32
To change monitor brightness and contrast	76.05%	67.56%	4.87**	<0.001	71.34
To change font size and font style in a document	78.34%	74.46%	2.35*	0.02	76.19
To copy, cut, paste or delete text in a document	80.92%	77.30%	2.05*	0.04	78.91
To transfer files between computer and other digital devices	73.09%	66.79%	2.94**	<0.001	69.60
To use a web browser	75.57%	69.02%	3.48**	<0.001	71.94
To search for information online with search engines	79.01%	74.00%	3.08**	<0.001	76.23
For sending/reading e-mails	81.77%	73.77%	4.61**	<0.001	77.34
To download and save files from the web	79.79%	73.01%	3.83**	<0.001	76.02
To use storage devices (CD,DVD, flash memory)	73.95%	61.81%	6.50**	<0.001	67.22

*Analysis and Interpretations*

To convert documents to PDF format	58.30%	45.17%	7.28**	<0.001	51.02
To use comment/highlight function when reading PDF files	53.91%	43.33%	5.76**	<0.001	48.04
To use search/find function when reading PDF files	60.31%	50.15%	5.31**	<0.001	54.68
To use Social Networking Sites (eg. Face book)	81.49%	71.09%	5.32**	<0.001	75.72
To use social bookmarking (eg. Delicious, Diigo)	42.08%	27.22%	8.27**	<0.001	33.84
To locate and read blogs	53.63%	34.43%	9.60**	<0.001	42.98
To use Really Simple Syndication (RSS) and feed readers (Google Reader, Blog lines) to manage feeds	38.36%	27.99%	5.85**	<0.001	32.61
To use any kind of anti-virus and anti-spam software	64.22%	48.08%	7.91**	<0.001	55.27
For scanning, scrolling, searching--using menu bars and keywords	76.53%	64.26%	6.72**	<0.001	69.73
To use hyperlinks in Websites and online interfaces for navigation	65.55%	51.31%	6.96**	<0.001	57.67
For tracing on screen with finger or mouse to identify titles or words	79.87%	68.17%	6.60**	<0.001	73.38
To use online dictionaries	71.09%	59.20%	5.99**	<0.001	64.50
For relating and comparing one digital content site to other known digital content site	54.10%	39.65%	7.88**	<0.001	46.09
For identifying main ideas and background knowledge of digital content site	52.77%	42.10%	6.17**	<0.001	46.85
For downloading e-books and audio books and performs troubleshooting on e-readers and other handheld reading devices	41.89%	32.90%	4.96**	<0.001	36.90
To evaluate web -based content sites for quality and credibility	52.39%	38.19%	7.99**	<0.001	44.52
To manipulate and store information and content for easier retrieval	63.17%	51.00%	6.98**	<0.001	56.42
To use variety of search strategies (keyword, Boolean operators, phrase searching)	67.37%	52.91%	8.38**	<0.001	59.35

\*\* Significant at 0.01 level; \* Significant at 0.05 level

Even though both genders were positive about their technological ability, male rated themselves higher than female. Index of

### *Analysis and Interpretations*

competency related to activities like creating a basic text document, to use storage devices, converting documents to PDF format, to use social bookmarking, locating and reading blogs, to use any kind of anti-virus and anti-spam software, for scanning, scrolling, searching with menu bars and keywords, to use hyperlinks and online dictionaries, to relate and compare and evaluate digital content site to manipulate and store information and content and also to use variety of search strategies was significantly higher in the case of male. Thus it can be concluded that the male students are more competent in digital reading than the female students.

#### **4.3.4.1 Score for Level of Competency in Digital Reading**

A score for level of competency in digital reading is calculated by adding the scores of level of competency to each aspect. For each aspect, a score of 0, 1, 2, 3, and 4 were given to the response very low, low, moderate, high and very high respectively. As there are 28 aspects, total score of level of competency ranges in between 0 to 112. This expected range is divided into three groups. Low level with scores ranges in between 0 to 36, medium level with scores ranges in between 37 to 74 and high level with scores ranges in between 75 to 112. Classification according to the level of competency is given below in table 26.

From the results it can be inferred that a good number (62.4%) of the students showed a medium level of competency in digital reading. It is also interesting to note that low level of competency is stated by only a few respondents and nearly 40 per cent of the students reported a high level of competency in digital reading.

Digital reading competencies involve both traditional print reading skills and a set of navigational skills. E.g. knowing how to search and find the relevant information, being able to critically examining

### *Analysis and Interpretations*

and assessing Internet information sources. Gender-wise classification based on level of competency in digital reading is shown in table 26. To test the significance of variable comprising gender and classification based on level of competency in digital reading, Chi-square test conducted and the results shows that there is a significant gender difference in the classification based on competency in digital reading since the p-value is less than 0.01.

It is clear from the table that male students exhibited a high level of competency as compared to the female students. Majority (76.4%) of the female students have medium level of competency in digital reading. Low level of competency is reported by a few numbers of the students.

**Table 26**  
**Classification based on Competency in Digital Reading**

Level of Competency	Responses (n=588)		
	Male	Female	Total
Low	2 (0.8%)	10 (3.1%)	12 (2.04%)
Medium	118 (45%)	249 (76.4%)	367 (62.4%)
High	142 (54.2%)	67 (20.6%)	209 (35.5%)
Total	262 (100%)	326 (100%)	588 (100%)
Mean ± SD	74.13 ± 15.24	62.14 ± 14.89	
Chi-square = 72.905** ; p-value < 0.001			

\*\* Significant at 0.01 level

Comparing the mean scores with those from male (74.13), the female students have a lower mean scores (62.14) for the competency in digital reading. This suggests that the association among the male

### *Analysis and Interpretations*

and female students in their level of digital reading competency is statistically significant.

Competent digital readers tend to know how to explore and navigate efficiently and effectively the digital content (OECD, 2011). Competent and skillful readers embrace reading strategies such as thinking about the topic, moving forward and backward in the content, observing their comprehension, and planning what they are reading, more often more possible than unskilled or novice readers. Here in this study in table 27 efforts were made to understand the university-wise comparison of competency in digital reading.

**Table 27**  
**Comparison of Competency in Digital Reading (University-Wise)**

<b>University</b>	<b>Mean</b>	<b>Std. Deviation</b>
University of Kerala	66.8457	15.91154
Mahatma Gandhi University	71.0721	15.95432
University of Calicut	67.1786	17.24444
Kannur University	65.9630	15.42881
Chi-square = 6.637 <sup>ns</sup> ; p-value = 0.084		

*ns non-significant at 0.05 level*

Results of Kruskal-Walli's ANOVA clearly show that p-value for the test is 0.084, which is greater than 0.05. Hence the test statistic Chi-square is non-significant. Hence accept the null hypothesis that there is no significant association between the variables.

Students need skills in evaluating digital information to be successful in digital reading. Particularly on the Web, information can be incomplete or unreliable; requiring students to reflect on information carefully. Today, as the universities are providing more digital resources, adequate knowledge about computers and retrieval techniques to effectively search these digital information sources are

### *Analysis and Interpretations*

essential for the students in all discipline. Table 28 summarises the results regarding the discipline-wise comparison of competency in digital reading.

**Table 28**  
**Comparison of Competency in Digital Reading (Discipline-Wise)**

<b>Discipline</b>	<b>Mean</b>	<b>Std. Deviation</b>
Science	68.38	15.53
Humanities	67.02	17.51
Social Science	67.07	15.51
Chi-square = 0.758 <sup>ns</sup> ; p-value = 0.685		

*ns non-significant at 0.05 level*

It is clear from the results that there is no significant association in the mean scores and standard deviation among the three disciplines. Results of Kruskal-Walli's ANOVA clearly shows that p-value for the test is 0.685, which is greater than 0.05. Hence the test statistic Chi-square is non-significant. Hence accept the null hypothesis that there is no significant association between digital reading competency and discipline of the students.

#### **4.3.5 Need of Training for Digital Reading**

New advancements for information and correspondence and new environments for their use require us to bring new possibilities to education undertakings that take place within these technologies. The new literacies of the Internet and other ICT incorporate the aptitudes, strategies, and dispositions important to effectively use and adapt to the quickly changing information and communication technologies and contexts that continuously develop in the world and impact all areas of personal and professional lives. These new literacies and skills enable us to utilise the Internet and other ICT to distinguish imperative inquiries, locate information, critically

### *Analysis and Interpretations*

evaluate the usefulness of that information, synthesise information to answer those inquiries, and then communicate the answers to others (Leu et al., 2004). The ability to find and locate information on the Internet is essential to Web based reading. The new technologies (high-resolution screens, digital libraries, e-books, etc.) are accessible, yet readers need to learn to overcome old reading habits while, at the same time, exploiting the new possibilities offered in imaginative and innovative ways. Henry (2006) indicates the location of information as a critical “gatekeeper” skill that to a great extent decided the effectiveness of digital reading comprehension.

With reference to these the students were asked whether or not they required training to improve their digital reading skills, and the analysed results are furnished in table 29. It is clearly seen that 45 per cent of the students reported that they don't require training for digital reading and in the meantime more than 40 per cent of them indicated their requirement of training.

**Table 29**  
**Need of Training for Digital Reading (Gender-Wise)**

Need of Training	Responses (n=588)		
	Male	Female	Total
Yes	74 (28.2%)	168 (51.5%)	242 (41.2%)
No	152 (58%)	111 (34%)	263 (44.7%)
Not know	36 (13.7%)	47 (14.4%)	83 (14.1%)
Total	262 (100%)	326 (100%)	588 (100%)
Chi-square = 37.844** ; p-value < 0.001			

\*\* Significant at 0.01 level

### *Analysis and Interpretations*

Zhang, Ye and Liu (2011) reported the results of a questionnaire survey among the students and teachers in Dalian Nationalities University concerning the usage of e-resources. The results proposed that the users should be supported with more training keeping in mind the end goal to enhance their information seeking skills while using e-resources. So sufficient training is essential to solve this hindrance.

Chi-square test conducted to test the significance of variables comprising gender and need of training for digital reading. The Chi-square value of 37.844 and p-value of 0.001 indicate there is a significant gender difference in their need of training for digital reading. Compared to male students more than 50 per cent of the female students indicated their interest in attending training for digital reading.

Further it is also noted that more than fifty per cent of the male students stated that they don't need training. It indicates their level of confidence in digital reading. A very few per cent of them also reported that they don't know whether they required training or not. As Ray and Day (1998) propose, the aptitude or skills required to boost the potential of digital resources are significantly more noteworthy than those required for searching printed sources. These skills incorporate knowledge of the structure of the database and the guidelines which must be put into the computer by the searcher, and moreover an understanding of the manners in which the instructions are linked with one another.

Table 30 tried to identify the discipline-wise analysis of need of training for digital reading. The data subjected to Chi-square test to understand the association between discipline and need of training for digital reading. The test produced a p-value of 0.024 which



indicate that there is a significant association between the variables, since it is less than 0.05 level of significance.

**Table 30**  
**Need of Training for Digital Reading (Discipline-Wise)**

Need of Training	Responses (n=588)		
	Science	Humanities	Social Science
Yes	69 (36.1%)	94 (49.2%)	79 (38.3%)
No	92 (48.2%)	71 (37.2%)	100 (48.5%)
Not know	30 (15.7%)	26 (13.6%)	27 (13.1%)
Total	191 (100%)	191 (100%)	206 (100%)
Chi-square = 11.240 ; p-value = 0.024			

\* Significant at 0.05 level

Results show that half of the students in Humanities reported that they need training. Nearly 40 per cent of the students in Science and Social Science disciplines stated that they need training in digital reading and almost fifty per cent of them reported that they don't need training.

#### **4.3.6 Level of Confidence in Digital Reading**

Reading and understanding digital content is a vital skill when textual information is received from digital media. Those who are very confident in digital reading will extract the contents of hypertext pages and also meaningfully link them on the basis of a specific reading goal. Therefore, they engage with the hypertext in a more task-oriented route than readers who are not confident in digital reading, bringing about more extreme and comprehensive task-relevant navigation and better understanding (Hahnel et al., 2016).

### *Analysis and Interpretations*

Table 31 shows the gender wise difference in the level of confidence in digital reading. Going through the results, it can be seen that more than 40 per cent of the students stated that their level of confidence in digital reading is good. Also, nearly 40 per cent of them reported an average level of confidence in digital reading. Only a few number of the students indicated a poor level of confidence in digital reading.

**Table 31**  
**Level of Confidence in Digital Reading (Gender Wise)**

Level of Confidence	Responses (n=588)		
	Male	Female	Total
Excellent	30 (11.5%)	14 (4.3%)	44 (7.5%)
Good	135 (51.5%)	114 (35%)	249 (42.3%)
Average	80 (30.5%)	146 (44.8%)	226 (38.4%)
Poor	16 (6.1%)	46 (14.1%)	62 (10.5%)
Very poor	1 (0.4%)	6 (1.8%)	7 (1.2%)
Total	262 (100%)	326 (100%)	588 (100%)
Chi-square = 38.441** ; p-value < 0.001			

\*\* Significant at 0.01 level

By applying Chi-square test, the p-value of 0.001 exhibited in the table indicates a significant association at one per cent level between the gender and their level of confidence in digital reading. This reveals that difference among male and female students regarding

### *Analysis and Interpretations*

their level of confidence in digital reading is statistically significant. Results show that more than 50 per cent of the male students said that they are good in their confidence in digital reading. Average level of confidence was reported by nearly fifty per cent of the female students. It is interesting to note that compared to female students, more number of the male students reported their level of confidence in digital reading as excellent. Also in contrast with the female students only a few male students stated that their level of confidence in digital reading is poor. On the whole it is noted that the male students have high confidence in digital reading than the female students.

Students who are confident in digital reading can make reading more enjoyable, which helps them to motivate students to become noticeably dynamic participants, encourage them to use critical reading skills, and enhance students reading fluency and comprehension of content. Ozek and Civelek (2006) in a study attempted to find the reading strategies generally used by English Language Teaching (ELT) students while reading a text. Result of the study shows that high-confidence and proficient readers significantly use pictures and illustrations, and they are more fruitful in speculating the significance and meaning of a word, skipping words, skimming and visualising events than low-proficient readers.

On the other hand, the above mentioned study indicates that readers who are confident in digital reading can apply reading strategies more viably and properly. These findings also supported with the results of study done by Akyel and Ercetin (2009). Study reveals that the students with high confidence and prior knowledge used certain cognitive and metacognitive reading strategies more frequently than readers with low prior knowledge. Table 32 tabulated the results of discipline-wise comparison of level of confidence in digital reading.

**Table 32**  
**Level of Confidence in Digital Reading (Discipline-Wise)**

Level of Confidence	Responses (n=588)		
	Science	Humanities	Social Science
Excellent	16 (8.4%)	12 (6.3%)	16 (7.8%)
Good	88 (46.1%)	69 (36.1%)	92 (44.7%)
Average	69 (36.1%)	76 (39.8%)	81 (39.3%)
Poor	18 (9.4%)	30 (15.7%)	14 (6.8%)
Very poor	--	4 (2.1%)	3 (1.5%)
Total	191 (100%)	191 (100%)	206 (100%)
Chi-square = 15.131 <sup>ns</sup> ; p-value = 0.057			

*ns non-significant at 0.05 level*

However, the Chi-square test shows that the p-value (0.057) is greater than 0.05. It depicts that there is no significant association between discipline and level of confidence in digital reading. The results shows that nearly fifty per cent of the students from Science and Social Science have good level of confidence in digital reading and around 36 per cent of the students from Humanities also opined the same.

Students with better attitude toward computers and more confidence in finishing high-level ICT assignments had a higher level of engagement in online reading activities. Reading may not be students' underlying intent when working with computers, but rather they unknowingly become engaged in online reading activities, because of a better attitude toward computers and trust in high-level ICT tasks (Lee & Wu, 2012). Imel (1990) contended that knowledge of

### *Analysis and Interpretations*

appropriate electronic information sources, supported by adequate searching skills, were desirable to identify and retrieve the needed information. The study emphasised a solid requirement for end-user education and computer literacy enhancement to benefit from an immense collection of e-resources. Table 33 portrayed the comparison of competency in digital reading among the students who have attended the computer related course and not attended the course.

**Table 33**  
**Comparison of Competency in**  
**Digital Reading among Students those who have**  
**Attended Computer Related Course and not Attended the Course**

<b>Computer Related Course Attended</b>	<b>Mean</b>	<b>Std. Deviation</b>
Yes	69.07	16.10
No	64.39	15.92
$Z = 3.219^{**}$ ; $p\text{-value} = 0.001$		

*\*\* Significant at 0.01 level*

Mann-Whitney U-test conducted for comparing the competency in digital reading among the students those who have attended computer related courses and not attended the courses. As the p-value is less than 0.01, and Z-value is significant, hence the null hypothesis is rejected and concludes that there exists a significant difference in the competency in digital reading among the students those who have attended computer related courses and not attended the courses. Mean score was higher in the case of those have attended the computer related courses which indicates that they have significantly higher competency in digital reading compared to those who do not attended the courses.

### *Analysis and Interpretations*

ICT change the way content is exhibited, which can be challenging for readers due to increase with regard to self-directed text selection for reading. Digital reading is not synonymous with reading printed texts and requires additional skill and mastery from students specifically, skills in dealing with computer environments and in deciding the value of various information encountered. In the effort made to test the relation between level of competency to use computer and other digital devices and digital reading competency, correlation coefficient conducted and the results are given in table 34.

**Table 34**  
**Relation between Level of Competency to Use Computer and other Digital Devices and Digital Reading Competency**

<b>Variable</b>	<b>Correlation</b>	<b>p-value</b>
Level of competency to use Computer and other digital devices and digital reading competency	0.713**	< 0.001

*\*\* Significant at 0.01 level*

The correlation value of 0.713 and p-value of 0.001 indicate that there exists a significant relation between the level of competency to use computer and other digital devices and digital reading competency at 0.01 level of significance. That implies that the level of competency to use computer and other digital devices is positively correlated with digital reading competency. These results underline that, if students should be proficient in digital reading, it is essential to help and support them in mastering skills in dealing with ICT and in creating effective navigational strategies by giving appropriate learning opportunities and guiding them through various challenges.

### *Analysis and Interpretations*

Good readers with high expertise in computer, digital devices and effective strategies for deciding on the convenience and usefulness of Web-based information are able to locate, evaluate, and synthesise Web-based information. Hypertext readers who already had good linear reading skills or could adequately manage with computer interfaces were able to find and fluently re-visit task-relevant pages while developing their reading path. In other words, if students have difficulties with linear reading or lack basic computer skills, they will struggle to find and relate relevant information to other information, and are likely to have problems with understanding hypertexts (Gil-Flores, Torres-Gordillo & Perera-Rodríguez, 2012).

As a significant relationship exists between level of competency to use computer and other digital devices and digital reading competency, it is desirable that sufficient emphasis should be given to developing the digital skills among the students through user education programmes. Supporting this, Vandenhoeck (2013) similarly reported that after explicit instruction and training, student's confidence and willingness to engage in digital reading have increased. Combined with explicit instructions in procedures, strategies, techniques and technical aspects of screen reading, would lead to greater confidence and ability when reading from a screen.

End-users with better advanced digital skills will probably benefit from the ever increasing volume of digital information. At the point, when the students have become expertise in computer and other digital devices, they will start using the digital information sources more frequently and confidently. Consequently, it helps the students in universities to be confident and competent in digital reading.

#### **4.4 Preference of Reading Print and Digital Resources**

Regardless of the expanding popularity of digital resources, it should also be noted that not a solitary sort of format has ever demonstrated satisfactory for all needs and perfect in all circumstances. Digital devices and the Internet which are more integrated in our daily lives now, provide several reading facilities which are faster, cheaper, and more ubiquitous than ever. Educational technologies and materials are also affected by this widespread phenomenon. Academically, with the development of electronic learning approaches, students are involved in reading from a digital screen much more than before. It should also be noted that an entire generation who is growing up with new technology and prone to have diverse desires toward the preference of reading resources. The huge corpus of instruction which flows through digital screens arises some questions on student's preferences and comfort about reading from a digital screen instead of reading from conventional printed papers.

Kurniawan and Zaphiris (2001) conducted an experimental research to compare the reading speeds of reading from paper or screen and they concluded that reading from screen is slower (10-30%) than reading from paper. This finding may have some implications for the designers of electronic reading materials since the reading speed may affect the preferences and the perceptions of the readers. Digital natives are described as being vastly different from previous generations with regards to the way they read and the way they use technology. Stemming from this, it is possible that the preferences of this generation in regards to digital or printed materials may also differ from that of previous generations. Therefore many researchers are interested in the preferences of readers as well.



#### **4.4.1 Preferred Resources for Reading Books, Journals, Newspapers, Magazines, Theses and Dissertations**

Considering the advancement of digital resources, it is vital to analyse reading in this environment with the end goal of recognising which resources and strategies are used in this environment. Liu (2005) clearly suggests that print and digital formats ought to be viewed as two distinct entities that vary from each other in an extensive variety of aspects such as reading pace, comprehension, uneasiness and disorientation of reading, cognitive load and readers preferences.

Table 35 detailed the results of students' preference among print and digital resources while reading. As per the results, a dominant part (71.3%) of the students likes to read books in printed form. Nicholas and Lewis (2008) in their study about the attitudes of Millennial toward books and e-books, concluded that although millennial students are quite familiar with and use many types of innovation day by day, when it comes to reading a book even they slant toward good, old fashioned print. More than 40 per cent of the students still prefer to read magazines, theses and dissertations in the format of print. Substantiating to this finding, Spencer (2006) detailed a survey of distance education students showing preference for printed content materials for reasons, among others, of portability, flexibility, and less eye fatigue.

**Table 35**  
**Preference among Print and Digital Resources**

<b>Resources</b>	<b>Print</b>	<b>Digital</b>	<b>Both</b>
Books	419 (71.3%)	38 (6.5%)	131 (22.3%)
Journals	129 (21.9%)	329 (56.0%)	130 (22.1%)
Newspapers	244 (41.5%)	67 (11.4%)	277 (47.1%)
Magazines	259 (44.0%)	235 (40.0%)	94 (16.0%)
Theses/Dissertations	238 (40.5%)	233 (39.6%)	117 (19.9%)

However on account of newspaper, nearly fifty per cent of the students like to read in both print and digital format. However it does not agree with the study of Shaikh and Chaparro (2005) in which they indicate that the number of e-newspaper readers is increasing while the conventional print newspaper publishing is significantly decreasing. But in the case of journals a good number (56%) of the students are choosing e-journals.

Academic libraries have traditionally assumed a critical part in giving access to and disseminating information across learning and research communities. That part has now been extended to facilitating access to e-resources such as e-books. By comparing with the acceptance of the e-journal format, librarian's acceptance of the e-book has been slower and more conservative. It was assumed that male students will constitute the majority of the students that prefer e-resources instead of printed format. In this context to understand which version students use in the case if a book has both printed and digital versions, the analysed results are depicted in table 36.

### *Analysis and Interpretations*

It is found that a majority (71.3%) of the students prefer to read books in printed form. Supporting these results, Abdullah and Gibb (2008) in their research were of the view that when the readers are given the right to choose, they prefer printed version of a book to e-book and expressed this situation as the habit of reading from paper. This finding is further confirmed by a Web-based survey conducted by Dilevko and Gottlieb (2002) among undergraduate library users at the University of Toronto. It was found that while students commonly start assignments and essays using e-resources, however traditional print resources for instance books stay crucial components in their research due to their reliability and permanent accessibility.

Ismail and Zainab (2005) indicated that the reasons why students are not happy to use e-books include, preference for printed books, lack of knowledge on how to use e-books, trouble in browsing and reading and the requirement for special software. Only a few per cent of the students favoured e-books.

**Table 36**  
**Preference among Books and E-books**

<b>Preferred Resources</b>	<b>Male (n=262)</b>	<b>Female (n=326)</b>	<b>Total (n=588)</b>
Books	178 (67.9%)	241 (73.9%)	419 (71.3%)
E-books	19 (7.3%)	19 (5.8%)	38 (6.5%)
Both	65 (24.8%)	66 (20.2%)	131 (22.3%)
Total	262 (100%)	326 (100%)	588 (100%)
Chi-square = 2.544 <sup>ns</sup> ; p-value = 0.280			

*ns non-significant at 0.05 level*

### *Analysis and Interpretations*

Numerous students may be unfamiliar with e-books and many not value their esteem. Easy to use interfaces would encourage students to take advantage of e-books. Nearly quarter per cent (22.3%) of the students reported that they would use both versions. Further these variables are subjected to Chi-square test to comprehend the association between male and female students preferred medium among print and digital resources while reading books. Test produced a p-value of 0.280 which shows that there is no significant association between the variables since it is greater than 0.05.

Table 37 shows the differences in print and digital preferences of students for reading journals. Nearly quarter (21.9%) per cent of the students prefer print format of journals and likewise more than fifty per cent of them prefer e-journals. Although it was expected that male students prefer screen more than female students, Chi-square results reveals that there is no significant gender difference (p-value >0.05) in the preference of format for reading journals. Therefore it can be concluded that female students also enjoy e-journals as much as male students.

**Table 37**  
**Preference among Journals and E-journals**

<b>Preferred Resource</b>	<b>Male (n=262)</b>	<b>Female (n=326)</b>	<b>Total (n=588)</b>
Journals	48 (18.3%)	81 (24.8%)	129 (21.9%)
E-journals	154 (58.8%)	175 (53.7%)	329 (56.0%)
Both	60 (22.9%)	70 (21.5%)	130 (22.1%)
Total	262 (100%)	326 (100%)	588 (100%)
Chi-square = 3.629 <sup>ns</sup> ; p-value = 0.163			

*ns non-significant at 0.05 level*

### *Analysis and Interpretations*

Here the researcher also noticed that compared to printed journals majority of the students favour e-journals. Consistent with these outcomes, Dillon and Hahn (2002) also found that at the University of Maryland libraries students preferred e-journals. Sathe, Grady and Giuse (2002) in a study of print vs. electronic journals, report that fellows, students, and residents favour e-journals. Easy accessibility, simplicity of printing, and ease of searching are among the most commonly cited reasons behind preferring e-journals.

The preference of the students with respect to the likelihood of using traditional and digital channels for reading newspaper is analysed and the results are given in table 38. Almost fifty per cent of the students prefer to read newspapers in both format. Further it is observed that more than 40 per cent of the students are interested in reading only print format of newspaper. Specifically, entertainment as a goal for reading a traditional newspaper would be firmly connected to the behaviour of the physical version readers. Related to these, Bogart (1992) stated that reading was relaxed and point by point or detailed when individuals read the dailies on paper, which would relate the activity to entertainment or leisure time.

**Table 38**  
**Preference among Newspapers and E-newspapers**

<b>Preferred Resource</b>	<b>Male (n=262)</b>	<b>Female (n=326)</b>	<b>Total (n=588)</b>
Newspapers	109 (41.6%)	135 (41.4%)	244 (41.5%)
E-newspapers	29 (11.1%)	38 (11.7%)	67 (11.4%)
Both	124 (47.3%)	153 (46.9%)	277 (47.1%)
Total	262 (100%)	326 (100%)	588 (100%)
Chi-square = 0.050 <sup>ns</sup> ; p-value = 0.975			

*ns non-significant at 0.05 level*

### *Analysis and Interpretations*

Comparatively a few students favoured e-newspaper for reading. Students choose to use print-based newspaper ignoring the many favourable circumstances of any e-newspaper. As shown in Table 38, the result of Chi-square test reveals that there is no significant gender difference in their preference of format for newspaper ( $p>0.05$ ).

Print magazines have experienced and overcome a number of technological developments in the history of the magazine. This new technology will change the way a magazine is produced and published. Digital magazines or electronic magazines are one of the innovations in the industry that transformed magazine in paper form into digital form. And the changes will have an impact to the entire industry, including the consumption culture (Wardhani, Sabana & Adriati, 2015). To explore the students reading patterns in more detail, gender wise differences in their preferred resources among print magazines and e-zines are portrayed in table 39. Results detailed that nearly 45 per cent of the students prefer print format of magazines and 40 per cent of them prefer e-zines. Also a small per cent (16%) of the students prefer both printed magazines and e-zines.

**Table 39**  
**Preference among Magazines and E-zines**

<b>Preferred Resource</b>	<b>Male (n=262)</b>	<b>Female (n=326)</b>	<b>Total (n=588)</b>
Magazines	98 (37.4%)	161 (49.4%)	259 (44.0%)
E-zines	112 (42.7%)	123 (37.7%)	235 (40.0%)
Both	52 (19.8%)	42 (12.9%)	94 (16.0%)
Total	262 (100%)	326 (100%)	588 (100%)
Chi-square = 10.056** ; p-value = 0.007			

\*\* Significant at 0.01 level

### *Analysis and Interpretations*

The Chi-square test carried out to assess the significance of the gap and the test confirmed that the association is significant and it cannot be ignored. The p-value of 0.007, retrieved as a result of statistical test clearly shows that there is a significant gender difference in the preference among magazines and e-zines at 0.01 level of significance. This reveals that association among male and female students regarding their preferred resources for reading magazines is statistically significant. It is clearly seen that compared to male students, printed magazine are mostly favoured by female students. Supporting these results, Sahai's (1970) results reveals that more than 90 per cent of the readers read print magazines and the percentage of women is higher than the men. In contrast to this, in the case of e-zines, male respondents are more interested in it than the female respondents.

Almost all reading materials, which used to be on the printed format before have digital versions now and they can be accessed remotely at any time for reading and research purposes. Ajayi, Shorunke and Aboiyade (2014) opined that e-resources such as e-journals, e-books, e-theses and dissertations when effectively utilised provide relevant information required by students, which if properly utilised can help in improving reading culture and improve academic excellence. Along with printed theses and dissertations, some universities are now offering ETDs, for example, Shodhganga@INFLIBNET centre provides a platform for research students to deposit their theses and make it available to the entire scholarly community in open access. Here the students were asked to indicate their opinion regarding their favourite format for reading theses and dissertations and the results are shown in table 40.

**Table 40**  
**Preference among Theses and Dissertations and E-theses and Dissertations**

<b>Preferred Resource</b>	<b>Male (n=262)</b>	<b>Female (n=326)</b>	<b>Total (n=588)</b>
Theses and Dissertations	95 (36.3%)	143 (43.9%)	238 (40.5%)
E-theses and Dissertations	107 (40.8%)	126 (38.7%)	233 (39.6%)
Both	60 (22.9%)	57 (17.5%)	117 (19.9%)
Total	262 (100%)	326 (100%)	588 (100%)
Chi-square = 4.393 <sup>ns</sup> ; p-value = 0.111			

*ns non-significant at 0.05 level*

The Chi-square test results (Chi-square=4.393; p=0.111>0.05) reveal that there is no significant gender difference in their preferences of reading medium while reading theses and dissertations. Therefore it can be concluded that that association among male and female students regarding their preferred resources for reading theses and dissertations is statistically non-significant.

#### **4.4.2 Techniques Used while Reading Print and Digital Resources**

Reading as often as possible involves not just looking at words on a page, but also underlining, highlighting and commenting, either on the text or in a different notebook. Strategies are found to be a concern for some students, while choosing whether to read on a computer screen or printed copy. Chou (2009) in a study about onscreen reading behaviours in academic settings revealed that reading on a computer screen restricted their application of reading strategies. Dominant part of respondents expressed that they could not apply reading strategies they normally utilised on printed copy



### *Analysis and Interpretations*

text (e.g., writing notes in the margins, underlining or highlighting to screen-based text). For the owner of the paper copy, writing in the margins of printed text had special personal values. Marks made while reading help comprehension, memorisation and later retrieval. Readers tend to scribble short remarks in margins; they draw asterisks to put forth an important statement stand out; they highlight, underline or circle keywords or phrases.

Chou (2009) have pointed out that students utilise distinctive reading strategies to understand diverse types of reading materials. Reading academic texts, for instance, requires the capacity to perceive and process the textual discourse practices of an academic discipline across a range of genres; though reading for recreation may well be a more casual, relaxed and less analytic process. This characteristic of high involvement in the use of reading strategies, such as underlining, highlighting, taking notes, and writing comments in the margin, influences readers' preferences toward text presentation modes.

The students were asked to state the different types of techniques used while reading print resources. By observing table 41, it is clear that a majority (75.9%) of the students use the technique like taking notes on separate paper while reading print resources. A good number (60.5%) of them also use the techniques of highlighting and underlining. It is also noted that more than quarter of the respondents are taking notes on computer while reading. Chi-square test conducted to understand whether there is any gender difference in the use of different techniques while reading print resources. Results show that there is a significant gender difference in the use of techniques like highlighting/underlining, writing in margins, taking notes on a separate paper, and for not using any techniques

*Analysis and Interpretations*

while reading print resources either at 0.01 and 0.05 level of significance.

**Table 41**  
**Techniques Used while Reading Print Resources**

<b>Type of Techniques</b>	<b>Male (n=262)</b>	<b>Female (n=326)</b>	<b>Total (n=588)</b>	<b>Chi-square</b>	<b>p-value</b>
Highlighting/underlining	144 (55%)	212 (65%)	356 (60.5%)	6.165*	0.013
Writing in margins	65 (24.8%)	114 (35%)	179 (30.4%)	7.08**	0.008
Taking notes on separate paper	169 (64.5%)	277 (85%)	446 (75.9%)	33.21**	< 0.001
Taking notes on Computer	72 (37.5%)	84 (25.8%)	156 (26.5%)	0.219 <sup>ns</sup>	0.640
None	54 (20.6%)	24 (7.4%)	78 (13.3%)	21.16**	< 0.001
Any other	1 (0.4%)	--	1 (.2%)	--	--

\*\* Significant at 0.01 level; \* Significant at 0.05 level; ns non-significant at 0.05 level

Notetaking while reading was important in deepening the comprehension of the text, and in helping them to form a plan for writing the summary. Compared to male students, vast majority (85%) of the female students are taking notes on separate paper while reading printed text. Both the genders use the techniques like highlighting/underlining and writing in margins at the time of reading, but majority of them are female students. Korbin and Young (2003) in their study observed that students use the print version did underlining and taking notes about the important information more frequently, possibly indicating a greater comfort with actual as opposed to virtual interaction with a text. Surprisingly, it is also seen that a few respondents have not used any techniques for reading printed resources.

### *Analysis and Interpretations*

Also there is no significant gender difference in taking notes on computer while reading print resources, as the test produced a p-value of 0.640, which is greater than 0.05. It is further clear from the result that the female students use techniques higher than the male students while reading print resources. Poole (2009) in a study about reading strategies used by male and female Columbian University students reported that the use of various reading techniques or strategies is significantly higher among the female students than the male students.

Students when reading from screen are not able to use as many techniques as they can when reading printed resources, they built up some unique strategies that can be used in a screen-reading environment, for example, copying and pasting, downloading, tagging, and typing notes into the computer documents. These types of reading techniques appear to help the students to assemble and retrieve information (Sheorey & Mokhtari, 2001). ChanLin (2013) opined that students with various reading necessities and great load from courses taken have been found to use numerous reading strategies and use studying techniques such as note-taking, underlining, writing in the margins and highlighting the significant parts of the text to improve their reading efficiency.

As Murphy et al. (2003) have stated the strategies essential for comprehending conventional printed text are not the similar strategies required to comprehend computerised texts. Several studies have demonstrated that students can probably read also on screen as they do on paper, if they are instructed the vital strategies. Instructors and teachers may need to be aware of the strategies for comprehension required for computerised texts, because they appear to be different from those for comprehending printed copy texts.

Many students have learned how to read in a printed copy environment, but lack the knowledge and awareness of how to read

### *Analysis and Interpretations*

in a screen-based environment. Hence, instructing new strategies that empower students to read effectively in this new reading environment is critical. Here the researcher tried to explore whether the application of reading techniques while reading digital resources varied according to gender differences and the results are depicted in table 42. A staggering (96.1%) per cent of the students indicated that they use the technique of downloading while reading digitally. Majority of them also use the techniques like taking notes on separate paper (75.3%) and copy and paste techniques (74.3%) while reading digital resources.

**Table 42**  
**Techniques Used while Reading Digital Resources**

<b>Type of Techniques</b>	<b>Male (n=262)</b>	<b>Female (n=326)</b>	<b>Total (n=588)</b>	<b>Chi-square</b>	<b>p-value</b>
Digital highlighting/underlining	109 (41.6%)	95 (29.1%)	204 (34.7%)	9.957**	0.002
Taking notes on separate paper	179 (68.3%)	264 (81%)	443 (75.3%)	12.53**	< 0.001
Adding digital comments	36 (13.7%)	23 (7.1%)	59 (10%)	7.192**	0.007
Copy and paste	192 (73.3%)	245 (75.2%)	437 (74.3%)	0.266 <sup>ns</sup>	0.606
Book marking	138 (52.7%)	108 (33.1%)	246 (41.8%)	22.799**	< 0.001
Tagging	67 (25.6%)	44 (13.5%)	111 (18.9%)	13.832**	< 0.001
Downloading	249 (95%)	316 (96.9%)	565 (96.1%)	1.387 <sup>ns</sup>	0.239
Enlarging	104 (39.7%)	103 (31.6%)	207 (35.2%)	4.178*	0.041
Taking notes on computer	153 (58.4%)	167 (51.2%)	320 (54.4%)	3.011 <sup>ns</sup>	0.083
Any other	--	1 (0.3%)	1 (0.2%)	--	--

\*\* Significant at 0.01 level; \* Significant at 0.05 level; ns non-significant at 0.05 level

### *Analysis and Interpretations*

Dilevko and Gottlieb (2002) found that students incline towards e-resources over their print equivalents when they want to copy and paste quotations directly into their essays. By applying Chi-square test, it is found that there exists a significant gender difference in the use of techniques like digital highlighting/underlining, taking notes on separate paper, adding digital comments, bookmarking, and tagging while reading digital resources, since the p-value is less than 0.01 level of significance. It can be seen that comparatively male students show superior to female in the use of techniques like digital highlighting/underlining, adding digital comments, bookmarking and tagging while reading digital resources.

In a study about gender differences in the online reading environment, Liu (2008) indicated that male students tend to bookmark electronic documents for future reading more than female. Regardless of obvious technological advances in digital text, Woody, Daniel and Baker (2010) reported that students tended to underutilise different enhanced features of e-texts or other on-screen readings, for example, digital highlighting/underlining and note taking.

Note-typing, for instance, may be a more appropriate skill to use than the conventional note-taking skill when students read digital materials on screen since they can hardly apply conventional note-taking aptitude in a screen-based environment. Surprisingly, technique like taking notes on separate paper during the process of digital reading is reported by a good number of female students than male students. Taking notes helps readers to extract the text structure during reading. It is a process which facilitates understanding and supports text re-reading.

### *Analysis and Interpretations*

The test also revealed that in the use of techniques like copy and paste, downloading and taking notes on computer there is no significant gender difference, since the p-value is greater than 0.05. Overall, from the above mentioned table 41 and 42 it can be concluded that female students are practicing more techniques while reading print resources and male students are practicing more techniques while reading digital resources.

#### **4.4.3 Frequency of Annotations while Reading Print and Digital Resources**

Annotations make an essential part of the writing-reading process. They have a vital part for their author, the reader adds at the margins his/her own particular ideas that evolve while reading the printed writings. Remarks conceived at the time of reading are the beginning of another chain of thought. Annotations on the margins of hand-written/printed works had special individual qualities for the owner of the paper copy. They were frequently the written proof of the reader's perspective and thoughts at the time of reading (Farber, 2007).

O'Hara and Sellen (1997) found that annotation on paper is effortlessly integrated with reading and several research participants in their study confirmed that they every now and again annotate study materials, and the physical format of a paper material alongside annotation and highlighting helped them to recollect the content. People like to annotate when they read, particularly for in-depth or concentrated reading. Annotations made by readers of conventional printed document either served a future use for the present owner of the document, or brought about better comprehension for subsequent readers if the document was shared.

### *Analysis and Interpretations*

Table 43 given below displays the results stated by the respondents regarding the frequency of annotations while reading print resources. Nearly 40 per cent of the students opined that they sometimes annotate while reading print resources and 30 per cent of them will often annotate the same. Only a few number of the students stated that they never annotate print resources while reading. To test the significance of variables comprising gender and their frequency of annotations while reading print resources, Chi-square test applied. The Chi-square value of 17.627 and p-value of 0.001 indicate a significant association at 0.01 level between the gender and their frequency of annotation. This makes it clear that the frequency of annotation while reading print resources among male and female students is statistically significant.

**Table 43**  
**Frequency of Annotations while Reading Print Resources**

Frequency	Responses (n=588)		
	Male	Female	Total
Always	22 (8.4%)	56 (17.2%)	78 (13.3%)
Often	76 (29%)	105 (32.2%)	181 (30.8%)
Sometimes	100 (38.2%)	118 (36.2%)	218 (37.1%)
Rarely	41 (15.6%)	34 (10.4%)	75 (12.8%)
Never	23 (8.8%)	13 (4%)	36 (6.1%)
Total	262 (100%)	326 (100%)	588 (100%)
Chi-square = 17.627** ; p-value = 0.001			

\*\* Significant at 0.01 level

### *Analysis and Interpretations*

As can be seen from the table that nearly 40 per cent of the male students stated that they sometimes annotate the printed text and around 32.2 per cent of the female students reported that they often annotate the document. Also nearly twenty per cent of the female students said that they always annotate printed text, and it is mentioned only by a few number of the male students. In printed environment, female students tend to annotate more often and always than male students, which clearly indicates that female are likely to be more serious readers than male. Additionally in contrast with female, 41 male students opined that they rarely annotate printed resources.

The behaviour of annotation reflects active engagement with content in an effort to learn and retain information. Annotating digital text is completely achievable, yet it requires significantly more resources and expertise than a simple pencil or highlighter. Herath (2010) reports that advanced digital media give the flexibility to read and choose annotations which prompts better comprehension. Table 44 shows the tabulated results of frequency of annotations while reading digital resources. When considering digital resources, more than fifty per cent of the students sometimes annotate the digital documents, and nearly quarter per cent of them often annotate while reading digitally. However, the Chi-square test results (Chi-square=10.031;  $p=0.040 < 0.05$ ) indicate that there is a significant gender difference in their frequency of annotations while reading digital resources.



**Table 44**  
**Frequency of Annotations while Reading Digital Resources**

Frequency	Responses (n=588)		
	Male	Female	Total
Always	12 (4.6%)	25 (7.7%)	37 (6.3%)
Often	54 (20.6%)	91 (27.9%)	145 (24.7%)
Sometimes	143 (54.6%)	159 (48.8%)	302 (51.4%)
Rarely	44 (16.8%)	47 (14.4%)	91 (15.5%)
Never	9 (3.4%)	4 (1.2%)	13 (2.2%)
Total	262 (100%)	326 (100%)	588 (100%)
Chi-square = 10.031* ; p-value = 0.040			

\* Significant at 0.05 level

It is noted from the table that compared to male students more female students stated that they were always and often annotate digital documents. A total of 27.9 per cent of the female students often annotate digital documents, compared to 20.6 per cent of the male students. But this result is not confirmed with the findings of Liu's study of gender differences in online environment (2008), which reports that female readers tend to annotate not as frequently as male readers. It is also observed from the results that a few numbers of the respondents never annotate digital resources while reading. Through overall analysis it is also evident from table 43 and table 44 that students annotate more in print resources than digital resources, which seems to be similar to the results of study revealed by Shabani et al. (2011). Their study reports that there is significant

difference in the amount of annotation from printed and digital resources.

#### **4.4.4 Level of Comprehension while Reading Print and Digital Resources**

In the scholarly world, it is anticipated that students read their texts for understanding, and furthermore reading comprehension and the ability to synthesise information and formulate new ideas are essential skills of information literacy. Theorist McLuhan points out that the medium is the message (McLuhan & Lapham, 1994). The medium adds and changes the meaning of the content by changing the observation. Such a view can be connected to clarify the impact of print and digital environment on the level of comprehending the message being read. The procedure of text comprehension involves the reader in a complex, dynamic, progressing communication with the content. This interaction frequently includes some sort of text manipulation such as highlighting or annotating.

Due to the increased accessibility of devices that permit reading from the screen, researcher explores if there are differences in the quality of reading a scholarly and literary text, specifically in reading comprehension, concentration and absorption in print and digital environment. However, in a recent study it was found that subjects who read from the paper accomplished better comprehension (Mangen et al., 2013). Results from a similar study of reading comprehension across paper, tablets, and computer among college students in China also demonstrate a significantly better performance when reading in print than on other electronic formats in both shallow and deep levels of comprehension (Chen et al., 2014). It is observed from the table 45 that more than 50 per cent of the students stated that they have high level of comprehension while

### *Analysis and Interpretations*

reading print resources and moderate level of comprehension is reported by more than 30 per cent of the students. Meanwhile very high level of comprehension is reported by 15 per cent of the students.

When data subjected to Chi-square test, to understand the gender association in their level of comprehension while reading print resources, it is noticed that there is a significant association between the variables since the p-value is less than 0.01.

**Table 45**  
**Level of Comprehension while Reading Print Resources**

Level	Responses (n=588)		
	Male	Female	Total
Low	5 (1.9%)	6 (1.8%)	11 (1.9%)
Moderate	102 (38.9%)	80 (24.5%)	182 (31%)
High	117 (44.7%)	187 (57.4%)	304 (51.7%)
Very high	38 (14.5%)	53 (16.3%)	91 (15.5%)
Total	262 (100%)	326 (100%)	588 (100%)
Chi square = 14.548** ; p-value = 0.002			

\*\* Significant at 0.01 level

When considering print resources, a good number (57.4%) of the female students reported that they had high comprehension level when reading print resources and in the same way very high comprehension is also opined by 53 female students. While low and moderate level of comprehension is reported by more male students

### *Analysis and Interpretations*

than female students. Thus it can also be inferred from the table that the level of comprehension while reading print resources is high among the female students than the male students.

Cognitivist approach underlines the structural contrasts between print and digital text that impose cognitive challenges to readers (Eshet-Alkalai & Geri, 2007). Dissimilar to linear reading of printed content from the earliest starting point to the end, digital text requires skills of non-linear reading and thinking that is spreading in different directions, by skipping sentences and paragraphs, changing or switching to other articles and coming back to the previous ones. Individuals on the Internet are "scanning", speed browsing the text to single out individual words and sentences (Liu, 2005). Eshet-Alkalai and Geri's investigation of comprehension when reading news on the Web or on print, indicates high school students performing better using online format, however, college students comprehending better when reading the news in print (2007).

Information format or environment can encourage or oblige the viability of reading. In most of the surveys that led before 1992, it is found that people read more slowly, with less accuracy and less understanding when reading from the screen compared with reading from the paper (Ferris, 2013). Some studies have looked reading comprehension and in addition speed and found no significant differences between reading from the screen and reading from paper (Muter & Maurutto, 1991; Noyes & Garland, 2008).

Opposed to these results, Belmore (1985) concluded that information displayed on video display terminals (VDTs) brought about a poorer comprehension by participants than information exhibited on paper. Results regarding the gender wise differences in the level of comprehension while reading digital resources are displayed in table

*Analysis and Interpretations*

46. It is evident from the results that there is no significant gender difference in their level of comprehension while reading digital resources (Chi-square=5.309;  $p=0.257>0.05$ ). Consistent with these results, some researchers found in their study that there are no significant gender differences, and thus the male and female groups had approximately the same comprehension level while reading digital resources (Huang, Liang & Chiu, 2013; Joshi & Aaron, 2000).

**Table 46**  
**Level of Comprehension while Reading Digital Resources**

Level	Responses (n=588)		
	Male	Female	Total
Very low	3 (1.1%)	1 (0.3%)	4 (0.7%)
Low	17 (6.5%)	30 (9.2%)	47 (8%)
Moderate	125 (47.7%)	172 (52.8%)	297 (50.5%)
High	98 (37.4%)	104 (31.9%)	202 (34.4%)
Very high	19 (7.3%)	19 (5.8%)	38 (6.5%)
Total	262 (100%)	326 (100%)	588 (100%)
Chi-square = 5.309 <sup>ns</sup> ; p-value = 0.257			

*ns non-significant at 0.05 level*

It is also evident from overall analysis of table 45 and table 46 that respondents reported a better comprehension in print resources than digital resources. Consistent with these findings, Dillon, Richardson and McKnight (1990) found that reading comprehension is slower from screen reading than from paper. This, in any case, is contradicted to the research finding by Margolin et al. (2013). They

found that there is no significant difference in reading comprehension in print and digital versions.

#### **4.4.5 Level of Concentration while Reading Print and Digital Resources**

The increasing amount of digital materials, and also the technology becoming more prevalent, browsing or scanning is turning into an essential reading pattern in today's information intensive environment. Skim reading, speed reading, less patience, distraction, selective and nonlinear reading are distinguished as some of the attributes of screen-based behaviour. Reading a printed material by and large requires discipline to concentrate on the material. Researchers express that development of digital media and the nature of hypertext have altered the reading behaviour of people and has resulted in less in-depth and concentrated reading (Levy, 1997).

With this view the students were asked to indicate their level of concentration while reading printed resources and the results are detailed in table 47. Out of 588 survey respondents, 471 students stated that they have high and very high concentration level while reading on paper. The finding is very steady with other statistics from similar study directed by Herath (2010) about online reading, in which survey respondents reported having high or very high concentration levels while reading printed materials. Here in this study only a few respondents were recorded for having low and very low concentration, while nearly 20 per cent of the students indicated that they had moderate level of concentration level while reading print resources.

**Table 47**  
**Level of Concentration while Reading Print Resources**

Level	Responses (n=588)		
	Male	Female	Total
Very low	1 (0.4%)	--	1 (0.2%)
Low	5 (1.9%)	2 (0.6%)	7 (1.2%)
Moderate	59 (22.5%)	50 (15.3%)	109 (18.5%)
High	129 (49.2%)	180 (55.2%)	309 (52.6%)
Very high	68 (26%)	94 (28.8%)	162 (27.6%)
Total	262 (100%)	326 (100%)	588 (100%)
Chi-square = 8.757 <sup>ns</sup> ; p-value = 0.067			

*ns non-significant at 0.05 level*

Meanwhile it is clear from the Chi-square test results that there is no significant association between the variables, since the p-value is greater than 0.05. By analysing these findings, it is clear that the perceptible change is the dropping number of responses for low concentration levels and the increasing number of responses for moderate, high and very high level of concentration while reading printed resources. Further it is also observed that from both the male and female students have comparatively similar responses regarding their level of concentration while reading printed resources.

Impact of digital media has logically been the subject of empirical and theoretical investigation by numerous researchers from an extensive variety of disciplines. However, they are at a beginning stage with respect to find the the impact of online reading on human

### *Analysis and Interpretations*

reading behaviour. Liu (2005) inspected how individuals reading behaviour has changed over the past ten years and the findings revealed that digital media have changed regular users' reading behaviours. Eveland and Dunwoody (2001) found that it is extremely troublesome for readers to devote full attention to online reading and they were confronting decreasing in-depth and concentrated reading in general. This raises a big concern that the online reading is disrupting individuals' natural sustained reading behaviour. Students were asked to indicate their level of concentration while reading digital resources and the responses are shown in table 48. When considering digital materials, only quarter per cent of the students stated that they had high concentration level when reading online. More than fifty per cent of them indicate a moderate level of concentration. A total of 94 respondents reported that they have low level of concentration while reading digitally.

**Table 48**  
**Level of Concentration while Reading Digital Resources**

Level	Responses (n=588)		
	Male	Female	Total
Very low	2 (0.8%)	--	2 (0.3%)
Low	34 (13%)	60 (18.4%)	94 (16%)
Moderate	150 (57.3%)	171 (52.5%)	321 (54.6%)
High	70 (26.7%)	81 (24.8%)	151 (25.7%)
Very high	6 (2.3%)	14 (4.3%)	20 (3.4%)
Total	262 (100%)	326 (100%)	588 (100%)
Chi-square = 7.692 <sup>ns</sup> ; p-value = 0.104			

*ns non-significant at 0.05 level*



### *Analysis and Interpretations*

Carr (2008) argues that Web based reading has decreased users' ability to concentrate and contemplate, and engage with information resources. Chi-square results reveals that there is no significant gender difference in their level of concentration while reading digital resources (Chi-square=7.692;  $p=0.104 > 0.05$ ).

However it does not agree with the results of study, gender differences in online environment done by Liu (2008) in which a higher proportion of male students report lower in-depth reading (57.5 per cent vs. 50.4 per cent) and decreasing concentrated reading (45.0 per cent vs. 36.6 per cent) than female students. Overall it is evident from table 47 and table 48 that students reported a better concentration level when they read printed resources than digital resources.

#### **4.4.6 Level of Absorption while Reading Print and Digital Resources**

The study continued to identify the changes to the typical reading behaviour of students in the digital environment. This section discusses the level of content absorption while reading print and digital resources among the respondents. As indicated by Miller (1956) the quantity of units that can be processed in short term memory is  $7 + 2$ . At the point, when individuals tend to skim read and speed read, the amount of information that gets absorbed by means of sensory memory can easily exceed this number of units. It is also important to note that the content that gets absorbed to the sensory memory could be all the more, contingent upon what other receptors sense in the meantime. In table 49 efforts were made to understand the level of absorption while reading print resources based on gender differences. It is worth mentioning that more than

50 per cent of the students indicated high content absorption level while reading on paper.

**Table 49**  
**Level of Absorption while Reading Print Resources**

Level	Responses (n=588)		
	Male	Female	Total
Low	6 (2.3%)	9 (2.8%)	15 (2.6%)
Moderate	82 (31.3%)	70 (21.5%)	152 (25.9%)
High	129 (49.2%)	179 (54.9%)	308 (52.4%)
Very high	45 (17.2%)	68 (20.9%)	113 (19.2%)
Total	262 (100%)	326 (100%)	588 (100%)
Chi-square = 7.468 <sup>ns</sup> ; p-value = 0.058			

*ns non-significant at 0.05 level*

The 'very high' option was selected by nearly 20 per cent of the students. Only 15 students expressed that they had low content absorption level, while quarter per cent of them reported that they had moderate level of content absorption level while reading print resources. Herath (2010) in a study of online reading found that majority of the participants indicated high content absorption level on printed resources than digital resources. However, the p-value of 0.058, retrieved as a result of Chi-square test makes it clear that there is no significant gender difference in the level of content absorption while reading print resources. This reveals that the association among the male and female students in their level of content absorption while reading print resources is statistically non-significant.

### *Analysis and Interpretations*

Majority of online materials are designed to be in small chunks and some content is also laid out in powerful ways. These organisation strategies help readers to hold content in their short term memory. However, when readers skim read they tend to skip some of the words, in this way the content that gets absorbed to the short term memory is not complete. Table 50 indicates the level of absorption while reading digital resources among the students.

**Table 50**  
**Level of Absorption while Reading Digital Resources**

Level	Responses (n=588)		
	Male	Female	Total
Low	17 (6.5%)	36 (11%)	53 (9%)
Moderate	136 (51.9%)	176 (54%)	312 (53.1%)
High	93 (35.5%)	94 (28.8%)	187 (31.8%)
Very high	16 (6.1%)	20 (6.1%)	36 (6.1%)
Total	262 (100%)	326 (100%)	588 (100%)
Chi-square = 5.488 <sup>ns</sup> ; p-value = 0.139			

*ns non-significant at 0.05 level*

Out of all 588 students, more than 50 per cent of the students reported a moderate level of absorption, while 53 students reported a low level of absorption in digital reading. Surprisingly it is also seen that a total of 187 students stated a high level of absorption in reading digital resources. To test the significance of variables comprising of gender and their level of absorption while reading digital resources, Chi-square test conducted and the results highlighted that there is no significant association between the variables, since the p-value of 0.139 is greater than 0.05. Overall, it

is evident from table 49 and table 50 that the respondents noticed higher content absorption level on printed resources compared to digital materials.

#### **4.4.7 Level of Comfortability While Reading Print and Digital Resources**

In recent years, improvements in e-reader technology and comfort of Smartphone reading have made digital reading a mainstream phenomenon. There was a drastic change in the reading sources in the digital revolution and now the potential reader can get to and browse the online information from the entire Web by using his/her terminal from anywhere. Though, both the printed and digital media have their own favourable circumstance and limitations, the challenge are to determine the applicability of a specific media in certain unique situation.

Regarding the users' perspective about e-books, Chu (2003) states that individuals by and large find it uncomfortable and they do not prefer to read books on screen. Slower reading speeds and increased eye fatigue have been indicated as other factors that discourage reading from screen. Students were asked to indicate their level of comfortability, while reading print resources and the analysed results are shown in table 51. Nearly 50 per cent of the respondents predominantly indicated that they are comfortable and more than 30 per cent of them stated that they are very comfortable while reading print resources. Only a few number of the students reported that they are uncomfortable with print resources while reading. Chi-square test results indicate that there exists a significant gender difference in their level of comfortability while reading print resources at 1 per cent level of significance.

**Table 51**  
**Level of Comfortability while Reading Print Resources**

Level of Comfortability	Responses (n=588)		
	Male	Female	Total
Not at all comfortable	1 (0.4%)	--	1 (0.2%)
Uncomfortable	4 (1.5%)	--	4 (0.7%)
Moderately comfortable	71 (27.1%)	40 (12.3%)	111 (18.9%)
Comfortable	118 (45%)	167 (51.2%)	285 (48.5%)
Very comfortable	68 (26%)	119 (36.5%)	187 (31.8%)
Total	262 (100%)	326 (100%)	588 (100%)
Chi-square = 29.373** ; p-value < 0.001			

\*\*Significant at 0.01 level

More than 50 per cent of the female respondents recorded that they feel comfortable while reading print resources and same opinion reported by male students are below 50 per cent. In the same way the option 'Very Comfortable' while reading print resources are also stated by more female students than male students, a trend also identified in a study done by Rowlands et al. (2007). Survey responses in their study indicate that men feel more comfortable with digital resources, while women state to be the more active readers and more comfortable with print resources. It is also interesting to observe that only a small number of the male students said that they are not comfortable with printed resources. The comfortable level while reading print materials showed a similar trend to the comprehension, concentration and absorption levels with regard to print materials.

*Analysis and Interpretations*

Table 52 detailed the level of comfortability among students while reading digital resources. Results indicate that nearly and around fifty per cent of the students revealed that they are moderately comfortable with digital resources. Also 40 per cent of them stated that they are comfortable, and a lesser number of the respondents recorded that they are uncomfortable while reading digital resources. Since the p-value is 0.139002, it can be assessed that the association between gender and their level of comfortability while reading digital resources is not significant. This makes it clear that there is no significant association between the dependent and independent variables.

**Table 52**  
**Level of Comfortability while Reading Digital Resources**

Level of Comfortability	Responses (n=588)		
	Male	Female	Total
Not at all comfortable	2 (0.8%)	--	2 (0.3%)
Uncomfortable	6 (2.3%)	24 (7.4%)	30 (5.1%)
Moderately comfortable	132 (50.4%)	151 (46.3%)	283 (48.1%)
Comfortable	99 (37.8%)	138 (42.3%)	237 (40.3%)
Very comfortable	23 (8.8%)	13 (4%)	36 (6.1%)
Total	262 (100%)	326 (100%)	588 (100%)
Chi-square = 16.501** ; p-value = 0.139002			

*ns non-significant at 0.05 level*

In the overall analysis of table 51 and table 52 it can also be inferred that the students are more comfortable with reading printed resources than digital resources. This supports the study by Saaid

### *Analysis and Interpretations*

and Wahab, (2014). They found that students spent more time to read printed material as compared to digital, where it showed that they felt uncomfortable reading digital texts for a longer period, the reason being the loss of concentration and eye fatigue. Similar to these results, in a study about gender differences in online reading environment, Liu (2008) found that a staggering 90.6 per cent of the students in the study rated online reading 'not comfortable' and they prefer paper as more comfortable medium for reading.

Of the possible elements that may have influenced students' performances when reading digitally, Tseng (2010) argued that when reading from the screen, a dark letter font on a light background is generally better, but it tends to create eye strain. At the point when a user is sitting close to the computer for any time span, the glare from a bright screen can be uncomfortable. Thus teaching students how to read hypertext is critical. Students who feel comfortable reading traditional texts printed on paper may not be familiar with reading hypertexts. In such cases, instructors need to take initiation to guide students through the process of reading digital text and help them avoid some of the pitfalls of digital reading.

#### **4.4.8 Choice of Reading Media under Different Circumstances**

While the Internet is a text-saturated world, reading on the Web screens tends to be altogether not quite the same as reading printed text. There is a sea change in the user's behaviour and attitude in information searching and use. Considering the social, cultural, and instructive objectives of reading, it is felt that it is worthwhile to know the reading habits of student's community in different circumstances.

Ross (2003) suggests that it is exceptionally fundamental to pay more consideration or attention to how readers actually engage with

### *Analysis and Interpretations*

various media, their purpose or explanation behind choosing one format over another, and the satisfaction with each format. Many individuals today require quick access to information at any time and any place. Since information on demand is turning into a typical concept, digital reading is a natural development. Readers' decisions and preferences for digital reading and reading on paper are contextual. Students in the selected universities have different perceptions and preferences in their choice of print and digital resources in different circumstances. The challenge is to determine the relevance and applicability of a particular medium in a given circumstances or conditions. For instance, digital media tend to be more useful for searching, while print media are favoured for actual consumption of information.

Here the students were asked to evaluate the circumstance affecting the choice of reading media and the outcomes are shown in table 53. By analysing the results, it is found that majority of the respondents like to choose digital media under circumstances like, for getting most recent information (83.8%) and at the time when the information need at the last minute (81.5%). Similar observation were made by Liu (2006) that majority of the participants in their study stated that they need to supplement print resources with digital resources for getting current information, coverage of materials not published in print and the desire to find complete sources.

Meanwhile more than fifty per cent of them also prefer digital resources for reading short documents, for one-time reading and for speed reading and nearly fifty per cent of them also prefer the same for casual reading. In the early 2000s, Dilevko and Gottlieb (2002) asked if undergraduates at the University of Toronto still felt that print books and print journals have something to offer, students' response was that they should use print books for their high-quality



work, whereas use of online sources was invariably associated with the need to just get things done quickly and easily.

**Table 53**  
**Choice of Reading Media under Different Circumstances**

<b>Circumstances for Reading</b>	<b>Responses (n=588)</b>		
	<b>Print Resources</b>	<b>Digital Resources</b>	<b>Both</b>
For reading short documents	177 (30.1%)	347 (59%)	64 (10.9%)
For depth and concentrated reading	495 (84.2%)	36 (6.1%)	57 (9.7%)
For casual reading (News & Entertainment)	185 (31.5%)	274 (46.6%)	129 (21.9%)
For most recent information	34 (5.8%)	493 (83.8%)	61 (10.4%)
For lengthy documents	398 (67.7%)	88 (15%)	102 (17.3%)
Something that is difficult to understand	356 (60.5%)	121 (20.6%)	111 (18.9%)
Need information at the last minute	37 (6.3%)	479 (81.5%)	72 (12.2%)
For one-time reading	168 (28.6%)	306 (52%)	114 (19.4%)
For speed reading	148 (25.2%)	341 (58%)	99 (16.8%)
For taking notes (annotation)	353 (60%)	133 (22.6%)	102 (17.3%)
For relaxed reading	445 (75.7%)	72 (12.2%)	71 (12.1%)
For reading something very important and interesting	269 (45.7%)	171 (29.1%)	148 (25.2%)

In the same way, majority of the students prefer print resources for depth and concentrated reading (84.2%) and for relaxed reading

### *Analysis and Interpretations*

(75.7%). This data supported Liu and Stork's (2000) findings which stated that many people search or browse digital documents, but when they need to have an in-depth reading of a document, they prefer to print it out for annotation. Some researchers contended that the development of digital media may give negative implication to the fact that people lack the ability to read deeply and to sustain a prolonged engaged in reading (Liu, 2005). For taking notes and for something that is difficult to understand, sixty per cent of the respondents choose print as reading media. And also, nearly 70 per cent (67.7%) of the students prefer print resources in the circumstances like reading lengthy documents and more than 45 per cent of the them prefer it and for reading something very important and interesting. Empirical data from Liu and Huang (2008) delineate that people prefer reading on paper where there is a requirement for reading lengthy documents, in-depth reading, and for taking notes.

Reading is not a single activity; rather, it shows up in assorted structures, and talented readers who know about these reading styles and strategies use them in different circumstances for different purposes. As indicated by their characteristics, the existing media support diverse styles of reading and on the other hand the readers choose dissimilar media in different circumstances (O'Hara & Sellen, 1997). Table 54 furnished below displays the male and female students' choice of reading media in different circumstances. It is clearly seen from the table that in the circumstances like for getting recent information, and also when the information is needed at the last time almost majority of the students highly prefer digital resources than print resources. But at the same time, majority of the students prefer print resources for depth and concentrated reading, for relaxed reading, and for reading lengthy documents.

**Table 54**  
**Choice of Reading Media under Different Circumstances (Gender-Wise)**

Circumstances for Reading	Male			Female			Chi-square	p-value
	Print	Digital	Both	Print	Digital	Both		
For reading short documents	75 (28.6%)	151 (57.6%)	36 (13.7%)	102 (31.3%)	196 (60.1%)	28 (8.6%)	4.04 <sup>ns</sup>	0.133
For depth and concentrated reading	208 (79.4%)	25 (9.5%)	29 (11.1%)	287 (88%)	11 (3.4%)	28 (8.6%)	11.24 <sup>**</sup>	0.004
For casual reading (news & entertainment)	62 (23.7%)	128 (48.9%)	72 (27.5%)	123 (37.7%)	146 (44.8%)	57 (17.5%)	16.27 <sup>**</sup>	<0.001
For most recent information	15 (5.7%)	212 (80.9%)	35 (13.4%)	19 (5.8%)	281 (86.2%)	26 (8%)	4.54 <sup>ns</sup>	0.103
For lengthy documents	166 (63.4%)	37 (14.1%)	59 (22.5%)	232 (71.2%)	51 (15.6%)	43 (13.2%)	8.82 <sup>*</sup>	0.012
Something that is difficult to understand	147 (56.1%)	55 (21%)	60 (22.9%)	209 (64.1%)	66 (20.2%)	51 (15.6%)	5.63 <sup>ns</sup>	0.06
Need information at the last minute	17 (6.5%)	209 (79.8%)	36 (13.7%)	20 (6.1%)	270 (82.8%)	36 (11%)	1.06 <sup>ns</sup>	0.589
For one-time reading	75 (28.6%)	118 (45%)	69 (26.3%)	93 (28.5%)	188 (57.7%)	45 (13.8%)	9.25 <sup>**</sup>	0.01
For speed reading	51 (19.5%)	159 (60.7%)	52 (19.8%)	97 (29.8%)	182 (55.8%)	47 (14.4%)	16.22 <sup>**</sup>	<0 .001
For taking notes (annotation)	136 (51.9%)	60 (22.9%)	66 (25.2%)	217 (66.6%)	73 (22.4%)	36 (11%)	21.98 <sup>**</sup>	<0 .001
For relaxed reading	178 (67.9%)	43 (16.4%)	41 (15.6%)	267 (81.9%)	29 (8.9%)	30 (9.2%)	15.44 <sup>**</sup>	<0 .001
For reading something very important and interesting	100 (38.2%)	75 (28.6%)	87 (33.2%)	169 (51.8%)	96 (29.4%)	61 (18.7%)	18.09 <sup>**</sup>	<0 .001

*ns non-significant at 0.05 level; \*\* Significant at 0.01 level; \* Significant at 0.05 level*

### *Analysis and Interpretations*

Chi-square test results depicted that there is no significant gender difference in their choice of reading media in the circumstances like for reading short documents, most recent information, for reading something that is difficult to understand and when the information is needed at the last minute, since the p-value is greater than 0.05 level of significance. This is somewhat contradictory to the past study done by Islam (2013) in which the findings showed that there is significant gender difference in terms of their opinion regarding their preference of reading digitally over reading on print in the circumstances like need information at the last minute and for reading something that is difficult to understand.

Results also indicates that there is significant gender difference in the choice of reading media under the circumstance like depth and concentrated reading, for casual reading, for reading lengthy documents, for one-time reading, speed reading, for taking notes, for relaxed reading, for reading something very important, since the p-value derived from the Chi-square test are associated either at 1 per cent and 5 per cent level of significance.

It is further clear from the table that in contrast to male student's majority of the female students likes to read print media for depth/concentrated reading (88%) and for relaxed reading (81.9%). At the same time digital media are chosen to read by male students for casual reading (48.9%) and for speed reading (60.7%). Also compared to male students more female prefer print resources for reading lengthy documents (71.2%), for taking notes (66.6%) and for reading something very important and interesting (51.8%). For one time reading more than fifty (57.7%) per cent of the female students likely to prefer digital media and it was only 45 per cent among the male students. Similarly, in a study about reading habits and attitudes in the digital age done by Islam (2013) found that there is significant gender difference in their preference of reading print over digital, when they read lengthy documents.

#### **4.4.9 Advantages and Disadvantages of Digital Resources for Reading**

In this information-saturated environment, a good amount of information can be acquired and the time assigned to reading the e-resources has increased. Considering the development of digital resources, it is important to analyse reading in this environment with the end goal of recognising which resources and strategies are utilised as part of this environment and which components of digital resources are of interest to readers. Nevertheless, people's time for reading is restricted and they cannot enhance reading time unlimitedly. Liu (2005) opined that digital media contribute to a transformative shift in reading and they additionally present a number of powerful advantages that are traditionally absent in the printed environment, for example, interactivity, non-linearity, immediacy of accessing information, and the convergence of text and images, audio and video.

In a study about enhancing screen reading strategies, Kol and Scholnik (2000) mentions that books are yesterday's technology—cumbersome, impermanent, costly, hard to find, forever out of print, slow to produce, slow to write and slow to read, and a strain on the eye. They also point out some of the benefits of digital resources for reading: they are readable in the dark, easily searchable, have a bookmark facility, and can read the text aloud. Noam (1998) predicts that paper books will turn into a secondary resource in scholarly world and that the main scholastic resources will be available through the electronic media in view of ease of access, storage, and cross-referencing.

A thorough and careful study of table 55 provides the results as far as categorisation of the lowest and highest advantages is concerned. Results confirmed that a staggering per cent of students stated that 24-hour access (88.6%) followed by quick access to information

### *Analysis and Interpretations*

(83.8%) is the main advantage of digital resources for reading. Majority of them also revealed that up-to-date information (76.7%) and download possibilities (74.1%) are the next following advantages of digital resources. This supported the statement made by Liu (2006) that digital resources have a number of advantages that are absent in printed resources such as remote access, 24-hour access, and multiple users for a single sources. Concerning the advantages of digital reading which is listed in the table, lowest priority is reported by 54.3 per cent of students for link to additional information. Ismail and Zainab (2005) found that reasons for reading digital resources include online access, rapid and easy access to new titles, no need to visit libraries, quick search, convenience, user-friendly, and 24-hour access.

**Table 55**  
**Advantages of Digital Resources for Reading**

<b>Advantages</b>	<b>Male (n=262)</b>	<b>Female (n=326)</b>	<b>Total</b>	<b>Z-value</b>	<b>p-value</b>
24 hours access	232 (88.5%)	289 (88.7%)	521 (88.6%)	0.038 <sup>ns</sup>	0.970
Quick access to information	219 (83.6%)	274 (84%)	493 (83.8%)	0.151 <sup>ns</sup>	0.880
Portable	165 (63%)	175 (53.7%)	340 (57.8%)	2.287*	0.022
No limit on storage	166 (63.4%)	174 (53.4%)	340 (57.8%)	2.458*	0.014
Ability to browse	157 (59.9%)	195 (59.8%)	352 (59.9%)	0.026 <sup>ns</sup>	0.979
Up-to-date information	203 (77.5%)	248 (76.1%)	451 (76.7%)	0.402 <sup>ns</sup>	0.688
Link to additional information	150 (57.3%)	169 (51.8%)	319 (54.3%)	1.312 <sup>ns</sup>	0.189
Time saving	176 (67.2%)	234 (71.8%)	410 (69.7%)	1.204 <sup>ns</sup>	0.229
Download possibilities	186 (71%)	250 (76.7%)	436 (74.1%)	1.559 <sup>ns</sup>	0.119
Multimedia information	172 (65.6%)	173 (53.1%)	345 (58.7%)	3.121**	0.002
Any other	2 (0.8%)	1 (0.3%)	3 (0.5%)	0.738 <sup>ns</sup>	0.461

*\*\* Significant at 0.01 level; \* Significant at 0.05 level; ns non-significant at 0.05 level*

### *Analysis and Interpretations*

In order to evaluate the significance of variables comprising gender and the advantages of digital resources, independent Z-test applied. Results indicate that there is no significant gender difference in their opinion about the advantages such as 24 hours access, quick access to information, ability to browse, up-to-date information, link to additional information, time saving and download possibilities provided by digital resources for reading, since the p-value is greater than 5 per cent level of significance.

Contrary to this findings, in a study about what do faculty and students really think about e-books, Rowlands et al. (2007) found that up-to-dateness and around-the-clock availability are the main advantages of digital resources for reading and male students tend to rate these aspects much more highly than female students. By applying Z-test, the results confirm that there is significant gender difference in their opinion about the advantages like portability, no limit on storage and multimedia facility about the digital resources for reading, since the p-value is less than either at 0.01 and 0.05 level of significance. Further it is clear from the results that in contrast with female students, more male students give priority to advantages like portability, unlimited storage and multimedia information of digital resources for reading.

Although more and more reading is occurring on screen, certain issues are still associated with reading in this mode. E-books can be taken on the bus or to the beach, but digital texts do not have the “unique tactile characteristics of paper” (Dillon, 1992). When comparing paper books and e-books, Kol and Scholnik (2000) mentioned other disadvantages of e-books: they require batteries, can break if dropped, are costly, and more difficult to lend or sell. At a close look at table 56, results regarding the disadvantages of digital resources for reading, majority of the respondents (85.2%) reveal that

### *Analysis and Interpretations*

eye strain is the main disadvantage of digital resources for reading followed by physical strain (74.8%). In Duran's (2013) study, the students expressed that the most serious distress is eye strain and back pain disregarding numerous positive sides of reading through the screen. Eyestrain is one of the generally reported reasons for print preference over digital resources. Chou (2012) in a study about understanding on-screen reading behaviour in scholarly context stated that participants reading from a screen made them experience the ill effects of eyestrain, an issue they did not connect with print-based texts. Hence, students reading print texts will probably continue reading at one sitting than students using screen-based texts (Bernhardt, 1993).

**Table 56**  
**Disadvantages of Digital Resources for Reading**

<b>Disadvantages</b>	<b>Male (n=262)</b>	<b>Female (n=326)</b>	<b>Total</b>	<b>Z- value</b>	<b>p- value</b>
Restricted accessibility	82 (31.3%)	102 (31.3%)	184 (31.3%)	0.002 <sup>ns</sup>	0.998
Unwanted information	140 (53.4%)	173 (53.1%)	313 (53.2%)	0.089 <sup>ns</sup>	0.929
Eyestrain	215 (82.1%)	286 (87.7%)	501 (85.2%)	1.898 <sup>ns</sup>	0.058
Physical strain	188 (71.8%)	252 (77.3%)	440 (74.8%)	1.531 <sup>ns</sup>	0.126
Outdated materials	65 (24.8%)	89 (27.3%)	154 (26.2%)	0.686 <sup>ns</sup>	0.493
Distraction	164 (62.6%)	165 (50.6%)	329 (56.0%)	2.940 <sup>**</sup>	0.003
Lack of awareness	69 (26.3%)	107 (32.8%)	176 (29.9%)	1.723 <sup>ns</sup>	0.085
Power problems	142 (54.2%)	225 (69%)	367 (62.4%)	3.701 <sup>**</sup>	<0.000
Software bugs	122 (46.6%)	177 (54.3%)	299 (50.9%)	1.869 <sup>ns</sup>	0.062
Not robust	89 (34%)	75 (23%)	164 (27.9%)	2.931 <sup>**</sup>	0.003

*\*\* Significant at 0.01 level; ns non-significant at 0.05 level*



### *Analysis and Interpretations*

Tseng (2008) concentrated the difficulties with reading text on the screen and depicted in five sorts, such as eyestrain and eyes-blurred, bright background colour, easy to skip lines, small font size and radiation from the screen and so on. Power problem is the next disadvantage mentioned by 367 students. This data supported Damilola's (2013) findings, which found that poor electricity supply greatly hindered the use of e-resources and poor Internet availability was another hindrance expressed by respondents. While more than fifty per cent of the students said that unwanted information, distraction and software bugs are the main problems they faced with reading digital resources.

Similarly, Mizrachi (2010) infers that explanations behind favouring print included eyestrain from reading on the screen and a lot of online distraction in digital reading. Reading digitally tends to distract reader's attentions with the overwhelming component in the interface and therefore a strategy ought to be executed to avoid such issues to improve the reader's comprehension and concentration (Saa'id & Wahab, 2014). More than quarter per cent of the students reported that restricted accessibility, outdated materials, lack of awareness and not robust are the main problems while reading digital resources. These sorts of complaints guide research development departments of technology companies to enhance their products with digital screens, e.g., paper like screen provide lusterless vision so as to protect eyes and let students spend more time with their reading.

Table 56 exhibited the results of gender comparison in their opinion about the disadvantages of digital resources for reading. However, by applying independent Z-test, it is found that there is no significant gender difference in their opinion about the some factors that hinder the effective use of digital resources for reading like restricted

### *Analysis and Interpretations*

accessibility, unwanted information, eyestrain, physical strain, outdated materials, lack of awareness and software bugs, since the p-value is greater than 0.05. Bashorun, Isah and Adisa (2011) in a study about electronic library use by academic staff at the University of Ilorin, Nigeria found that slow Internet access and absence of constant power supply were the major factors hindering the utilisation of digital resources. Cushman (1986) finds that visual fatigue is significantly higher when reading texts on a screen than on paper and trusts that e-book technology has far to go before it can equal the readability and richness of printed books.

Further the independent Z-test results also reveals that there is significant gender difference in their viewpoint about the disadvantages of digital reading like distraction, power problem and not robust, since the p-value is less than 0.01 level of significance. Male students exceeded female students in their opinion about the disadvantages of digital resources like distraction and not robust. Supporting this, Liu and Stork (2000) reported in their study that reading print materials is less distracting than reading online. But power problems while digital reading is reported by more (69%) number of female students than male students.

#### **4.4.10 Advantages and Disadvantages of Print Resources for Reading**

In spite of many years of work by computer engineers and e-reader designers to enhance the optics, display, and ease of navigation of virtual texts, readers still have a general inclination for the print presentation, particularly with regards to longer, all the more challenging material. A few researchers have started to think that this long-standing preference for print might be more attitudinally based than objective, and reflect readers' inability to actively engage

### *Analysis and Interpretations*

with digital texts from which they are trying to teach (Tanner, 2014). Students were asked for the features of print resources they considered to be the most important or advantageous for reading and the results are presented in table 57. Analysing the respondents' reply, majority of the students give more priority to the advantages like tangibility (78.4%), physical comfort of print resources (76.9%) and no power requirement (75.5%).

**Table 57**  
**Advantages of Print Resources for Reading**

<b>Advantages</b>	<b>Male (n=262)</b>	<b>Female (n=326)</b>	<b>Total</b>	<b>Z- value</b>	<b>p- value</b>
Tangibility (physical existence)	203 (77.5%)	258 (79.1%)	461 (78.4%)	0.485 <sup>ns</sup>	0.628
Portable	135 (51.5%)	156 (47.9%)	291 (49.5%)	0.886 <sup>ns</sup>	0.376
No power is required	188 (71.8%)	256 (78.5%)	444 (75.5%)	1.885 <sup>ns</sup>	0.059
No vision problem	174 (66.4%)	229 (70.2%)	403 (68.5%)	0.992 <sup>ns</sup>	0.321
Content quality	99 (37.8%)	154 (47.2%)	253 (43.0%)	2.319*	0.020
Flipping pages	118 (45%)	142 (43.6%)	260 (44.2%)	0.359 <sup>ns</sup>	0.720
Physical comfort	190 (72.5%)	262 (80.4%)	452 (76.9%)	2.225*	0.026
Sentimental value	167 (63.7%)	207 (63.5%)	374 (63.6%)	0.061 <sup>ns</sup>	0.951
Any other	2 (0.8%)	3 (0.9%)	5 (.9%)	0.208 <sup>ns</sup>	0.835

\* Significant at 0.05 level; ns non-significant at 0.05 level

Nunberg (1994) notes that browsing a document database will never be quite as informative as browsing a bookstore or library stacks, since electronic documents don't bear physical traces of their provenance the way print books do. Nearly 70 per cent of them said that they have no vision problem and 64 per cent have sentimental value for print resources while reading. A comprehensive review by Ziefle (1998) reached the conclusion that paper is superior to computer, in light of the display screen qualities whereby the eyes

### *Analysis and Interpretations*

tire all the more rapidly. Next priority was given to the portability of print medium and it was supported by nearly fifty per cent of the respondents.

Darnton (2014) opined that almost 50 per cent of French students consider the smell of a print book to be a key part of their reading experience. Nearly 45 per cent of students replied content quality and feature of flipping pages while reading print resources are the advantages attracted to them. Mizrachi (2015) in a study about undergraduates' academic reading format preferences and behaviours, observed some of the favourable circumstances that are mentioned by students about print resources are less eyestrain, tactile aspects of holding, flipping and thumbing, sustained concentration, and greater inclination to highlight and annotate the printed text.

Meanwhile, the results of the independent Z-test detailed in the table indicate that Z-value is statistically non-significant at 0.628, 0.376, 0.059, 0.321, 0.720, 0.951 and 0.835, which means there is no significant gender difference in their opinion about the advantages like tangibility, portability, no power is required, no vision problem, flipping pages, and sentimental value, respectively of print resources for reading. With reference to the difficulty of vision problem encountered while digital reading a contrary finding was reported by Kang, Wang and Lin (2009). They found that female students had significantly less eye fatigue than male students due to male spending a longer time on digital reading than female. Results of Z-test also reveal that there is significant gender difference in their opinion about the advantages like content quality and physical comfort of print resources for reading, since the p-value is less than 0.05 level of significance. That means male and female students have difference of opinion regarding the advantages like content quality and physical comfort of print resources. Female students give more priority to these advantages than male students.

### *Analysis and Interpretations*

In contrast, students additionally recognised many negative characteristics that hindered the print reading experience. The arrival and proliferation of digital resources have a number of significant impacts on the use of print resources for reading. Table 58 depicted response of students about the disadvantages they felt while reading print resources.

Majority (71.3%) of the students acknowledged that cost is the main problem, a finding similar to that of Mizrachi (2015). Students in this study reported some factors influenced their preferences in favour of electronic format: strain caused by the weight of print material, and the cost of print material. Mizrachi further stated the comment made by the respondents that if the cost of print and digital version is same, they prefer paper version, because reading on the computer makes the information harder to understand.

**Table 58**  
**Disadvantages of Print Resources for Reading**

<b>Disadvantages</b>	<b>Male (n=262)</b>	<b>Female (n=326)</b>	<b>Total</b>	<b>Z-value</b>	<b>p-value</b>
Difficulty of getting updated information	173 (66%)	236 (72.4%)	409 (69.6%)	1.660 <sup>ns</sup>	0.097
Outdated materials	124 (47.3%)	152 (46.6%)	276 (46.9%)	0.170 <sup>ns</sup>	0.865
Difficulty of indexing the contents	69 (26.3%)	71 (21.8%)	140 (23.8%)	1.282 <sup>ns</sup>	0.200
Storage problem	186 (71%)	214 (65.6%)	400 (68.0%)	1.391 <sup>ns</sup>	0.164
Physical damage	182 (69.5%)	215 (66%)	397 (67.5%)	0.908 <sup>ns</sup>	0.364
Difficult to search	146 (55.7%)	177 (54.3%)	323 (54.9%)	0.347 <sup>ns</sup>	0.729
Cost	181 (69.1%)	238 (73%)	419 (71.3%)	1.041 <sup>ns</sup>	0.298
Lack of additional information	152 (58%)	165 (50.6%)	317 (53.9%)	1.797 <sup>ns</sup>	0.072

*ns non-significant at 0.05 level*

### *Analysis and Interpretations*

Seventy per cent of the students opined about the difficulty of getting updated information in print media. These findings seems to match those of Herath (2010) in a study about effect of the Internet on reading behaviour, reported that up-to-date information was the major reason for respondents to choose digital resources over printed resources. Herath further communicated that online materials for instance, Websites convey a rich user experience by aggregating all the relevant information together. Many of them offer interactive features which engage the reader to create an interactive environment.

Storage problem and physical damage caused to printed text are the next main problem they felt while reading which is stated by nearly 70 per cent of the students. Difficult to search and lack of additional information in the printed resources is the next disadvantage mentioned by more than fifty per cent of the students. However, by applying independent Z-test, Z-value is found to be non-significant at 0.05, which infers that there is no significant gender association with regards to the disadvantages of print resources for reading.

#### **4.5 Attitude towards Digital Reading**

Attitudes towards reading have been characterised as individuals feelings about reading, which result in approaching or avoiding reading tasks (Cooter & Alexander, 1984). Attitude has been appeared to be a significant dimension in reading. If attitude, the main prerequisite for reading is not positive, then it is likely that the other necessity such as motivation, attention, comprehension and acceptance won't happen at all or will happen haphazardly (Brooks, 1996). Positive dispositions or attitude, mindsets, and beliefs are key measurements of successful reading and learning, especially for students growing up in a digital information age (Coiro, 2012).

### *Analysis and Interpretations*

Students who enjoy reading and who perceive themselves to be good readers will read more frequently and more widely, which in turn expands their reading experience and improves their comprehension skills. Reading attitudes are learnt characteristics that impact whether students participate in or abstain from reading activities and they can be affected by societal, familial, and scholastic based variables (Zarra-Nezhad, Shooshtari & Vahdat, 2015). Attitudes towards reading have been positively identified with attainment across studies. Compared with enjoyment of reading, the relationship between reading attitudes and attainment is clearer and the proof more consistent that research has repeatedly found that positive reading attitudes are linked to achievement (McKenna & Kear, 1990).

More youthful eras, who grew up with a scope of alternative media forms for reading and had a totally different balance between printed and digital media amid their youth (Allen, 2013). Digital texts incorporate an extended perspective of texts and, according to Leu et al. (2008), these digital texts can be “nonlinear, multimodal with a heavy visual orientation, interactive, unbound in time and space, with murky conveyance of authorship and authority”. On the Internet, characteristics or qualities of digital texts become more complicated to comprehend in light of the fact that there are hyperlinks and paths that the user/reader can follow to search for information, entertainment, communication, and community. These paths require the reader to be able to settle on decisions about which paths to follow (Leu et al., 2008). Therefore it is essential to know how students feel about reading digital texts, because of the relative newness of this form of reading, which are rapidly becoming more widespread.

### *Analysis and Interpretations*

Leu et al. (2008) summarised research in the range of students' comprehension of digital and Internet texts and in their interpretation of the studies they reasoned that students "enjoy utilising the Internet". Ramirez (2003) is of the opinion that the young generation who have more experienced with computers and grown up with this technology will reveal distinctive attitude towards reading in digital environment. In this study, attitudes towards digital reading were assessed by students agreement or disagreement to twenty four statements listed in table 59.

It is found that nearly fifty (49%) per cent of the students favoured to the statement that digital reading is one of their favourite activities and also get really excited about what they read digitally. According to Skinner, Kindermann and Furrer (2009), while most pupils at first feel positive about reading, the individuals who are not good at reading frequently create negative attitudes towards it. They likewise reported in their review that these negative attitudes could much of the time be reversed by intervention programmes that helped to enhance their skills, change their view of themselves as readers, in this way motivating them to improve. Meanwhile around 33 per cent of the students neither agree nor disagree that they spend lot of spare time for digital reading. Also 43 per cent of the respondents give a negative attitude towards reading digitally while at home. When they get free time they like to read digitally which was opined by 50 per cent of the students.

A staggering 88 per cent of the students favoured digital reading as they access up-to-date information and also helps to get in 24 X 7 hours. Nearly 40 per cent of the students neither agree nor disagree with the statement that they quickly forget what they read digitally and feel anxious when they have lot of digital reading to do. Almost close to 50 per cent of the students not supported the statement that



### *Analysis and Interpretations*

they tried but just cannot read digitally well. More than fifty per cent of the students have negative feeling for getting upset when they think about having to read digitally and positive feeling for the liking towards digital reading. Nearly 50 per cent of the students favoured the opinion that encountering unfamiliar words and getting tired and sleepy is the hardest part of digital reading and around 42 per cent of the students have a negative feeling towards the statements like digital reading required a lot of help, lot of hard work and it's a very difficult exercise.

**Table 59**  
**Attitude towards Digital Reading**

Statements	Responses (n=588)				
	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Digital reading is one of my favorite activities	29 (4.9%)	100 (17.0%)	176 (29.9%)	230 (39.1%)	52 (8.8%)
I get really excited about what I have read digitally	12 (2.0%)	104 (17.7%)	184 (31.3%)	251 (42.7%)	37 (6.3%)
I spend a lot of my spare time for digital reading	33 (5.6%)	172 (29.3%)	192 (32.7%)	167 (28.4%)	24 (4.1%)
Digitally I read a lot, when I am at home	59 (10.0%)	195 (33.2%)	185 (31.5%)	130 (22.1%)	19 (3.2%)
I like to read digitally whenever I have free time	8 (1.4%)	90 (15.3%)	194 (33%)	259 (44%)	36 (6.1%)
I can access up-to-date information through digital reading	1 (0.2%)	11 (1.9%)	54 (9.2%)	328 (55.8%)	194 (33%)
Digital reading helps me to get information in 24 X 7 hours	2 (0.3%)	9 (1.5%)	57 (9.7%)	259 (44%)	261 (44.4%)
I quickly forget what I have read digitally even if I have just read it	26 (4.4%)	180 (30.6%)	227 (38.6%)	132 (22.4%)	23 (3.9%)

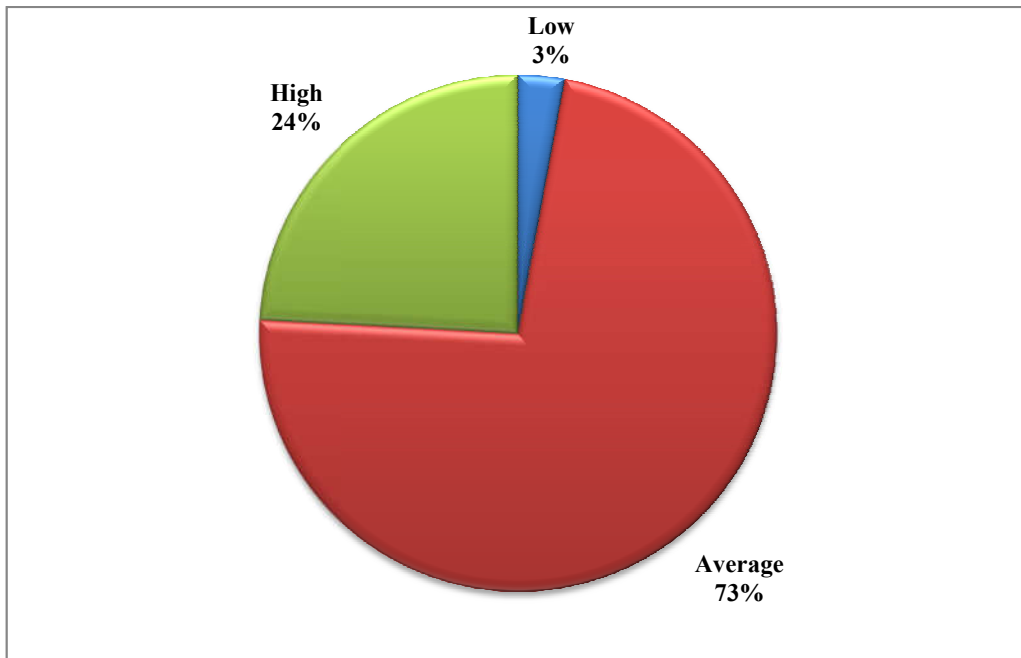
*Analysis and Interpretations*

I try very hard, but I just cannot read digitally very well	52 (8.8%)	222 (37.8%)	196 (33.3%)	105 (17.9%)	12 (2.0%)
I get upset when I think about having to read digitally	86 (14.6%)	225 (38.3%)	196 (33.3%)	74 (12.6%)	7 (1.2%)
Encountering unfamiliar words is the hardest part of digital reading	25 (4.3%)	112 (19%)	168 (28.6%)	235 (40%)	48 (8.2%)
When I read digitally I usually get tired and sleepy	17 (2.9%)	134 (22.8%)	167 (28.4%)	211 (35.9%)	59 (10%)
I often feel anxious when I have a lot of digital reading to do	34 (5.8%)	162 (27.6%)	217 (36.9%)	154 (26.2%)	21 (3.6%)
I need a lot of help in digital reading	49 (8.3%)	188 (32%)	173 (29.4%)	146 (24.8%)	32 (5.4%)
Digital reading is one of the best ways for me to learn new things	1 (0.2%)	33 (5.6%)	140 (23.8%)	310 (52.7%)	104 (17.7%)
There are better ways to learn new things than by digital reading	10 (1.7%)	112 (19%)	197 (33.5%)	200 (34%)	69 (11.7%)
Digital reading makes me more relaxable	22 (3.7%)	173 (29.4%)	265 (45.1%)	121 (20.6%)	7 (1.2%)
It is easier for me to understand what I read digitally if pictures, audio & video are included	1 (0.02%)	21 (3.6%)	90 (15.3%)	293 (49.8%)	183 (31.1%)
I like digital reading very much	13 (2.2%)	104 (17.7%)	173 (29.4%)	265 (45.1%)	33 (5.6%)
Digital reading is a very difficult exercise	43 (7.3%)	209 (35.5%)	200 (34%)	120 (20.4%)	16 (2.7%)
I get a lot of enjoyment from digital reading	26 (4.4%)	93 (15.8%)	204 (34.7%)	248 (42.2%)	17 (2.9%)
Digital reading is very informative	1 (0.2%)	6 (1%)	78 (13.3%)	379 (64.5%)	124 (21.1%)
Digital reading gives me more fun	8 (1.4%)	127 (21.6%)	262 (44.6%)	173 (29.4%)	18 (3.1%)
Digital reading needs a lot of hard work	25 (4.3%)	224 (38.1%)	224 (38.1%)	107 (18.2%)	8 (1.4%)

### *Analysis and Interpretations*

Kretzschmar et al. (2013) did a study that compared reading effort on three distinct media such as an e-reader, a paper page and a tablet computer and furthermore examined the eye movement, brain activity and reading speed while reading these three media. Results reveal that all the students preferred reading on paper, despite the fact that the study found no support for it being more effortful to read on digital media. The authors propose that it is more about individuals' attitude towards digital media than the actual reading experience. Digital reading is one of the best ways to learn new thing which is supported favourably by nearly 70 per cent of the students. Around 45 per cent of them have positive feeling to the statement that there are better ways to learn new things than by digital reading and also get a lot of enjoyment from digital reading. At the same time 45 per cent of the students neither agree nor disagree that digital reading makes them more relaxable and fun. Above 80 per cent of the students have a favoured opinion that it is easy for them to understand what they read digitally, if pictures, audio and video are included and that is also very informative.

A score for attitude towards digital reading is calculated by adding the scores of statements related to attitude towards digital reading. For each aspect, a score of 0, 1, 2, 3, and 4 were given to the response strongly disagree, disagree, neither agree nor disagree, agree and strongly agree in the case of positive statement and reverse score were given in the case of negative statements. Then the total scores is divided by the maximum expected score (number of statements x 4) and multiplied it by 100 to get the percentage score. Then these percentage score is classified into three equal classes. Low level with scores less than 33.3, average level in between 33.3 and 66.7 and high level with score greater than 66.7. Assessment of attitude towards digital reading is given in Figure below.



**Figure 4**  
**Attitude towards Digital Reading**

From the figure it can be clearly seen that a majority (73%) of the students have an average level of attitude towards digital reading. Meanwhile nearly quarter (24%) per cent of the students have high attitude and a few students (3%) have a low attitude towards digital reading. Ackerman and Lauterman (2012) let 80 undergraduate engineering students read five texts either on paper or computer screen under three diverse time conditions. For two texts they were allowed just seven minutes to read (pressured), for two texts they were permitted as much time as they required (free) and for one text the participants thought they could use as much time as they needed, however were interrupted after seven minutes. The paper readers generally got better results, yet not under the interrupted time condition. The results of this study demonstrate that the problem with screen reading is more psychological than technological.

### *Analysis and Interpretations*

Percentage score for the attitude were subjected to Kolmogrov-Smirnov test to test the normality of the variable. Test statistic Kolmogrov-Smirnov Z (1.041) found to be non-significant as the p-value (0.229) is greater than 0.05 level. Hence the percentage scores were subjected to parametric test for testing the significant difference among the sub samples based on gender, discipline and university.

With the end goal for students to develop into effective readers, they must possess both the skill and the will to read. As noted by Guthrie and Wigfield (2000), motivation is the thing that activates behaviour. The degree to which students positively or negatively take part in reading is impacted incredibly by the attitude they have towards reading. Student's attitude towards reading is a focal component influencing reading performance. Student's attitude to digital reading can be affected by their recreational and academic experiences. These experiences may differ for male and female students.

Here the researcher tried to identify the male and female student's attitudes towards digital reading by applying independent Z-test. From the analysed results given in table 60, Z-value is found to be significant at 0.01, since the p-value is less than 0.01. It is clear that there is significant gender difference in the attitudes towards digital reading. However, it doesn't agree with the study of Karim and Hasan (2007), which found no significant difference between the attitude of men and women towards digital reading.

**Table 60**  
**Attitude towards Digital Reading (Gender-Wise)**

<b>Gender</b>	<b>N</b>	<b>Mean</b>	<b>Std. Deviation</b>	<b>z-value</b>	<b>p-value</b>
Male	262	60.07	13.43	3.801**	< 0.001
Female	326	55.99	12.48		

\*\* Significant at 0.01 level

### *Analysis and Interpretations*

Comparing the mean scores with those from male (60.07), the female students have a lower mean scores (55.99) and hence it can be concluded that the male students have more positive attitudes towards digital reading than the female students. A trend also identified in a study done by Liu (2008), which stated that female students were more unsatisfied with digital reading (30.9 per cent vs. 18.8 per cent) and male students have more positive attitude towards digital reading, compared to female (30 per cent vs. 22 per cent) students. This is somewhat contradictory to the past research that female students have more positive attitudes toward digital reading than male students (Allen, 2013). Again another interesting contradictory finding was observed by Huang et al. (2013) that both genders represented positive attitudes towards reading digitally.

Table 61 shows the results of discipline-wise analysis of attitudes towards digital reading. By applying one way ANOVA test, p-value is found to be greater than 0.05, hence F-value is non-significant at 0.05. Also the mean score value of three discipline is almost found to be similar.

**Table 61**  
**Attitude towards Digital Reading (Discipline-Wise)**

<b>Discipline</b>	<b>N</b>	<b>Mean</b>	<b>Std. Deviation</b>	<b>F-value</b>	<b>p-value</b>
Science	191	58.01	12.35	0.754 <sup>ns</sup>	0.471
Humanities	191	57.00	13.30		
Social Science	206	58.47	13.49		

*ns non-significant at 0.05 level*

It is clear that there is no significant association between discipline and attitudes towards digital reading. This result does not fit, however, with past research conducted by Karim and Hasan (2007) about reading habits and attitude in the digital age. They explored

### *Analysis and Interpretations*

127 undergraduate students' reading habits and attitudes across two disciplines, namely, Information Technology and Arts. They found that there is a significant difference between students of these two majors, i.e., students of Arts have a more positive attitude towards digital reading and enjoy reading more compared to students of Information Technology.

Table 62 highlights the results of university-wise comparison of attitudes towards digital reading. By conducting statistical test one way ANOVA, It is clearly seen that p-value is greater than 0.05, hence F-value is non-significant at 0.05 level. Thus it can be concluded that there is no significant association between the variables.

**Table 62**  
**Attitude towards Digital Reading (University-Wise)**

<b>University</b>	<b>N</b>	<b>Mean</b>	<b>Std. Deviation</b>	<b>F-value</b>	<b>p-value</b>
University of Kerala	175	58.38	13.30	0.262 <sup>ns</sup>	0.853
Mahatma Gandhi University	111	57.78	13.71		
University of Calicut	140	57.09	13.55		
Kannur University	162	57.81	13.06		

*ns non-significant at 0.05 level*

In this way, attitude, a person's prevailing feelings and evaluative beliefs about something assume a noteworthy part in motivation to participate in particular activities. In relation to education, student's attitudes have an essential part in their motivation or willingness to take part in academic exercises, such as reading. In the mean time, student's attitudes impact their willingness to participate in an activity, such as reading and it is notable that students who spend the most time engaged in reading have the highest achievement.

Here it was found that students have an average level of attitude towards digital reading.

#### **4.6 Influence of Digital Resources on Reading**

Changes in reading behaviour are a key issue identified with information explosion – how do students interact with information in an inexorably digital environment. Digital resources are currently becoming extremely popular among users and the increased mechanisation of print encouraged a shift from intensive reading to extensive reading. In today's information intensive environment, browsing or scanning is turning into a principal reading pattern (Liu, 2012). Birkerts (1994) stresses that in our culture, access is not a problem, but rather proliferation is and the reading demonstration is fundamentally different than it was in its earliest days. Universities offer more classes through online; news enterprises give e-newspapers; and distributors and publishers release more e-books and journals and accordingly the online availability of content based information is consistently increasing.

As argued by Carr (2008) the impact of the Internet and digital reading may have influenced and altered the individual's reading patterns. Then again, some argue that digital media have filled in as a catalyst prompting new styles of printed books with graphics in new structures and configurations, non-sequential organisation, and multiple layers of meaning. Youth are spending increasing amounts of time in conversations with others in this nonlinear hyperlinked condition which has significantly influenced the way in which youth read and interact with each other (Saa'id & Wahab, 2014).

Digital texts are characterised by their richness and profundity of the information they provide through nodes or chunks of information that are linked together (Amer, Albarwani & Ibrahim, 2010). As Coiro



(2003) indicates digital resources introduce new supports and in addition new challenges that can have a great impact on an individual's ability to comprehend what he or she reads. Digital texts are commonly interactive, nonlinear, and comprehensive of multiple media forms. Every one of these characteristics affords new open doors, while likewise showing a range of difficulties and challenges that require new thought processes for making meaning.

#### **4.6.1 Influence of Different Facilities in Making Change in Digital Reading**

Innovative advances are drastically altering the texts and tools available to students for reading in the digital environment. Since 2007, the number of gadgets available for displaying digital text has increased potentially. Technology can be more than a tool for drilling students on skills; it can be an instrument for acquiring the vocabulary and background knowledge fundamental to turning into a skilled reader (Biancarosa & Griffiths, 2012). According to Hillesund (2011), reading is influenced by the design of handheld devices and current multipurpose personal computers (e.g., iPad) in light of the fact that new designs present better approacher for using hands and fingers (e.g., touch screens). New technology may make it conceivable to perform onscreen reading activities for an extended time frame.

Here the researcher tried to understand the influence of different facilities in making change in the digital reading of students. As per the detailed results depicted in table 63, majority (68.2%) of the students opined that with the availability of laptop, net book, mobile phone, ipad and Internet, their digital reading increases. Herath (2010) stated that the Internet or computer based activities make reading more enjoyable. Such activities likewise motivate students' to become active participants, encourage them to utilise critical reading skills, and enhance students reading fluency and understanding of content.

**Table 63**  
**Influence of Different Facilities in**  
**Making Change in Digital Reading**

Facilities	Responses (n=588)		
	Increases	Decreases	No change
Availability of Laptop, Net book, Mobile Phone, I pad	401 (68.2%)	123 (20.9%)	64 (10.9%)
Availability of Open Access Resources	237 (40.3%)	124 (21.1%)	227 (38.6%)
Availability of the Internet	362 (61.6%)	151 (25.7%)	75 (12.8%)
Availability of Computer networks (LAN, Wi-Fi)	287 (48.8%)	112 (19%)	189 (32.1%)
Availability of E- reader	292 (49.7%)	61 (10.4%)	235 (40%)

In a similar vein, table 64 shows the gender-wise analysis of influence of difference facilities in making change in digital reading.

**Table 64**  
**Influence of Different Facilities in**  
**Making Change in Digital Reading (Gender-Wise)**

Facilities	Male (n=262)	Female (n=326)	Z-value	P-value
Availability of Laptop, Net book, Mobile Phone, I-pad	191 (72.9%)	210 (64.4%)	1.843 <sup>ns</sup>	0.065
Availability of Open Access Resources	112 (42.7%)	125 (38.3%)	0.689 <sup>ns</sup>	0.491
Availability of the Internet	171 (65.3%)	191 (58.6%)	1.315 <sup>ns</sup>	0.188
Availability of Computer networks (LAN, Wi-Fi)	145 (55.3%)	142 (43.6%)	1.996*	0.046
Availability of E- reader	138 (52.7%)	154 (47.2%)	0.940 <sup>ns</sup>	0.347

*ns non-significant at 0.05 level; \* Significant at 0.05 level*

### *Analysis and Interpretations*

Result of Z-test shows that there is no significant gender difference in the percentage of positively influenced users, due to availability of all the resources, except availability of computer networks (LAN, Wi-Fi) facility. In the case of availability of computer networks (LAN, Wi-Fi), 55.3 per cent of the male students have positive influence which is significantly higher than the percentage of positively influenced female students.

#### **4.6.2 Distraction while Digital Reading**

Readers today need to overcome old reading habits identified with conventional print-based texts, while obtaining and exploiting new, innovative methodologies that consider the nature of electronic texts. Readers sometimes waste time; notwithstanding, navigating to Websites irrelevant to their interest areas or topics can frequently distract their attention further. Liu (2003) opined that as the amount of information increases, the ability to understand the meaning of written documents becomes more difficult and also in a saturated information environment, attention to the content has decreased considerably. Moreover, poor Web page design may disturb their Web based reading process, and some content and connected sites can pose troubles for readers at specific levels (Park & Kim 2016).

To understand the digital content clearly, it is important to find about the characteristics of the text. As indicated by Eden and Eshet-Alkalai (2012) reading from digital displays particularly from computer screen creates severe usability problems that the readers must adapt to. Among these issues are the large distance from the display, the long lines, the issue in shifting the eye-gaze from line to line and the blurring of text on computer screen. One of the most potential negative impacts of the digital environment is its effect on natural reading pattern. In the online condition, readers need to

### *Analysis and Interpretations*

adapt to an enormous measure of content and read selectively. In addition to adapting to potentially distracting colourful or blinking graphics, audio, and video, readers often become disoriented on the grounds that they need to make constant choices on which hyperlink to click or whether to scroll further down, instead of devoting full attention to reading (Liu, 2008).

Students were asked whether they get distracted while reading digitally. It can be seen from table 65 that out of 588 students, 45.1 per cent of the students reported that they get distracted by the links, colours and advertisements of the digital materials while reading. Supporting these findings, Herath (2010) in a study about the effect of the Internet on reading behaviour reported that the graphics, video, and other commercial content in the online resources cause higher distraction levels to the readers. While a few number of the students indicated that they did not get distracted (9.4%) by digital reading, and nearly fifty per cent of them indicated that they sometimes get distracted.

**Table 65**  
**Distraction while Digital Reading**

<b>Responses</b>	<b>Male</b>	<b>Female</b>	<b>Total</b>
Yes	115 (43.9%)	150 (46%)	265 (45.1%)
No	25 (9.5%)	30 (9.2%)	55 (9.4%)
Sometimes	122 (46.6%)	146 (44.8%)	268 (45.6%)
Total	262 (100%)	326 (100%)	588 (100%)
Chi-square = 0.264 <sup>ns</sup> ; p-value = 0.877			

*ns non-significant at 0.05 level*

### *Analysis and Interpretations*

Schmar-Dobler (2003) observes that the Internet content has blinking graphics, vivid colour, and lots of eye-catching phrases that can guide or distract from the reading. Eveland and Dunwoody (2001) opined that while reading digitally, readers need to take a great deal of decision regarding, the text to read, which link to follow while reading, and whether or not to scroll down the page and they were confronting decreasing concentrated and in-depth reading in general. This raises an imperative concern that the online reading is disrupting individuals' natural sustained reading behaviour.

Chi-square test performed to look for an association between gender and distraction by the links, advertisements and colours of digital materials while reading. Since the p-value is 0.877 which is greater than 0.05, it can be assessed that the association between the dependent and independent variable is not significant. This makes it clear that there is no significant association between gender and distraction by the links, advertisements and colours of digital materials while reading.

As proposed by Leu et al. (2011) certain online reading strategies and skills are required by the people to achieve comparative levels of reading experience as on paper. Readers need to control the distractions while reading digitally and try to dedicate more effort to concentrate on the content. While reading paper based materials, they have a tendency to maintain a strategic distance from distractions by going to a peaceful and quiet place. Similarly, students require some aptitude and skills to filter out distractions like banner advertisements that hinder sustained reading and to pick the appropriate amount of relevant information in digital environment. Educational instructors can incorporate these skills in the curriculum particularly for young generations who have the tendency to have more exposure to online materials.

#### **4.6.3 Helpfulness of Different Features while Digital Reading**

When reading conventional texts printed on paper, students start reading from the top left-hand corner and complete at the bottom right-hand corner. Their eyes move in a straight line, which is a direct or linear activity. However, when reading hypertexts, students can click a hyperlink to discover certain information. As they click the different hyperlinks, they are frequently taken to a different Web page. While browsing diverse Web pages, they are involved in great deal of reading activities. The Internet gives new text formats and diverse elements to interact with the information on the Web pages. Digital reading is thus not a linear activity any longer. For reading digital texts, readers cannot turn page by page as they do on a printed book. They need to figure out how to navigate and explore the digital text, and navigational skills transform readers into dynamic information explorers (Tseng, 2010).

As Murphy et al. (2003) asserted students require more advanced strategic processing abilities when endeavouring to read and grasp hypertext. Students were asked to indicate whether or not the following listed features helped their digital reading and the results are shown in table 66. A staggering 99.1 per cent of the students opined that save and download feature helped them a lot for digital reading. The pages in computer environment on which the information is exhibited are outlined as long pages on which the scroll bar is used up and down so as to get to the information and short pages on which the information is partitioned into small pieces and viewed using back and forward button. Vast majority of the students revealed that cursor (95%) and scroll bar (86.1%) helped the students for reading digitally.

**Table 66**  
**Helpfulness of Different Features while Digital Reading**

<b>Features</b>	<b>Helped</b>	<b>Did not Helped</b>	<b>No Difference</b>
Scroll bar	506 (86.1%)	47 (8.0%)	35 (6.0%)
Cursor	556 (94.6%)	18 (3.1%)	14 (2.4%)
Hyperlinks	417 (70.9%)	80 (13.6%)	91 (15.5%)
Tagging	107 (18.2%)	239 (40.6%)	241 (41%)
Bookmarking	248 (42.2%)	115 (19.6%)	225 (38.3%)
Save & Download	583 (99.1%)	1 (0.2%)	4 (0.7%)
Copy & Paste	443 (75.3%)	45 (7.7%)	100 (17%)
Highlighting	201 (34.2%)	158 (26.9%)	228 (38.8%)
Search, Find	411 (69.9%)	41 (7.0%)	136 (23.1%)

Liu (2005) opined that flipping and scanning (a reading pattern associated with printed documents) is not just a method for locating information in a document, additionally a way to get a sense of the entire content. Scrolling on a computer screen does not support this mode of reading and information processing. Readers tend to build up a visual memory for the location of items on a page and within a document. Scrolling weakens this relationship. Majority of the students indicated that copy and paste (75.3%), hyperlinks (71%),

### *Analysis and Interpretations*

and search, find (70%) features also helped them for reading digitally. Kol and schcolnik (2000) clarified that despite the fact that readers can use the find function to search for a key word on a digital text, find function does not take readers straight forwardly to the desired location, it will highlight the desired keyword throughout the text, however the readers still need to scroll down pages to locate the exact section.

Chou (2012) proposed that reading in a hypertext environment where supplemental information was given through hyperlinks made reading and learning more worthy and enjoyable. Feature of bookmarking is also helpful for digital reading which was stated by 42.2 per cent of the students. Moreover, researchers (Huang, Chern & Lin, 2009) investigating how skillful reading takes place generally agree that skillful readers use more global strategies, such as having a reason as a main priority, previewing text or using typographical aids, than unskillful readers. At the same time 41 per cent of them equally said that tagging feature did not help or they did not feel any difference with or without these features. Nearly 40 per cent of the students stated that they had not found any difference with or without the feature of highlighting.

Table 67 details the results of Mann-Whitney U-test by comparing the gender wise opinion of students regarding their opinion about the features that helped or not while reading digitally. It is clear through the statistical test, as the p-value is greater than 0.05 level, Z-value is not significant hence accepted null hypothesis and conclude that there is no significant gender difference in their opinion, about the features like scroll bar, cursor, hyperlinks, tagging, copy, paste and highlighting that helped them for digital reading. The findings related to the gender and their opinion about the helpfulness of features like



hyperlink and copy, paste for digital reading is contrary to the observation made by some researchers.

**Table 67**  
**Helpfulness of Different Features while Digital Reading**  
**(Gender-Wise)**

<b>Features</b>	<b>Male (n=262)</b>	<b>Female (n=326)</b>	<b>Z- value</b>	<b>p- value</b>
Scroll bar	233 (88.9%)	273 (83.7%)	1.711 <sup>ns</sup>	0.087
Cursor	248 (94.7%)	308 (94.5%)	0.104 <sup>ns</sup>	0.917
Hyperlinks	191 (72.9%)	226 (69.3%)	0.810 <sup>ns</sup>	0.418
Tagging	67 (25.6%)	40 (12.3%)	1.787 <sup>ns</sup>	0.074
Bookmarking	140 (53.4%)	108 (33.1%)	3.281 <sup>**</sup>	0.001
Save & Download	262 (100%)	321 (95.5%)	3.889 <sup>**</sup>	0.000
Copy & Paste	196 (74.8%)	247 (75.8%)	0.242 <sup>ns</sup>	0.809
Highlighting	107 (40.8%)	94 (28.8%)	1.801 <sup>ns</sup>	0.072
Search, Find	205 (78.2%)	206 (63.2%)	3.388 <sup>**</sup>	0.001

*ns non-significant at 0.05 level; \*\* Significant at 0.01 level*

Barnett et al. (2012) in their study about academic reading at Loughborough University revealed that compared to male students more female students (55% of female compared with 40% of male) stated that when reading they copy and pasted materials from online resources. Similarly Large et al. (2002) in a study of Web searching behaviour of sixth-grade students find that boys click more hyperlinks per minute than girls, and boys tend to perform more page jumps per minute than girls.

### *Analysis and Interpretations*

Results of Mann-Whitney U-test also reveals that in the features like save and download, search, find and bookmarking, p-value is less than 0.01, Z-value is significant, hence rejected the null hypothesis and concluded that there exists significant gender difference in their opinion about the features like save and download, search, find and bookmarking that helped them to read digitally.

By observing the table, compared with female students, all the male students stated that the features like save and download helped a lot for reading digitally, and also majority (78.2%) of them favoured search, find feature and a good number (53.4%) of them favoured bookmarking feature. Interestingly, these findings demonstrated similarities to the findings of Liu (2008) about gender differences in the online reading environment that male students tend to book mark electronic documents for future reading more often than female.

Similarly, in a study about Web searching behaviour of sixth-grade students, Large et al. (2002) found that groups of boys on the average save and download more than girls, and they have no difference of opinion in search and find features of digital reading that helped them, which is not substantiated the findings of this study.

#### **4.6.4 Influence of Different Factors while Digital Reading**

With the quick improvement of computer-based instructions, such as Web and courseware, the inclination to obtain information through computers, especially in an online form emerges subsequently. Also the readability of text on computer screens is essential to ensure a powerful interaction with the media (Ali et al., 2013). Generally, readability refers to the speed and comfort of reading and the comprehension of its importance. In particular, the

### *Analysis and Interpretations*

legibility of words, sentences, and paragraphs characterises the level of readability. Readability is likewise identified with features and layout of text which influence the understanding of the meaning that the author expected to pass on (Barth, 2008). There are many variables that can influence or enhance the readability of text on a computer screen, such as font colour, font size, type face, text layout, background colour, etc.

A study by Shaikh and Chaparro (2005), which measured the reading habits of Internet users involving five types of documents, namely journal articles, news, periodicals, written text, and product information, found that readers will probably read journals in printed documents and the news, periodicals, written text, and product information in online documents. Therefore, the studies looking on the factors affecting the readability of online text is concluded imperative. This thought is significant, because readability is the most important factor influencing the efficiency and fatigue of one's work. Furthermore, in the role of writers to design documents with good readability, it is important to ensure that messages can be conveyed effectively to the readers (Ali et al., 2013).

Table 68 indicates the level of influence of different factors on the digital reading of the students. By analysing the results it is found that nearly fifty per cent of the students mentioned that the factors like font size and text layout is highly influencing while reading digitally. For computer based instructional design, selection of appropriate fonts has an impact on students, especially in terms of recognising and reading the symbols effectively. At the same time more than fifty per cent of the students stated that type face (font type) (51%) and back ground colour (54%) are the most influential factor while digital reading.

**Table 68**  
**Influence of Different Factors while Digital Reading**

<b>Factors</b>	<b>Response (n=588)</b>				
	<b>Not at all Influential</b>	<b>Slightly Influential</b>	<b>Somewhat Influential</b>	<b>Very Influential</b>	<b>Extremely Influential</b>
Font colour	63 (10.7%)	192 (32.7%)	146 (24.8%)	162 (27.6%)	25 (4.3%)
Font size	10 (1.7%)	82 (13.9%)	219 (37.2%)	228 (38.8%)	49 (8.3%)
Typeface (Font type)	15 (2.6%)	86 (14.6%)	187 (31.8%)	243 (41.3%)	57 (9.7%)
Text layout	13 (2.2%)	79 (13.4%)	206 (35%)	245 (41.7%)	45 (7.7%)
Background colour	14 (2.4%)	78 (13.3%)	182 (31%)	228 (38.8%)	86 (14.6%)

One of the seldom highlighted issues identified with text and font is readability and the common influencing factors affecting the readability are spaces, font size and font type (Ali et al., 2013). Also, a standout amongst the most troublesome tasks for Web designer is having the capacity to select harmoniously matching colour combinations, because the effective use of colour is fundamental for legibility in Web design. Evidence exhibits that colour improve learning and motivation. Hence, the best possible decision of background and foreground colours is important in assuring good legibility (Erdogan, 2008). Meanwhile level of influence of font colour is very low among the students which were reported by 44 per cent of the students.

Mann-Whitney U-test conducted to understand the gender difference in the level of influence of different factors while reading digitally. In the above said factors like font colour, font size and type face, p-value is less than 0.01, Z-value is significant hence rejected the null hypothesis and conclude that there exists significant gender

difference in their viewpoint about the level of influence of above mentioned factors for digital reading.

**Table 69**  
**Influence of Different Factors while**  
**Digital Reading (Gender-Wise)**

Factors	Index of Influence		Z-value	P-value
	Male	Female		
Font colour	58.30	51.46	3.041**	0.002
Font size	43.32	38.19	2.805**	0.005
Typeface (Font type)	43.32	36.89	3.251**	0.001
Text layout	40.74	39.80	0.719 <sup>ns</sup>	0.472
Background colour	37.40	37.58	0.131 <sup>ns</sup>	0.896

*ns non-significant at 0.05 level; \*\* Significant at 0.01 level*

By analysing the influence of different factors on digital reading among the students depicted in table 69, it is understood that the factors like font colour, font size and type face are more influential for the male students than the female students while reading digitally. Results of Mann-Whitney U-test also reveals that there is no significant gender difference in their opinion about the level of influence of factors like text layout and background colour while digital reading, since the p-value is greater than 0.05 level of significance.

#### **4.6.5 Changes on Reading Practices by Digital Reading**

Studies related with digital resources and its impact on peoples reading behaviours exhibit mixed conclusions. Some researchers have recognised the powerful advantages of digital media which are absent in printed materials, others have criticised the impact of the Internet on human cognition and reading capabilities (Herath, 2010). Based on a survey of 113 people who have broad experience in Web based reading in the US, Liu's (2005) study finds a screen-based

### *Analysis and Interpretations*

reading behaviour is emerging. The screen-based reading behaviour is portrayed by more time on browsing and scanning, one-time reading, non-linear reading, and reading more selectively, while less time is spent on in-depth reading, concentrated reading, and diminishing sustained attention.

Students were asked to respond about the changes on their reading practice by digital reading and the findings are depicted in table 70. Of the respondents, a staggering 95 per cent of the students agreed that a superficial or quick reading behaviour is increased due to digital reading. Due to large amount of advanced digital materials available on the Internet, the students searched through numerous Web pages everyday looking for a piece of information. Subsequently, they tended to skim read and scanned most material in order to get through it fast. As indicated in table, majority (86%) of the students in this survey disagree with the statement that their browsing and scanning while digital reading decreases. Consistent with these findings over 80 per cent of participants in a survey reported by Liu (2005) revealed that a greater percentage of time was spent on browsing and scanning.

Individuals like to browse and discover things by accidents. According to a study by the Poynter Institute (2000), Web users have a tendency to do a great deal of brief scanning, foregoing rapidly through many article summaries, however when their interest is caught they will dive into a specific topic or article in-depth. Majority (84%) of the students disagree that their keyword spotting practice has decreased in digital reading. It seems that the students employ keyword spotting as a strategy to locate needed information as a way to cope with the overloaded information environment.

**Table 70**  
**Changes on Reading Practices by Digital Reading**

<b>Changes on Reading Practices</b>	<b>Responses (n=588)</b>				
	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neither Agree nor Disagree</b>	<b>Agree</b>	<b>Strongly Agree</b>
Increased interactive reading	9 (1.5 %)	67 (11.4%)	147 (25%)	238 (40.5%)	127 (21.6%)
Decreased browsing & scanning	170 (28.9%)	336 (57.1%)	69 (11.7%)	13 (2.2%)	--
Increased sequential reading	4 (0.7%)	87 (14.8%)	170 (28.9%)	241 (41%)	86 (14.6%)
Decreased keyword spotting	185 (31.5%)	305 (51.9%)	72 (12.2%)	23 (3.9%)	3 (0.5%)
Increased superficial (Quick) reading	2 (0.3%)	4 (0.7%)	26 (4.4%)	264 (44.9%)	292 (49.7%)
Decreased one time reading	56 (9.5%)	245 (41.7%)	113 (19.2%)	161 (27.4%)	13 (2.2%)
Increased concentrated reading	178 (30.3%)	242 (41.2%)	134 (22.8%)	32 (5.4%)	2 (0.3%)
Increased extensive reading	13 (2.2%)	117 (19.9%)	139 (23.6%)	189 (32.1%)	130 (22.1%)
Decreased sustained attention	13 (2.2%)	90 (15.3%)	151 (25.7%)	198 (33.7%)	135 (23%)
Increased reading selectively	2 (0.3%)	19 (3.2%)	102 (17.3%)	362 (61.6%)	103 (17.5%)
Increased in-depth reading	229 (38.9%)	226 (38.4%)	109 (18.5%)	22 (3.7%)	--

### *Analysis and Interpretations*

It is also observed that majority (80%) of them favoured to the statement that digital reading increases their selective reading practice. A trend also identified in a study (Liu, 2005) that approximately 78 per cent of the students report that they read more selectively. In the information-abundant world, attention turns into a scarce resource and people have a tendency to be more specific when they confront an overwhelming amount of information. In a search for pertinent information, readers tend to exhibit more frequent and more overt selectivity, which thus prompts both more partial understanding and deeper understanding (Liu, 2005).

Shallower and less in-depth reading is another feature of hyper-extensive reading. Majority of the students in this study disagree that digital reading increases their in-depth reading (77.3%) and concentrated reading (71.5%). These outcomes supported the statement made by Levy (1997) that the development of digital libraries and e-resources has resulted in tendency of people to less in-depth as well as more inconsequent and non-concentrated reading. Further the researcher also observes that the digital environment has a tendency to urge people to explore numerous subjects extensively, yet at a more superficial level.

A glimpse of table 70 also reveals that digital reading increases their interactive reading, and it is reported by a good (63%) number of the students. Herath (2010) infers that some digital materials, for example, Websites offer various interactive features that help the reader to create an interactive environment and these features enable online material to be more appealing to use. It can also be noticed that nearly 60 per cent of the students in this study mentioned decrease in sustained attention and increase in sequential reading. Hyper-reading (e.g. jump) may affect sustained

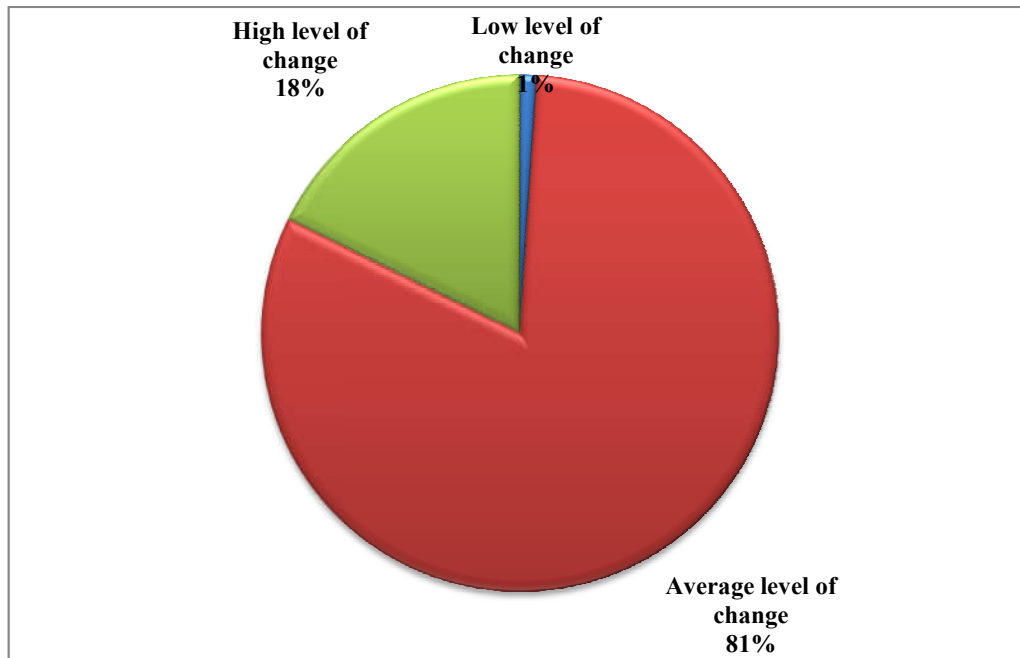


### *Analysis and Interpretations*

attention and contributes to more fragmented reading, since each page has to compete with many other pages for users attention.

Upholding to these results, Herath (2010) found that short attention span was often found in digital reading and numerous respondents stated that they had low levels of concentration and moved their focus therefore missed out a lot of words while reading and portrayed this as less engrossed and less careful reading practices. Stoll (1995) takes note of that hyperlink distract people from reading and thinking deeply about a solitary subject. Further it is watched that more than fifty per cent of the students disagree with the statement that the reading practices such as one time reading has decreased and in the mean time, they also agree that their extensive reading has increased through digital reading.

A score for perception about changes on reading practices by digital reading is calculated by adding the scores of statements related to it. For each statement, a score of 0, 1, 2, 3, and 4 were given to the response strongly disagree, disagree, neither agree nor disagree, agree and strongly agree in the case of positive statement and reverse score were given in the case of negative statements. Then the total score is divided by the maximum expected score (number of statements x 4) and multiplied it by 100 to get the percentage score. Then these percentage score is classified into three equal classes. Low level with scores less than 33.3, average level in between 33.3 and 66.7 and high level with score greater than 66.7. Assessment of changes on reading practices by digital reading is given in the figure number 5.



**Figure 5**  
**Changes on Reading Practices by Digital Reading**

It can be inferred that majority (81%) of the students reported an average level of change is occurred on their reading practices by digital reading. Also a high level of change in their reading practices is stated by nearly 20 per cent of the students. A few number of the students (1%) also reported a low level of change through digital reading. Score for perception about changes on reading practices by digital resources were subjected to Kolmogrov-Smirnov test to test the normality of the variable. Test statistic Kolmogrov-Smirnov Z (2.451) is found to be significant, as the p-value is less than 0.01 levels. Hence the index subjected to non parametric test for testing the significant difference among the sub samples based on gender and discipline.

Mann-Whitney U-test conducted for comparing the changes on reading practices by digital reading among male and female

### *Analysis and Interpretations*

students. As per the test results given in table 71, p-value is less than 0.05, Z-value is significant hence rejected the null hypothesis and conclude that there exists a significant gender difference in their changes on reading practices by digital reading.

**Table 71**  
**Changes on Reading Practices by Digital Reading (Gender-Wise)**

<b>Gender</b>	<b>N</b>	<b>Mean</b>	<b>Std. Deviation</b>	<b>z-value</b>	<b>p-value</b>
Male	262	57.76	11.25	2.385*	0.017
Female	326	55.66	11.33		

*\* Significant at 0.05 level*

Mean score is higher for male students which indicate that the changes on reading practices by digital reading are greater for the male students than the female students. This is somewhat contradictory to the study reported by Shabani et al. (2011) about reading behaviour in digital environment among higher education students. They found in their study that the difference in mean scores of various reading practices between male and female students in Isfahan University is not statistically significant.

For comparison between disciplines, Kruskal-Wallis's ANOVA done and the results are depicted in table 72. Chi-square value is found to be significant at 0.01 level. Hence pair wise comparison of the different discipline was done with Mann-Whitney U-test. Results show that there exists significant association between discipline and changes on reading practices by digital reading.

**Table 72**  
**Changes on Reading Practices by Digital Reading (Discipline-Wise)**

<b>Discipline</b>	<b>N</b>	<b>Mean</b>	<b>Std. Deviation</b>	<b>Chi-square value</b>	<b>p-value</b>
Science	191	52.94 <sup>c</sup>	11.45	40.862**	< 0.001
Humanities	191	56.50 <sup>b</sup>	9.75		
Social Science	206	60.08 <sup>a</sup>	11.55		

\*\* Significant at 0.01 level

Mean score is higher in the case of Social Science group and lower for that of Science group. This indicates that Social Science group feels significantly more change in their reading practices compared with other two groups and Science group shows low change compared with other two groups.

In an inexorably networked environment, the new generation readers gradually develop the new reading behaviour and progressively change their traditional reading practices. The students believe that digital reading increased their interactive reading, quick reading, browsing, scanning, keyword spotting, selective reading and sequential reading and at the same time decreases concentrated reading, in-depth reading, one time reading and sustained attention. It indicates that the online readers need to utilise print sources for in-depth and concentrated reading. The alarming factor is the decline in the concentrated and in-depth reading, which might be due to the hyperlinks embedded in the digital text, blinking images, unwanted Websites and scrolling of Web pages. Every one of these issues should be settled to read the digital resources with full concentration. These practices of reading are exceptionally basic for actual consumption of information and knowledge to qualify instructive as well as competitive examinations.

However, different new technological devices for reading like Kindle of Amazon can make digital reading easy. Likewise, it is extremely essential to create awareness among students about the deep Web and open access Web resources. It is relevant to note that students who engage in in-depth and concentrated reading have developed self-confidence and they know their capacity to read and open entry way for them.

#### **4.6.6 Factors Hinder the Effective Use of Digital Resources for Reading**

The digital or electronic information resources are increasingly becoming accessible due to application of information and communication technologies. As a result, the use of digital resources is growing all the more quickly indicating a shift in readers' preferences towards digital resources. There are various problems which become hurdles for the students to use digital resources.

Ndubuisi (2013) argued that inspite of the fact that the e-resources have numerous advantages, issues in getting to and utilising Web-based or electronic information resources are still noticed, especially among post graduate students. This study tries to understand the problem, which students were confronting while using digital resources. Egberogbe (2011) listed some factors hindering the use of e-resources in Nigeria higher institutions, some of the factors listed are inadequate strategic planning, lack of adequate or reliable funding, lack of Internet to give information services to users and an absence of consistent training for users in new ICT services.

According to the filled-in questionnaires, the researcher found some problems that are faced by the students when they are reading digitally. As per the outcomes displayed in table 73, around 61.1 per cent of the students indicated that to some extend, slower reading

### *Analysis and Interpretations*

comprehension is the main factor hindering them for the effective use of digital resources for reading. More than fifty per cent of the students stated that difficulty to read on screen (53.4%), difficulty to formulate search term (51.2%) and lack of skill/competency in ICT (50.5%) are the major problems hindering them to some extent for digital reading.

**Table 73**  
**Extend of Hindrances made by the Different Factors for the Effective Use of Digital Resources for Reading**

Factors	Responses (n=588)			Level of Hindrance
	To a Great Extend	To Some Extend	Not at All	
Slower reading comprehension	151 (25.7%)	359 (61.1%)	78 (13.3%)	56.0
Lack of Internet access	176 (29.9%)	285 (48.5%)	127 (21.6%)	54.0
Difficult to formulate search term	153 (26%)	301 (51.2%)	134 (22.8%)	51.5
Lack of knowledge about proper sites	209 (35.5%)	293 (49.8%)	86 (14.6%)	60.5
Difficult to evaluate the sources	223 (37.9%)	263 (44.7%)	102 (17.3%)	60.5
Difficult to read on screen	201 (34.2%)	314 (53.4%)	73 (12.4%)	61.0
Lack of interest	73 (12.4%)	284 (48.3%)	231 (39.3%)	36.5
Difficult to save and download	8 (1.4%)	119 (20.2%)	461 (78.4%)	11.5
Lack of skill/competency in ICT	75 (12.8%)	297 (50.5%)	216 (36.7%)	38.0

Hornbaek and Frokjaer (2003) also found similar result in their study that slower reading comprehension and increased eye fatigue are the major problems the students stated for not reading articles online. A major problem however identified by Egberongbe (2011),

### *Analysis and Interpretations*

are of the same opinion with the result of this research results i.e., lack of information retrieval skills for exploiting e-resources, thus making the level of use of resources by the students is very low. At the same time nearly fifty per cent of the students also opined that lack of knowledge about proper sites, lack of Internet access, lack of interest and difficulty to evaluate the sources also hindering to some extent their effective use of digital resources.

In an attempt to identify likely problems hindering the effective use of e-resources on students reading culture, Ajayi et al. (2014) reported that most of the students have inadequate skill on how to use e-resources, and also poor Internet facility is a key factor hindering the use of e-resources. Surprisingly it is also noted that more than three quarter of the respondents also stated that saving and downloading the digital resources is not at all a problem for them for digital reading which means a good number of the students has expertise in saving and downloading the digital text for reading.

For each factor, a score of 0, 1 and 2 were given to the responses not at all, to some extent, and to a great extend always respectively. Then the index of level of hindrance to each factor is calculated with the given formula

$$Index = \frac{(0f_1 + 1f_2 + 2f_3)}{2} \times 100$$

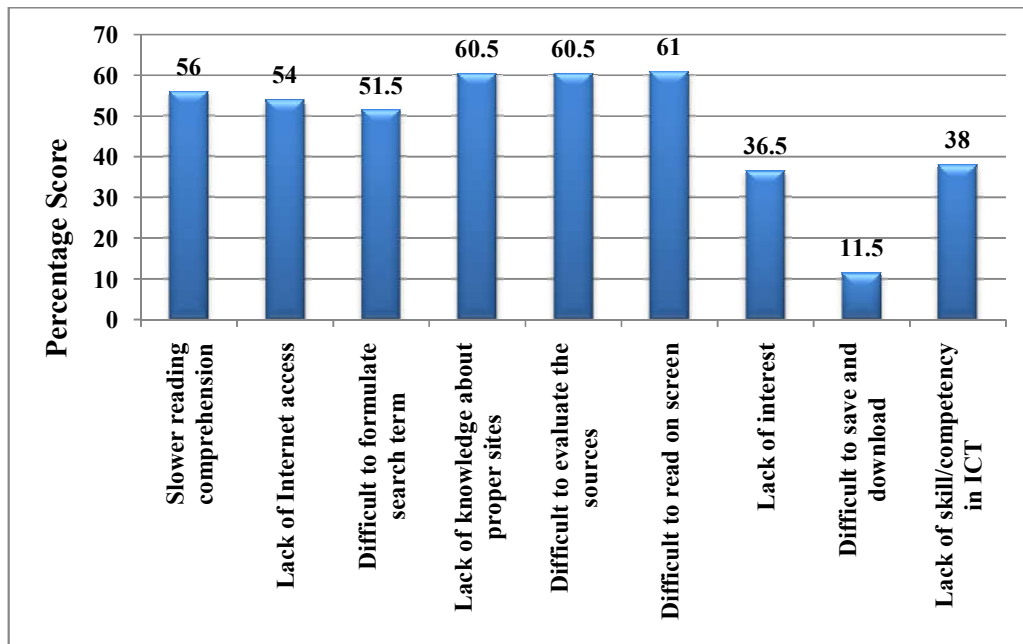
Where

- f<sub>1</sub> = number of respondents responded as not at all
- f<sub>2</sub> = number of respondents responded as to some extend
- f<sub>3</sub> = number of respondents responded as to a great extend

Based on the index for each factor, level of hindrance can be assessed as low level with a score less than 33.3, average level in between 33.3 and 66.7 and high level with a score greater than 66.7.

### *Analysis and Interpretations*

A graphical representation of the extent of hindrance made by different factors for the effective use of digital resources for reading are depicted in figure 6.



**Figure 6**  
**Extent of Hindrance made by Different Factors for the Effective Use of Digital Resources for Reading**

It is clearly seen that the major hindrances faced by more than 60 per cent of the students for the effective use of digital resources are their difficulty to read from screen, lack of knowledge about proper sites and difficulty in evaluating the sources. Followed by these more than fifty per cent of them stated that slower reading comprehension, lack of Internet access and difficulty in formulating the search term are the hindrances they faced for the effective use of digital resources.

More recently, however several studies of information seeking on the Web have pointed to gender differences in young searchers. Table 74 detailed the gender wise analysis of level of hindrance made by different factors for the effective use of digital resources for reading.



### *Analysis and Interpretations*

For gender wise comparison, Mann-Whitney U-test conducted and the test results reveal that p-value is greater than 0.05, Z-value is not significant, hence accepted the null hypothesis and concluded that there is no significant gender difference in their opinion, about the factors like slower reading comprehension, lack of Internet access, difficulty to formulate search term, lack of knowledge about proper sites, difficulty to evaluate the sources, difficulty to read on screen and lack of interest that hinder the effective use of digital resources for reading.

**Table 74**  
**Extend of Hindrance made by Different Factors for the Effective Use of Digital Resources for Reading (Gender-Wise)**

Factors	Extend of Hindrance		Z-value	P-value
	Male	Female		
Slower reading comprehension	58.0	55.0	1.303 <sup>ns</sup>	0.193
Lack of Internet access	52.5	55.5	0.887 <sup>ns</sup>	0.375
Difficult to formulate search term	50.0	53.0	0.904 <sup>ns</sup>	0.366
Lack of knowledge about proper sites	57.5	63.0	1.744 <sup>ns</sup>	0.081
Difficult to evaluate the sources	58.5	61.5	1.097 <sup>ns</sup>	0.272
Difficult to read on screen	60.0	61.5	0.758 <sup>ns</sup>	0.448
Lack of interest	35.0	37.5	1.072 <sup>ns</sup>	0.284
Difficult to save and download	8.5	14.0	2.763 <sup>**</sup>	0.006
Lack of skill/competency in ICT	31.5	43.0	4.232 <sup>**</sup>	<0.001

*ns non-significant at 0.05 level; \*\* Significant at 0.01 level*

Meanwhile the test results also shows that there exists a significant gender difference in their opinion about the hindrance of factors such as difficult to save, download and lack of skill/competency in ICT for digital reading. As the p-value is less than 0.01, Z-value is

### *Analysis and Interpretations*

significant, hence rejected the null hypothesis and concluded from the results that difficult to save and download and lack of skill/competency in ICT are great hindrance for the female students to read digitally than the male students.

The technological advancements influence reader's information seeking behaviour and strategies of information searching. As per Shuling (2007), digital resources have turned into a noteworthy asset in every university library. The advancement of digital resources has hugely transformed information handling and management in academic environments. Though, reader's inclinations are leaning towards using digital resources, they are constrained by different issues.

#### **4.6.7 Perception about the Influence of Digital Resources on Reading**

Studies on reading habits among college students have gained as much consideration in recent years, because of the influence of digital resources made available through the Internet (Liu, 2005). Several scholars in reading and literacy such as Landow (1998) and Lanham (1993) agree that the computerised media brought through dynamic advancement of ICT has introduced a transformative shift in reading and writing. Students have been known to be exceptionally open to various forms of media in their reading practices. New generations are spending increasing amount of time in conversations with others in this nonlinear, hyperlinked environment which has significantly influenced the way in which youth read and communicate with each other.

Saaid and Wahab (2014) in a study about impact of digital materials on students reading habit reveals that a good number of the respondents agreed that their reading habits had changed and their

### *Analysis and Interpretations*

enthusiasm for reading had developed, because of the emergence of digital publications such as online newspapers, magazines, books and journals. Similarly, Shen (2006) directed a study with the purpose to determine the impact of computer technology on college students' reading habits and concludes that the students' reading habits change from paper-based to Internet-based reading.

Table 75 indicates the student's perception about the influence of digital resources on the reading. The result indicated that more than 40 per cent of the students agreed with the statement, digital resources improve their reading habit. The declining interest in reading among students in higher institution is a challenge to all, as it affects the educational standard and the quality of graduates sent into the society, while in this study nearly 50 per cent of them disagreed that digital resource reduces their reading interest. This finding seems to agree with (Makotsi, 2005) in the literature reviewed. A handful of them disagreed with the fact that digital reading reduces their reading interest.

In seeking the respondents' biggest impact of digital emergence, Saaid and Wahab (2014) revealed that majority of them agreed that their reading habits have changed and their interest in reading have developed due to the emergence of digital materials such as e-newspapers, e-books and e-zines. As mentioned earlier, researchers investigating digital reading suggested that such an environment increases readers' engagement in reading practices (Ramirez, 2003; Chou, 2012). Further, the table also shows nearly 70 per cent of the students believed that it has expanded their reading possibility; while around quarter per cent of them neither agree nor disagree to the above said statement. Meanwhile more than half of the students favoured the statement that digital resources decrease the time spend on reading.

**Table 75**  
**Perception about Influence of Digital Resources on Reading**

<b>Influence of Digital Resources on Reading</b>	<b>Response (n=588)</b>				
	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neither Agree nor Disagree</b>	<b>Agree</b>	<b>Strongly Agree</b>
It improves my reading	46 (7.8%)	157 (26.7%)	142 (24.1%)	176 (29.9%)	67 (11.4%)
It reduces my reading interest	65 (11.1%)	213 (36.2%)	190 (32.3%)	115 (19.6%)	5 (0.9%)
It has expanded my reading possibility	5 (0.9%)	27 (4.6%)	152 (25.9%)	279 (47.4%)	125 (21.3%)
It decreases the time spend on reading	21 (3.6%)	137 (23.3%)	113 (19.2%)	281 (47.8%)	36 (6.1%)
It makes reading more enjoyable	13 (2.2%)	112 (19%)	191 (32.5%)	250 (42.5%)	21 (3.6%)
Reading digital resources is a waste of time	126 (21.4%)	249 (42.3%)	194 (33%)	17 (2.9%)	2 (0.3%)
Digital resources badly affect my reading habit	67 (11.4%)	117 (19.9%)	168 (28.6%)	222 (37.8%)	14 (2.4%)
It has improved my independent and life-long reading skills	5 (0.9%)	88 (15%)	219 (37.2%)	196 (33.3%)	80 (13.6%)
It decreases my dependence on print resources	44 (7.5%)	170 (28.9%)	106 (18%)	209 (35.5%)	59 (10%)
It increases my access to wide variety of information sources	1 (0.2%)	15 (2.6%)	105 (17.9%)	272 (46.3%)	195 (33.2%)

### *Analysis and Interpretations*

Contrary to this Loan (2011) found that improved access to relevant information through the Internet has increased the time spend on reading by students. The students retrieve, with a single click, many hits identified with his/her field of interest easily and each hit is by all accounts more valuable and interesting than another. The reading of the relevant hits, in a steady progression, definitely increases the time spent on reading. In any case, it is likewise possible that students may be doing other things during surfing the Internet like online chatting, playing games and watching videos. All type of these activities may be responsible for decreasing time spent on reading.

Liu (2005) reported that a document on the Web has an average of nine links; this implies that when a user accesses a Web document, he/she in the meantime has a possibility of accessing nine other documents. Individuals are confronted with the sheer volume and collection of information and how much time they choose to spend on reading is an essential decision, given the way that they cannot expand the time on reading boundlessly. Reading on computer screen is even more a scanning type and as mentioned earlier, in-depth and concentrated reading is decreasing. Around 40 per cent of the students stated that digital resources badly affect their reading habit. Igbokwe, Obidike and Ezeji (2012) stated that ICT technology especially the Internet technology is having adverse effect on the reading culture of Nigerians. This is because it discourages lazy students from engaging in serious reading.

The table also reveals that nearly 50 per cent of the respondents agreed that reading digital resources is enjoyable, also helps to improve the independent and lifelong reading skills and it decreases their dependence on print resources. These findings are reflective of the study conducted by Ajayi et al. (2014) that reveals how e-resources influence reading culture and most of the respondents

### *Analysis and Interpretations*

reveal that it improves their reading habit; it has expanded their reading possibility; it makes reading enjoyable and also improved their independent and life-long reading skills. Also, as per the results revealed by Loan (2011), majority of the students strongly agree that digital resources decrease their dependence on print sources. The Internet provides access to a wide range of digital sources available in any part of globe related to various branches of knowledge and hence decreases dependence on print sources.

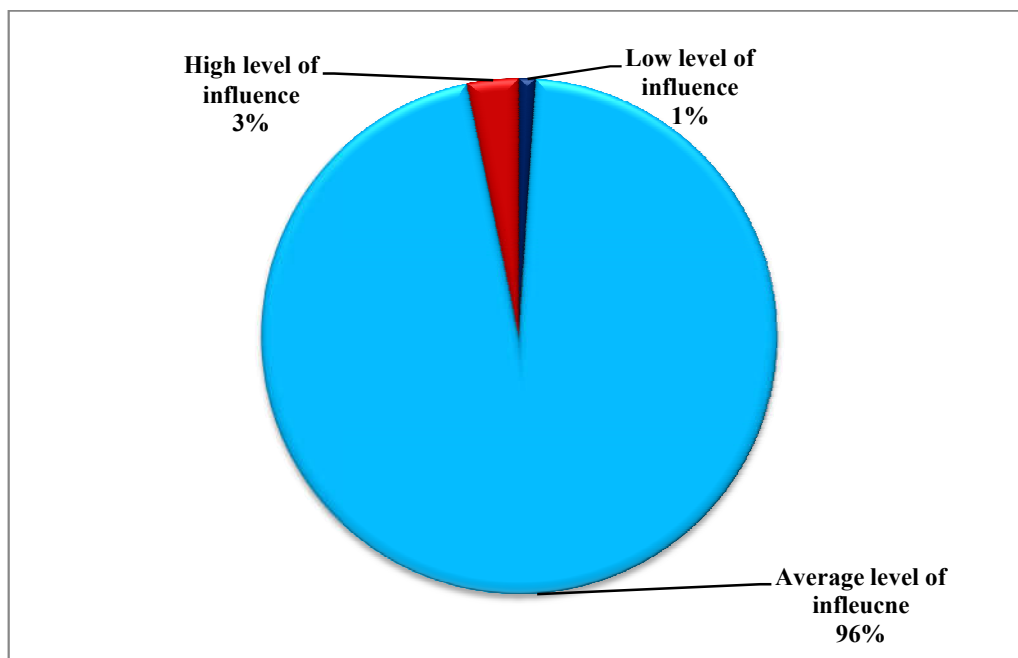
The table below also revealed that 375 (63%) students disagreed to the statement that reading digital resources is a waste of time. Similarly Makotsi (2005) found that a good number of the respondents disagreed with the fact that use of digital resources waste their time. Consequently, majority (79%) of the students agreed that it increases their access to wide variety of information sources. Interestingly, these findings found similarities to the findings of study conducted by Loan (2011) about the impact of the Internet on reading habits of net generation college students. All the students believe that the Internet increases access to wide variety of information sources and bridges the traditional gaps between user and information.

Since easy access to wide assortment of reading materials assumes critical role in enhancing students' reading habits, the researcher suggested that book companies, educational distributors and publishers could provide more learning opportunities over the Internet that help the students to frame a strong or robust digital reading habits.

A score for perception about influence of digital resources on reading is calculated by adding the scores of statements related to it. For each statement, a score of 0, 1, 2, 3, and 4 were given to the

### *Analysis and Interpretations*

response strongly disagree, disagree, neither agree nor disagree, agree and strongly agree in the case of positive statement favouring the influence of digital resources on reading and reverse score were given in the case of negative statements. Then the total score is divided by the maximum expected score (number of statements x 4) and multiplied it by 100 to get the percentage score. Then these percentage score is classified into three equal classes. Low level with scores less than 33.3, average level in between 33.3 and 66.7 and high level with score greater than 66.7. Assessment of perception about the influence of digital resources on reading is given in the figure 7.



**Figure 7**  
**Perception about Influence of Digital Resources on Reading**

It is clear that vast majority (96%) of the students have an average level of influence by reading digitally. Only a few number of the students stated a high level and low level of influence of digital resources on their reading. In a study about the effect of ICT on the

### *Analysis and Interpretations*

reading habits of students of RUFUS GIWA polytechnic, Owo, Hassan, Olaseni and Mathew (2012) revealed that new technology does not just influence students learning and studying in the classroom, additionally influences their reading behaviour. Lyons (1999) claimed that the computer revolution is probably not going to significantly influence the reading habits in the point of view of history and current literacy trends. However, other researcher trusted that computers and the Internet are changing the way individuals read (Nadeem & Abdul Rahman, 2014).

Score for perception about changes on reading practices by digital resources were subjected to Kolmogrov-Smirnov test to test the normality of the variable. Test statistic Kolmogrov-Smirnov Z (1.836) is found to be significant, since the p-value is less than 0.01 level. Hence the index subjected to non parametric test for testing the significant difference among the sub samples based on gender and discipline. Mann-Whitney U-test conducted for comparing the perception about the influence of digital resources on reading among the male and female students and the results are given in table 76.

**Table 76**  
**Perception about Influence of Digital Resources on Reading**  
**(Gender-Wise)**

<b>Gender</b>	<b>N</b>	<b>Mean</b>	<b>Std. Deviation</b>	<b>z-value</b>	<b>p-value</b>
Male	262	52.81	8.86	2.480*	0.013
Female	326	50.78	8.07		

\* Significant at 0.05 level

As the p-value is less than 0.05, Z-value is significant, hence rejected the null hypothesis and concluded that there exists a significant gender difference in their perception about the influence of digital resources on reading. Mean score is higher in the case of male students which indicate that they have significantly higher influence



### *Analysis and Interpretations*

of digital resources on their reading practices than those of female students.

For comparison between different disciplines, Kruskal-Walli's ANOVA done and the results are shown in table 77. Since the p-value is 0.348, it can be assessed that the association between perception about the influence of digital resources on reading and discipline is statistically non-significant at 0.05 level of significance. This makes it clear that there is no significant association between the variables.

**Table 77**  
**Perception about Influence of Digital Resources on Reading**  
**(Discipline-Wise)**

<b>Discipline</b>	<b>N</b>	<b>Mean</b>	<b>Std. Deviation</b>	<b>Chi-square value</b>	<b>p-value</b>
Science	191	51.43	7.90	2.110 <sup>ns</sup>	0.348
Humanities	191	51.13	8.43		
Social Science	206	52.44	9.03		

*ns non-significant at 0.05 level*

Reading in different knowledge domains expects to prepare students for a working environment where information is expanding exponentially, where technology is quickly changing, and where students must compete on a worldwide level (ChanLin, 2013). Several scholars in reading and literacy such as Smagorinsky and O'Donnell-Allen (1998) all agree that the digital media has introduced a transformative move in reading and writing. The far reaching global utilisation of the Web and the use of alternative reading resources, eminently using hypertexts and multimedia resources have made extreme changes in reading patterns.

Here the researcher attempted to understand how digital resources influence the reading culture and a considerable number of the respondents reveal that it improves their reading; it makes reading

### *Analysis and Interpretations*

enjoyable, and improved their independent and lifelong reading skills. A good number of the students reported that digital resources expanded their reading possibility and increased their access to wide variety of information sources. It can be induced that with various sources of information on the Web, the Internet can assume supplementary part in increasing the reading habit of the students, rather than diminishing it. For this to happen, students should be guided by their teachers and guardians to use the Internet and its services usefully and constructively, as opposed spending long hours on the Internet playing games or other non-productive activities. A handful of them disagreed with the fact that it reduces their reading interest and digital resources waste their time.

However, closer observation of the results showed that the digital resources made an average level of influence on the reading culture of the students of universities in Kerala. Burk (2001) reports that corporate giants Microsoft and Adobe Systems have created sophisticated e-book reader software that improves the digital reading experience. Hardware manufacturers such as Gemstar and Franklin keep on producing new digital reading devices. However in spite of various advantages offered by different e-book readers and despite the widespread popularity of PDAs and pocket PCs fit for reading e-books, the e-book market has so far neglected to materialise.

#### **4.7 Conclusion**

This chapter analysed the data collected from the students of four selected universities regarding their reading behaviour in digital environment by using various statistical techniques like Chi-square, ANOVA, Mean, Std Deviation, Simple Percentage method, Z-test, Mann-Whitney U-test and Correlation, etc. Results are interpreted

### *Analysis and Interpretations*

with the help of tables and diagrams which helps the researcher to extract the findings through clear interpretations.

The results revealed that, in spite of all new technological improvement in screens, text formats, and reading devices like LCD screen, PDF and Adobe Reader have been intended to make digital reading simple; however, screens are yet not ideal for the continuous, in-depth, and concentrated reading. In modern times helping more students to become effective readers is one of the goals of instructors. Many students nowadays are fairly techno-savvy, teachers or educators should go beyond teaching technical skills to integrating ICT in the classroom where students can truly explore and experience the digital resources. If traditional literacy world has been replaced by the digital technology, it is important that educators, distributors, publishers, writers, and software engineers might collaborate with each other to make all the interesting and economic digital materials for students in light of the knowledge of students' reading habits and reading behaviours (Issa et al., 2014).

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## Chapter 5

# **FINDINGS, SUGGESTIONS AND CONCLUSIONS**

### **5.1 Introduction**

This study has been a purposeful inquiry to assess the reading behaviour in digital environment among the students of universities in Kerala. Five research questions have guided this study such as students' reading pattern, their digital reading competency, preference of reading print and digital resources, attitudes towards digital reading and the influence of digital resources on the reading culture of the students. After the analysis of data, this section presents the final piece by drawing together major findings of the study to each research question in summarised form with suggestions and recommendations for improving the reading of the students in the digital environment. The formulated hypotheses are tested and the conclusion has been given at the end. Finally the recommendations for further research are also highlighted.

### **5.2 Major Findings of the Study**

Major findings of the study are presented in different categories as follows.

#### **5.2.1 Reading Pattern**

1. Time spent for reading print resources is high as compared to digital resources. Out of 588 students, 243 (41.32%) students spend less than one hour for reading digital resources.
2. The female students spend more time for reading print resources than the male students.

### *Findings, Suggestions and Conclusions*

3. There is no significant gender differences exists in the time spent for reading digital resources.
4. Majority of the students like to read newspapers in both print and digital format and there is no significant gender difference existed in it.
5. There is no significant gender difference in the preference of reading journals, e-journals, e-books, e-theses and dissertations.
6. The female students are more interested in reading academic books, magazines and literature works than the male students.
7. The male students are significantly more interested in reading blogs and e-zines than the female students.
8. There is no significant gender differences existed in their preference of reading time in the morning, afternoon, before going to bed, free time and meal time.
9. However, the female students spend more time for reading in the evening than the male students.
10. The female students are dominant in their purpose of reading for entertainment, project works, examination, preparing notes, assignments and seminar. But the male students are dominant in their purpose of reading for awareness.
11. There is no significant gender difference in their purpose of reading for current information.
12. There exists no significant gender difference in the method of reading digital resources through online and offline.



### *Findings, Suggestions and Conclusions*

13. A staggering per cent (93.9%) of the female students tend to print out digital resources for reading more than the male students.
14. A considerable number (39.1%) of the students have high level of frequency of reading e-journals compared to other digital resources.
15. At the same time the frequency of reading digital resources like e-theses and dissertations, and e-research reports is low among the students in the universities of Kerala.
16. The frequency of reading digital resources among the majority (70%) of the students in the universities in Kerala is at an average level.
17. There is a significant gender difference in the frequency of reading digital resources.
18. There is no significant difference in the frequency of reading digital resources among the students of different disciplines.
19. For digital reading majority (75.8%) of the students use mobile phone followed by laptop computer (74.1%).
20. Compared to the female students, laptop and tablet are highly used by the male students for digital reading.
21. Use of digital devices like desktop computer, mobile phone, e-book reader and net book computer for reading is almost same among the male and female students.

#### **5.2.2 Digital Reading Competency**

22. Experience in the use of computer is almost similar in both male and female students.

### *Findings, Suggestions and Conclusions*

23. There is no significant association between discipline and attending of computer related course.
24. Nearly 40 per cent of the students have moderate level of competency to use devices like net book computer (39.1%), iPad (35.5%), scanner (39.6%) and LCD/Multimedia projector (39.3%).
25. Nearly 50 per cent of the students have very high competency to use mobile phone (47.4%) and more than 40 per cent of them have low competency in e-reader (41.5%).
26. Considering the level of competency to use computer and other digital devices are concerned, more than three fourth (73.1%) of the students have a medium level of competency.
27. There exists a significant gender difference in the level of competency to use computer and other digital devices.
28. There is no significant difference among the students in different disciplines regarding their level of competency to use computer and other digital devices.
29. Level of competency in the use of computer and other digital devices shows significant differences among the students from four selected universities.
30. A medium level of competency was reported by more than 40 per cent of the students in the digital reading skills like converting documents to PDF format (44.2%), using comment/highlight function (46.8%), search, find (45.6%), reading PDF files (46.8%), relating and identifying background knowledge of digital content site (43.7%), for evaluating Web-based content (43.5%), storing content for easy retrieval (45.9%) and to use variety of search strategies (415%).

### *Findings, Suggestions and Conclusions*

31. A low level of competency is also found among nearly 45 per cent of the respondents in the skills to use social book marking, to use RSS and feed readers and also for downloading e-books and audio books and to perform trouble shooting on e-readers.
32. Digital reading competency of the students in the four selected universities is at an average level.
33. Majority of the students have higher level of competency in the digital skills like to copy, cut, delete or paste text in a document, followed by sending/reading e-mail, for searching information with search engines and to change font size and font style in a document.
34. There exists a significant gender difference in the digital reading competency of the students.
35. The male students are highly competent in digital reading than the female students.
36. Digital reading competency among the students showed no significant university-wise differences.
37. There is no discipline-wise differences existed in digital reading competency of the students.
38. There is a significant gender difference in students' need for training on digital reading.
39. Compared to the male students, about half per cent of the female students indicated interest in attending training on digital reading.

### *Findings, Suggestions and Conclusions*

40. Compared to the female students, a good number (58%) of the male students stated that they don't need training in digital reading.
41. Discipline-wise differences existed in the need for training in digital reading.
42. There is a significant gender differences existed in their level of confidence in digital reading. Male students have high confidence in digital reading than the female students.
43. There is no significant discipline-wise differences existed in the level of confidence in digital reading of the students.
44. There exists a significant difference in the competency in digital reading among the respondents who have attended computer related courses and who have not.
45. The level of competency to use computer and other digital devices is positively correlated with digital reading competency.
46. Positive correlation indicates that as the level of competency to use computer and other digital devices increases then digital reading competency also increases.

#### **5.2.3 Preference of Reading Print and Digital Resources**

47. No significant gender differences were noted in the preference of print and digital format, while reading books, journals, newspapers and theses and dissertations.
48. There exists a significant gender differences in the preference of print and digital format, while reading magazines. Printed magazines are mostly favoured by the female students and e-zines are more interested for the male students.

### *Findings, Suggestions and Conclusions*

49. Compared with the male students, while reading print resources majority (85%) of the female students use the techniques like taking notes on separate paper and a good number (65%) of them use highlighting/underlining techniques and 35 per cent of them use the technique of writing in margins.
50. Habit of taking notes on computer while reading print resources is almost in the same manner among the male and female students.
51. The male students are superior to the female students in the use of techniques like digital highlighting/underlining, adding digital comments, bookmarking and tagging for reading digital resources.
52. A staggering (96.1%) per cent of the students indicate that they use the technique of downloading and majority of them also use the techniques like taking notes on separate paper (75.3%) and copy and paste technique (74.3%) while reading digitally.
53. There is no significant gender differences existed in the use of techniques like downloading, copy and paste and taking notes on computer while reading digitally.
54. The female students are practicing more techniques while reading print resources and the male students are practicing more techniques while reading digital resources.
55. The female students tend to annotate more in print and digital text than the male students.
56. The students annotate more in print resources than digital resources.

### *Findings, Suggestions and Conclusions*

57. Level of comprehension while reading print resources is higher among the female students than the male students.
58. Level of comprehension while reading digital resources is almost in the same manner among the male and female students.
59. Students reported a better comprehension in print resources than digital resources.
60. There is no significant gender difference in their level of concentration while reading print and digital resources.
61. Respondents seemed to have better concentration level, if they read on print resources than digital resources.
62. There is no significant gender difference in their level of absorption while reading print and digital resources.
63. There exists a significant gender difference in their level of comfortability while reading print resources.
64. Compared to the male students, a good number (51.2%) of the female students stated that they feel comfortable while reading print resources.
65. The association of gender with their level of comfortability while reading digital resources is not significant.
66. Students in the universities are more comfortable with reading print resources than digital resources.
67. Majority of the students like to choose digital media under circumstances like, for getting most recent information (83.8%) and at the time when the information need at the last minute (81.5%).

### *Findings, Suggestions and Conclusions*

68. Large majority (84.2%) of the students prefer print resources for depth and concentrated reading, majority (75.7%) of them for relaxed reading, and a good number (67.7%) of them for reading lengthy documents.
69. There is no significant gender difference in their choice of reading media for the circumstances like, for reading short documents, most recent information, something that is difficult to understand and when information is needed at the last minute.
70. In contrast to the male students, more female students like to read print media for depth/concentrated reading (88%), for relaxed reading (81.9%), for lengthy documents (71.2%), for taking notes (66.6%), and for reading something very important (51.8%).
71. Compared to the female students, digital media are chosen to read by more number of the male students for casual reading (48.9%) and for speed reading (60.7%).
72. The main advantages of reading digital resources reported by the students are 24 hour access followed by quick access and up-to-date information.
73. In contrast with the female students, more male students give priority to advantages like portability, unlimited storage, and multimedia information of digital resources for reading.
74. Vast majority (85.2%) of the respondents reveals that eye strain is the main disadvantage of digital resources followed by physical strain and power problem.
75. More than three fourth of the students give more priority to print resources for the advantages like tangibility (78.4%),

### *Findings, Suggestions and Conclusions*

physical comfort (76.9%) and no power requirement (75.5%), for reading.

76. There is no significant gender difference in their opinion about the advantages like tangibility, portability, no power is required, no vision problem, flipping pages, and sentimental value of print resources for reading.
77. The female students give more priority to advantages like content quality and physical comfort of print resources for reading than the male students.
78. Majority (71.3%) of the students mentioned that cost is the main disadvantages of print resources for reading followed by difficulty of getting updated information, storage problem and physical damages.
79. There is no significant gender difference with regards to the disadvantages of print resources for reading.

#### **5.2.4 Attitude towards Digital Reading**

80. Almost fifty per cent of the students favoured the statement that digital reading is one of their favourite activities and also get really excited about what they read digitally.
81. Students like to read digitally when they get free time which was opined by 50 per cent of the students.
82. A staggering 88 per cent of the students favoured digital reading as they access up-to-date information and also helps to get in 24 X 7 hours.
83. Nearly 40 per cent of the students neither agree nor disagree with the statement that they quickly forget what they read



### *Findings, Suggestions and Conclusions*

digitally and feel anxious when they have lot of digital reading to do.

84. More than fifty per cent (52.3%) of the students have negative feeling for getting upset when they think about having to read digitally and positive feeling for the liking towards digital reading.
85. Nearly fifty per cent (48.2%) of the students favoured the opinion that encountering unfamiliar words and getting tired and sleepy (45.9%) is the hardest part of digital reading and a considerable number of the students have a negative feeling towards the statements like digital reading required a lot of help (40.3%), lot of hard work (42%) and it is a very difficult exercise (43%).
86. Digital reading is one of the best ways to learn new thing which is supported favourably by nearly 70 per cent of the students.
87. Nearly half of the students have positive feeling to the statement that there are better ways to learn new things than by digital reading and also opined that they get a lot of enjoyment from digital reading.
88. Majority (80.1%) of the students have a favoured opinion that it is easy for them to understand what they read digitally, if pictures, audio and video are included and that is also very informative.
89. At the same time nearly fifty per cent of the students neither agree nor disagree that digital reading makes them more relaxable and fun.

### *Findings, Suggestions and Conclusions*

90. Majority (73%) of the students in the universities of Kerala have an average level of attitude towards digital reading.
91. There is a significant gender difference in the attitudes of the students towards digital reading.
92. The male students have more positive attitudes towards digital reading than the female students.
93. There is no significant difference in the attitude towards digital reading among the students of different disciplines.
94. There is no significant difference in the attitude towards digital reading among the students of different universities.

#### **5.2.5 Influence of Digital Resources on Reading**

95. Nearly 70 per cent of the students opined that with the availability of laptop, net book, mobile phone and ipad, their digital reading increases.
96. A considerable number of the respondents mentioned that there is no change in their digital reading due to the availability of open access resources (38.6%) and e-reader facilities (40%).
97. There is no significant gender difference in the influence of different facilities in making changes in digital reading due to availability of laptop, mobile phone, net book, ipad, open access resources, Internet, and e-reader.
98. Nearly fifty per cent of the students reveal that sometimes they get distracted by the links, colours and advertisements of the digital materials while reading.

### *Findings, Suggestions and Conclusions*

99. There is no significant association between gender and distraction by the links, advertisements and colours of digital materials while reading digitally.
100. A staggering per cent (99.1%) of the students opined that save and download feature helped them a lot for digital reading.
101. Vast majority of the respondents revealed that cursor (95%), and scroll bar (86.1%) helped them for reading digitally.
102. Majority of the students indicated that copy and paste (75.3%), hyperlinks (71%), and search, find (70%) features also helped the students for digital reading.
103. There is no significant gender difference in the features like scroll bar, cursor, hyperlink, tagging, copy, paste and highlighting that helped the students for reading digitally.
104. Compared to the female students, all the male students stated that the features like save and download helped a lot for reading digitally, and also majority (78.2%) of them favoured search, find feature and a good number (53.4%) of them favoured bookmarking feature.
105. More than fifty per cent of the students stated that type face (51.3%) and back ground colour (53.6%) are the most influential factor while digital reading.
106. Factors like font colour, font size and type face are more influential for the male students while digital reading when compared to the female students.
107. There is no significant gender differences in their opinion about the level of influence of factors like text layout and background colour while reading digitally.

### *Findings, Suggestions and Conclusions*

108. A vast majority (95%) of the students agreed that a superficial or quick reading behaviour is increased due to digital reading.
109. Vast majority of the students disagree that their browsing, scanning (86%) and keyword spotting practice (83%) has decreased in digital reading.
110. Majority (79.5%) of the students favoured to the statement that digital reading increase their selective reading practice.
111. More than 70 per cent of the respondents in this study indicate that they are facing decreasing in-depth reading and concentrated reading while reading digitally.
112. More than fifty per cent of the students admits that digital reading increases their interactive reading, sequential reading, extensive reading and decreased their sustained attention.
113. Majority (81%) of the students reported that an average level of change is occurred on their reading practices by digital reading.
114. There exists a significant gender difference in their changes on reading practices by digital reading.
115. Changes on reading practices by digital reading were greater for the male students, since their mean score is higher than the female students.
116. There exists a significant discipline-wise difference in the perception about changes on reading practices by digital reading.
117. Students from Social Science discipline feel significantly more change in their reading practice by reading digitally compared to students from Science and Humanities disciplines.

### *Findings, Suggestions and Conclusions*

118. More than 60 per cent of the students indicated that difficulty to read from screen, lack of knowledge about proper sites and difficulty in evaluating the sources are the main factors hindering their effective use of digital resources for reading.
119. Above fifty per cent of the students reported that slower reading comprehension, lack of Internet access and difficulty in formulating the search term are the hindrances they faced for the effective use of digital resources.
120. Nearly 40 per cent of the respondents also opined that lack of interest and lack of skill/competency in ICT are some factors hindering their effective use of digital resources.
121. There is no significant gender difference in their viewpoint regarding the hindrance of factors like slower reading comprehension, lack of Internet access, interest, difficulty to formulate search term, lack of knowledge about proper sites, difficulty to evaluate the sources and reading on screen while reading digitally.
122. At the same time in the matter of factors such as difficulty to save and download and lack of skill/competency in ICT while reading digitally, the female students out rated the male students.
123. Almost 40 per cent of the students agreed with the statement that digital resources improve their reading habit.
124. Nearly fifty per cent (47.3%) of the students disagreed that digital resource reduces their reading interest.
125. Nearly 70 per cent of the students believed that digital resources has expanded their reading possibility, while around

### *Findings, Suggestions and Conclusions*

quarter per cent of them neither agreed nor disagreed to the statement.

126. Meanwhile more than 50 per cent of the students favoured to the statement that digital resources decreases the time spend on reading.
127. Nearly fifty per cent of the respondents agreed that reading digital resources is enjoyable, also helps to improve the independent and lifelong reading skills and it decreases their dependence on print resources.
128. A good number (63%) of the students disagreed with the fact that use of digital resources waste their time.
129. Consequently, more than three fourth of the students (79%) agreed that it increases their access to wide variety of information sources.
130. Vast majority (96%) of the students have an average level of influence by reading digitally.
131. There exists a significant gender difference in their perception about the influence of digital resources on reading.
132. The influence of digital resources on reading of the male students is higher, since their mean score is greater than those of the female students.
133. The association between perception about the influence of digital resources on reading and discipline is not significant.

### **5.3 Tenability of Hypotheses**

The tenability of hypotheses which was framed based on the objectives of the study was examined in the light of the findings drawn out of the study.

#### **Hypothesis – 1**

The first hypothesis states that there is a significant gender difference in the reading pattern of the students of universities in Kerala.

Finding numbers 2, 6, 7, 9, 10, and 13 confirms that there is a significant gender difference in the time for reading print resources; in their preferred type of reading materials like academic books, magazines, literature, blogs and e-zines; in their preferred time for reading at evening; in their purpose of reading for entertainment, project works, examination, preparing notes, assignments, awareness; and also in the method of taking printout of digital resources. It is clearly revealed through the statistical test Chi-square and the results displayed in table number 4, 6, 7, 8 and 11. Further, the results of Mann-Whitney U-test shown in table number 13 and finding number 17 also indicate that there is a significant gender difference in the frequency of reading digital resources.

But according to findings numbers 3, 4, 5, 8, 11 and 12, there is no significant gender difference with respect to the time spent for reading digital resources; in their preference of reading materials like journals, e-journals, e-books, newspapers, e-newspapers, e-theses and dissertations; in their preference of reading time at morning, afternoon, before going to bed, meal time, free time; in their purpose of reading for current information; and in the method of reading digital resources through online and offline.

Therefore, on the basis of the above mentioned findings this hypothesis is partially substantiated.

**Hypothesis – 2**

The second hypothesis states that there exists a significant gender difference in the level of competency of the students to use computer and other digital devices.

According to finding number 27 there exists a significant gender difference in the level of competency of the students to use computer and other digital devices. By applying Chi-square test and the results given in table number 21, it is clear that the level of competency to use computer and other digital devices is higher in the male students compared to the female students. It is also evident from finding number 20 and the results of Chi-square test shown in table number 15, that laptop computer and tablet are highly used by male students for digital reading than female students.

Hence, on the basis of the above stated findings this hypothesis is fully accepted.

**Hypothesis – 3**

The third hypothesis states that there is a significant discipline-wise difference in the level of competency of the students to use computer and other digital devices.

According to finding number 28 and the Chi-square test results shown in table number 22, there is no significant discipline-wise difference in the level of competency to use computer and other digital devices, since the p-value is greater than 0.05 (Chi-square=2.309;  $p=0.679 > 0.05$ ).

Therefore, in the light of the above stated findings this hypothesis is fully rejected.



**Hypothesis – 4**

Fourth hypothesis states that there is a significant gender difference in the digital reading competency of the students.

Findings number 34 and 35 clearly indicate that there is significant gender difference in the digital reading competency of the students. It is clearly revealed through the results of Mann-Whitney U-test depicted in table number 25. Table number 26 further shows the classification based on level of competency in digital reading among the male and female students. Comparing the mean scores with those from male students (74.13), the female students have a lower mean scores (62.14) for the competency in digital reading. This reveals that the male students are more competent in digital reading than the female students. Further finding number 38, 39, 40 and 42 indicate that there is significant gender difference in their need of training for digital reading and also male students have high confidence in digital reading than the female students.

So, on the basis of the above mentioned findings this hypothesis is fully accepted.

**Hypothesis - 5**

Fifth hypothesis states that there is a significant discipline-wise difference in the digital reading competency of the students.

Findings number 37 and the results of Kruskal-Walli's ANOVA test depicted in table number 28 clearly shows that there is no significant discipline-wise difference in the digital reading competency of the students, since the p-value is greater than 0.05.

So, on the basis of above mentioned findings this hypothesis is fully rejected.

**Hypothesis – 6**

Sixth hypothesis states that there exists a significant relationship between digital reading competency and level of competency to use computer and other digital devices.

This is evident from finding number 45 and 46. To test the relation between level of competency to use computer and other digital devices and digital reading competency, Spearman's Rank Correlation was worked out. As per the results detailed in table 34, the correlation value of 0.713 and p-value of <0.001 indicate that there exists a significant relationship between the level of competency to use computer and other digital devices and digital reading competency at 0.01 level of significance.

In the light of these findings, this hypothesis is fully accepted.

**Hypothesis – 7**

Seventh hypothesis states that there is significant gender difference in the preference of reading print and digital resources among the students of universities in Kerala.

As per finding number 48 and the results of Chi-square test detailed in table number 39 indicate that there is a significant gender difference in the preference of print and digital format while reading magazines and e-zines. As per the details of table 54 and finding number 70 and 71, there is significant gender difference with respect to the preference of reading resources under the circumstance like depth and concentrated reading, for casual reading, for reading lengthy documents, for one-time reading, speed reading, for taking notes, for relaxed reading, for reading something very important, since the p-value derived from the Chi-square test shows that the

### *Findings, Suggestions and Conclusions*

variables are associated either at 1 per cent and 5 per cent level of significance.

It is also clear from finding number 49, 51 and 54 that the female students are practicing more techniques while reading print resources and the male students are practicing more techniques while reading digital resources. Further table number 43 and 44 indicate the gender difference in the frequency of annotation while reading print and digital resources. It is also evident from table number 45 and 51 that there is significant gender difference in the level of comprehension and comfortability, while reading print resources by applying Chi-square test.

As per the above findings, this hypothesis is fully accepted.

#### **Hypothesis – 8**

Eighth hypothesis states that there is a positive attitude towards digital reading among the students of universities in Kerala.

A score for attitude towards digital reading is calculated by adding the scores of statements related to attitude towards digital reading. Then the total scores is divided by the maximum expected score (number of statements x 4) and multiplied it by 100 to get the percentage score. Then these percentage score is classified into three equal classes. Low level with scores less than 33.3, average level in between 33.3 and 66.7 and high level with score greater than 66.7. Percentage analysis for assessing the attitude towards digital reading shows that students in the universities of Kerala have only an average level of attitude towards digital reading. It is clearly depicted in finding number 90 and figure 4.

Hence the hypothesis is fully rejected.

**Hypothesis – 9**

Ninth hypothesis states that there is a significant gender difference in the attitude of the students towards digital reading.

Finding number 91 and the results of independent Z-test detailed in table number 60 clearly indicate that there is significant gender difference in the attitude of the students towards digital reading, since the p-value is less than 0.01. Finding number 92 further shows that male students have more positive attitude towards digital reading compared to the female students.

In the light of the above mentioned findings this hypothesis is fully accepted.

**Hypothesis – 10**

Tenth hypothesis states that there exists a significant discipline-wise difference in the attitude of the students towards digital reading.

According to finding numbers 93, there is no significant discipline-wise difference in the attitude of the students towards digital reading. As per the results of one way ANOVA test displayed in table number 61, p-value is greater than 0.05, hence F-value is non-significant at 0.05. Thus it can be concluded that there is no significant discipline-wise difference in the attitude towards digital reading.

As per the above findings, this hypothesis is fully rejected.

**Hypothesis - 11**

Eleventh hypothesis states that there is a significant gender difference in the perception about the influence of digital resources on the reading culture of the students.

Results of Mann-Whitney U-test detailed in table 76 and finding number 131 and 132 indicate that there exists a significant gender difference in their perception about the influence of digital resources on reading. Mean score is higher in the case of male students which indicate that they have significantly higher influence of digital resources on their reading than those of female students. Results of Mann-Whitney U-test further detailed in table number 67 and 69 reveals that features like save, download, search, find and bookmarking and factors like font colour, font size and type face are more influential for the male students while digital reading compared to the female students. Comparing the changes on reading practices by digital reading among the male and female students, result of Mann-Whitney U-test displayed in table number 71 and finding number 114 and 115 indicate that there exists significant gender difference, since the p-value is less than 0.05.

So on the basis of the above mentioned findings this hypothesis is fully accepted.

**Hypothesis – 12**

Twelfth hypothesis states that there is a significant influence of digital resources on the reading culture of the students.

The influence of digital resources on reading is calculated by adding the scores of statements related to it. Then the total score is divided by the maximum expected score (number of statements x 4) and multiplied it by 100 to get the percentage score. Then these

### *Findings, Suggestions and Conclusions*

percentage score is classified into three equal classes. Low level with scores less than 33.3, average level in between 33.3 and 66.7 and high level with score greater than 66.7. Percentage analysis for assessing the influence of digital resources on reading shows that students in the universities in Kerala have an average level of influence by reading digitally. Results also show that very few students are having high level of influence due to digital reading. It is clearly depicted in finding number 130 and figure number 7.

As per the findings mentioned above this hypothesis is fully rejected.

#### **5.4 Suggestions**

Based on the findings and student's response on the various aspects of reading behaviour in digital environment, the following suggestions are made with a view to improve the reading behaviour of the younger generation in particular and people from all cross-sections of life in general in the digital environment.

1. University authorities and especially libraries may provide adequate networked computers with fast Internet connectivity which thus leads to create interest in digital reading behaviour of the students.
2. The study firmly recommends that the university libraries may give more attention to develop sufficient ICT infrastructure and acquisition of e-resources.
3. Further effective training, workshop and information literacy programmes at regular intervals may be organised by the university libraries on how to access and utilise the e-resources and services efficiently.
4. Results clearly depicted that only a few number of the students use e-reader for digital reading. Educators may take efforts to

### *Findings, Suggestions and Conclusions*

encourage the students to understand the different advantages of e-readers and motivational influence to accept them as positive and helpful in promoting digital reading.

5. Students that once in a while or never utilised e-resources may be encouraged, and create enabling environments for the use of e-resources.
6. University authorities may provide high speed Wi-Fi facilities in the campus so that readers can read the digital resources anywhere from the campus at any time.
7. Distinctive sorts of materials at various levels such as language, arts, literature, and stories may be leveled and developed online to energise the students for reading and adapt different reading levels.
8. Educational distributors, publishers, teachers, and researchers may cooperate with each other on developing and publishing sound reading materials online for the benefits of students to use.
9. Effective strategies may be employed by the libraries such as using e-mail alert messages, instant messages as a method for promoting the reading of digital resources.
10. Publishers and distributors of academic materials may combine instructional content and study activities online.
11. Since reading materials assume an important role in improving students' reading habits, book companies, educational distributors and publishers may take efforts to develop and provide more learning opportunities over the Internet and provide various commercial software products that enable the students to form a solid, robust online reading habit.

### *Findings, Suggestions and Conclusions*

12. In addition, the findings of the study may help to assist the university authorities, especially the computing department and library to look into service matters relating to accommodating the reading and studying habits of the student.
13. As per findings, a good amount of reading time that takes place at morning and night among the students may call for the respective university authority to consider opening more reading areas that work for longer hours. An entire 24 hours of computing service may likewise enable the students to use the internet at times more convenient to them (e.g. evenings), since the daytime is fully occupied with classes.
14. A cautious way to deal with the utilisation of ICTs by the students in relation to their reading habits is profoundly desirable.
15. Teachers may guide the students in choosing the appropriate Websites which give clear guidelines and instructions with proper content to avoid wasting time searching for Websites; rather, they should focus on reading the content with more concentration.
16. For digital reading, adjusting the setting of computer screens and of Web pages is equally essential. Along these lines, it is important to adjust viewing conditions that minimise stress to the eyes such as brightness and contrast and convergence of computer screens.
17. Students who feel comfortable reading traditional texts imprinted on paper may not be comfortable with reading hypertexts. In such cases, it behoves educators to guide the



### *Findings, Suggestions and Conclusions*

students on how to search the information on the Internet and how to read through its numerous hyperlinks that enable them to avoid some of the pitfalls of online reading.

18. Guidance may be given by the teachers and parents for their students to use the Internet and its services constructively, rather than spending long hours on playing games on Internet and other non-productive activities. The role of teachers and guardians for enhancing the reading habit of the students cannot be overemphasised.
19. University libraries may be centrally located. The building may be functional so that user can easily access it and also stimulate students' reading interest. Prompt awareness may be given to students whenever new resources such as books, e-books, e-journals, etc. arrive in the university library. University authorities may take keen interest in providing enough reading space, proper seating arrangement and well illuminated area in the library for readers.
20. Searching for exact and precise information on the Internet is an art. Organising a workshop on online information searching can help the readers in searching the exact information and can get an idea of how to refine a search strategy.
21. Librarians may take initiative to assess the needs of users and study the most sought of information and try to obtain the same and also help in conveying the information in the form required by the user, thus helping the user adapt to the changing digital environment.
22. To enhance the digital reading competency of the students, orientation programs like digital literacy training may be

### *Findings, Suggestions and Conclusions*

provided. It may contain the tools and techniques for searching information on the Internet, use of OPAC, online and DVD, CD-ROM databases, e-journals, e-books, etc.

23. Librarians, teachers, and guardians may take efforts and assist in developing a positive attitude towards digital reading among the students and try to understand the interests of the students and influence them to realise the benefit of reading.
24. Library professionals may take initiative to update academic faculty members on the available digital resources in the university libraries. Then the faculty members need to sensitise the students regarding the benefit of digital resources. Assignments related to course work requiring the use of digital resources may be developed, which in turn will compel the students to read digitally.

### **5.5 Conclusions**

Reading mediums have reached a wider range of facilities in the last couple of decades, whereas paper has been almost the only choice for a long time. While print still keeps up its legacy, digitised information is quickly expanding at an unprecedented pace. Subsequently, individuals are gradually adopting the digital materials and developing screen-based reading in the information age. This study attempted to enhance the understanding about reading behavior in digital environment among the students of universities in Kerala.

Students revealed a combination of reading patterns for both print and digital materials. In the overall analysis, results indicate that the students are spending significant amount of time for reading print resources compared to digital resources, especially female students. There might be many reasons underlying this choice and it would be

### *Findings, Suggestions and Conclusions*

enriching to study these reasons to guide those who are working on designing digital reading mediums. It is clear from the results that majority of the students prefer to read at morning and at night which may due to the classes that they need to attend during the daytime. This may call for the university authority to consider opening more reading areas that work for longer hours.

The findings also indicated that people choose to read for several reasons. Majority of the students are reading for examination purpose that might be to enhance their academic performance and they do not have much time to spare for recreational reading. Meanwhile, blogs and e-zones are mostly preferred by the male students and academic books, magazines and literature are highly preferred by the female students. However, the students should always spend their time on academic as well as non academic reading without any fall. Guardians and teachers must hold hands to develop a good reading habit at the early age of students, so that it will probably keep going for a long time.

Considering the reading style, students like to read the print resources by starting from beginning and read to the end and in the case of digital resources, they scan the content and read only the part that is of interest to them. Students are more interested to read the digital resources through online and a good number of them also like to read offline. The female students tend to print out the digital resources for reading more than the male students. The overall frequency of reading digital resources among the majority of the students in the universities in Kerala is at an average level. The frequency of use of these digital resources indicates that the students should be encouraged by their lecturers to utilize digital resources for references that enable them to use and locate these resources and increase the frequency of reading. For digital reading

### *Findings, Suggestions and Conclusions*

majority of the students use devices like mobile phone and laptop computer and it is also found that only a small per cent of them use e-book readers like Kindle, Nook, etc. Educators should encourage the students the various advantages of e-readers for creating interest in digital reading.

Digital reading is not synonymous with reading linear texts and requires additional skills from the students, in particular skills in dealing with computer environments and in deciding on the usefulness of various information encountered. Regarding the digital reading competency of the students, findings clearly reveal that a good number of the students in the universities of Kerala showed a medium level of competency. It is also noted that the male students exhibited a high level of competency as compared to the female students.

Results also depicted that there exists significant relationship between digital reading competency and level of competency to use computer and other digital devices. Good readers with reutilized skills in dealing with computers and effective strategies for deciding on the usefulness of Web-based information are able to locate, evaluate, and synthesize Web-based information.

The comparison of print and digital media provided a fascinating insight into students' reading. The respondents recognized that they perceived changes to the way they read and how they felt while reading print and digital resources. Majority of the students prefer print medium while reading books, magazines and theses and dissertations. Almost all reading materials which used to be on the printed format before have digital versions now, which will be very helpful to students of higher institutions like university through the provision of online information resources, because of its flexibility in

### *Findings, Suggestions and Conclusions*

searching than their paper based counterpart, and they can be accessed remotely at any time for reading and research purposes.

Meanwhile, the results indicated lower comprehension and concentration levels with digital materials compared to print materials. The students also indicated a low content absorption and comfortably on digital materials as opposed to print materials. Majority of the students like to choose digital media under circumstances like gathering most recent information and at the time when information is needed at the last minute.

The main advantages of reading digital resources reported by students are 24 hour access followed by quick access and up-to-date information. Students admitted that they still prefer print media for depth reading, relaxed reading, for lengthy documents, for taking notes, etc. by indicating the physical discomforts related to digital materials. Vast majority of the respondents reveal that eye strain is the main disadvantage of reading digital resources followed by physical strain and power problem. While reading on screen, it is imperative to adjust viewing conditions that minimize stress to the eyes such as brightness, contrast and convergence of screens.

The impacts of new medium were evident during the analysis. A good number of the students give more priority to print resources for the advantages like tangibility, no power requirement, physical comfort, no vision problem and sentimental value for reading. Meanwhile students also opined that cost is the main disadvantage of print resources for reading followed by difficulty of getting updated information, storage problem and physical damages.

The extent to which students positively or negatively engage in reading is influenced greatly by the attitude they have towards reading. Similarly, from the findings it is also clear that majority of

### *Findings, Suggestions and Conclusions*

the students in the universities in Kerala have an average level of attitude towards digital reading and the male students have more positive attitudes towards digital reading than the female students. For instance, responsive educators that know their students' attitudes about reading can tailor lessons and assignments to match students' interests, in this manner maintaining positive attitude and discouraging negative attitude.

A good number of the students reveal that they get distracted by the links, colours and advertisements of the digital materials while reading. Therefore, instructors should guide the students to select the suitable Websites which give proper content without wasting time for searching; rather they should focus on reading the content. A staggering per cent of the students stated that save and download feature helped them a lot for digital reading and majority of them mentioned that features like copy, paste, and search, find options also helped a lot. Students also indicated that the factors like font size and text layout are the highly influencing variables while reading digitally.

A number of critical effects of the digital environment on students' reading behaviour were additionally evident through the findings. One of the implications noted through the analysis of data was the importance of reading skills for students in the digital age. To achieve similar levels of reading experience as on paper, students require certain online reading strategies and essential skills. Students agreed that through digital reading, some changes have occurred in the reading practices, such as their superficial or quick reading, interactive reading, sequential reading, one time reading and extensive reading are increased, and screen-based reading behaviour like browsing, scanning and keyword spotting practice also increased. As a result, students indicate that they are facing

### *Findings, Suggestions and Conclusions*

decreasing in-depth reading, sustained attention and concentrated reading while reading digitally. These changes on reading practice were greater for male students than the female students. From the overall analysis, findings showed that an average level of change has occurred on the reading practices of the students in the universities in Kerala by digital reading which is reported by majority of the respondents.

In order to identify the likely problem hindering the effective use of digital resources on students reading culture, the research shows that a good number of the students indicated that difficulty to read from screen, lack of knowledge about proper sites and difficulty in evaluating the sources are the main factors hindering them. The research also reveals how digital resources influence reading culture and below fifty per cent of the respondents reveal that digital resources improve their reading habit and a handful of them believed that it has expanded their reading possibility. Nearly fifty per cent of the students agreed that digital resource is enjoyable, also helps to improve the independent and lifelong reading skills and it decreases their dependence on print resources. Meanwhile, closer observation of the results showed that the digital resources made an average level of influence on the reading culture of the students in the universities in Kerala.

This study investigated and validated that online reading behaviour is quite different from offline reading and has its own particular implications. It is apparent that online reading has certain impact on students' reading behaviour and they seem to demonstrate different reading patterns on both print and digital medium. The above mentioned findings lead the researcher to conclude that the students need to improve their reading in the digital environment. The results raise concerns in terms of human cognition and perceive the need of

### *Findings, Suggestions and Conclusions*

skills and strategies required for reading to overcome such concerns and to develop a better digital reading behaviour.

The findings from this study demonstrate values for both academics and practitioners. This study contributes to extend and upgrade the current scholarly literature on digital reading by providing empirical evidence. Therefore, educators and publishers will be better informed on students' reading behaviour and cooperate with each other for designing sound reading materials online. The people will understand the impact of the Internet and digital reading and how to react to the negative impacts which were recognised. It can be expected that the participation on a global scale give a delicate measure for anticipating reading behaviour in the digital environment.

#### **5.6 Recommendations for Further Research**

This study has enabled to understand the reading behaviour in digital environment among the students in the universities in Kerala. The investigator wishes to suggest the following areas for further research to add the quantum of knowledge in this area.

1. Future research can broaden the findings of this study by investigating similar research problems in different age groups and in various cultural contexts, and reasons for choosing one format over another.
2. Further studies should focus more on how reading can actually take place with computers and wireless communication devices, through non-linear reading, how the information and knowledge are extracted, and the various factors that contribute to the online reading pattern.



### *Findings, Suggestions and Conclusions*

3. Future studies could analyse student's silent reading performance and comprehension to determine reading difficulties and student's motivation for reading through comparisons of printed resources and tablet PCs.
4. Further examination could investigate students on-screen reading behaviours with e-readers, such as Kindle or Sony Reader.
5. A longitudinal study to analyse whether changes in reading habits are occurring over time, especially when the Internet will become more accessible, would be another avenue for future research.
6. Further study should especially analyse reading behaviour with respect to the reading environment, i.e., the reading location or reading devices, as different behaviours can be expected.
7. Experimental investigation will be able to detect or explore possible cause-and-effect relationships between different factors and students onscreen reading behaviours.
8. Further research is needed to assess how the typographical factors affect reading from screen.
9. More studies are required to investigate students reading behaviours when they read for other academic purposes rather than writing papers and also student's perspectives and attitudes toward reading for various scholarly purposes.

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# Appendix A: Questionnaire

## University of Calicut Department of Library and Information Science

Dear Student,

This questionnaire is intended to collect data/suggestions for a research study entitled *Reading Behaviour in Digital Environment: A Study among Students of Universities in Kerala* as part of my Ph.D degree. I seek your valuable cooperation and help in obtaining the necessary information. I request you to fill up the questionnaire with care and accuracy. The information provided will be kept confidential and used only for academic purpose.

Divya P.  
Research Scholar

### Respondent's Identification

Gender: Male  Female

University: a) University of Kerala  c) University of Calicut   
b) Mahatma Gandhi University  d) Kannur University

Name of Department \_\_\_\_\_

### I Reading Pattern

1. How much time do you spend for reading print and digital resources in a day? (Please tick)

Resources	Less than 1 hour	1-2 hours	3-4 hours	More than 4 hours
Print	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Digital	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. What types of reading materials do you read? (Multiple options permitted)

- a) Newspapers  g) E-Journals   
b) Academic books  h) E-books   
c) Magazines  i) E-Newspapers   
d) Journals  j) E-zines (Magazines)   
e) Literatures (Poetry, fiction, drama----)  k) E-theses & Dissertations   
f) Blogs  l) Others (Please specify-----  
-----)

3. Which time do you prefer reading?

- a) Morning  c) Afternoon  e) Mealtime   
b) Evening  d) Before going to bed  f) At different times (specify) -

4. What is your main purpose of reading? (Multiple options permitted)

- a) For awareness  e) For assignments and seminars   
b) For current information  f) For project works   
c) For entertainment  g) For examination purpose   
d) For preparing notes  h) Any other (Please specify)-----

5. Which of the following factors encouraged you to read more? (Multiple options permitted)

- a) More free time  f) Interest in reading   
 b) Free availability of materials  g) Influence of friends   
 c) Interested subjects  h) Encouragement from teachers   
 d) Easy availability of materials  i) For academic achievements   
 e) Influence of parents & relatives  j) Others (Please specify)-----

6. How would you describe the way you read the print and digital resources? (Please tick)

Sl. No.	Reading style	Print Resources	Digital Resources
1	I start from the beginning and read to the end	<input type="checkbox"/>	<input type="checkbox"/>
2	I read quickly (skim-read)	<input type="checkbox"/>	<input type="checkbox"/>
3	I scan the content and read only the content that interests me	<input type="checkbox"/>	<input type="checkbox"/>
4	I read the first part and skip to the last part	<input type="checkbox"/>	<input type="checkbox"/>
5	Others (Please specify)-----	<input type="checkbox"/>	<input type="checkbox"/>

7. How do you read digital resources?

- a) Offline  b) Online  c) By taking print out  d) All of these

8. How often do you read the following digital resources? (Please tick)

Sl. No.	Digital Resources	Always	Often	Sometimes	Rarely	Never
1	E-journals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	E-books	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	E-newspapers/news sites	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	E-zines (Electronic magazines)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	E-theses and Dissertations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	E-research reports	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	Databases	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	Any other (Please specify)-----	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

9. Which device do you use the most for digital reading? (Multiple options permitted)

- a) Desktop computer  e) E-book reader (eg.Nook, Kindle, etc.)   
 b) Laptop computer  f) Net book/Notebook computer   
 c) Tablet (eg.Ipad)  g) Others (Please specify) -----  
 d) Mobile Phone

## II Digital Reading Competency

10. How long have you been using computer?(Please tick)

Less than one year	1-3 years	4-6 years	7-9 years	More than 9 years
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

11. Have you attended any computer related course? a) Yes  b) No

If yes, which computer course have you done?

- a) Office Management / Automation  b) DCA  c) PGDCA   
 d) BCA/BSc Computer Science  e) MCA/MSc Computer Science   
 f) Part of syllabus  g) Any other (Please specify) -----

12. Please indicate your level of competency in the following computer and other digital devices

Sl. No.	Computer and Digital devices	Very Low	Low	Moderate	High	Very High
1	Desktop Computer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Laptop Computer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Netbook/Notebook Computer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Tablet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Mobile Phone	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	E reader	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	I-Pod	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	Printer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	Scanner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	LCD/Multimedia Projector	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

13. Please indicate your level of competency in the following activities for digital reading?

Sl. No.	Digital Reading Competency	Very Low	Low	Moderate	High	Very High
1	To create a basic text document	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	To change monitor brightness and contrast	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	To change font size and font style in a document	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	To copy, cut, paste or delete text in a document	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	To transfer files between computer and other digital devices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	To use a Web browser	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	To search for information online with search engines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	For sending/reading e-mails	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	To download and save files from the Web	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	To use storage devices (CD,DVD, flash memory)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	To convert documents to PDF format	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	To use comment/highlight function when reading PDF files	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13	To use search/find function when reading PDF files	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	To use Social Networking Sites (eg. Facebook)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15	To use social bookmarking (eg. Delicious, Diigo)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16	To locate and read blogs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17	To use Really Simple Syndication (RSS) and feed readers (Google Reader, Blog lines) to manage feeds	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18	To use any kind of anti-virus and anti-spam software	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

19	For scanning, scrolling, searching--using menu bars and keywords	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20	To use hyperlinks in Websites and online interfaces for navigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21	For tracing on screen with finger or mouse to identify titles or words	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22	To use online dictionaries	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23	For relating and comparing one digital content site to other known digital content site	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24	For identifying main ideas and background knowledge of digital content site	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25	For downloading e-books and audio books and performs troubleshooting on e-readers and other handheld reading devices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26	To evaluate Web -based content sites for quality and credibility	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27	To manipulate and store information and content for easier retrieval	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28	To use variety of search strategies (keyword, Boolean operators, phrase searching)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

14. Do you need training for digital reading?

- a) Yes                       b) No                       c) Not now

15. Please indicate your level of confidence in digital reading?

- a) Excellent               b) Good               c) Average               d) Poor   
e) Verypoor

### III Preference about reading Print Resources and Digital Resources

16. Please select the most preferred resource from each of the following pairs of print and digital resources

- a) Books                       /                      E-books   
b) Journals                       /                      E-journals   
c) Newspapers                       /                      E-Newspapers   
d) Magazines                       /                      E-Zines (Electronic Magazines)   
e) Theses & Dissertations                       /                      E-theses & Dissertations

17. Do you use any of the following techniques while reading print resources? (Multiple options permitted)

- a) Highlighting/underlining                       d) Taking notes on computer   
b) Writing in margins                       e) None   
c) Taking notes on separate paper                       f) Any other (Please specify) -----

18. Do you use any of the following techniques while reading digital resources? (Multiple options permitted)

- a) Digital highlighting/underlining                       f) Tagging   
b) Taking notes on separate paper                       g) Downloading   
c) Adding digital comments                       h) Enlarging   
d) Copy and Paste                       i) Taking notes on computer   
e) Book marking                       j) Any other (Please specify) -----

19. How often do you make annotation (Note Taking) while reading print and digital resources? (Please tick)

Resources	Always	Often	Sometimes	Rarely	Never
Print	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Digital	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

20. Please indicate your level of comprehension, concentration, and absorption while reading print and digital resources (Please tick)

Level of	Very Low	Low	Moderate	High	Very high
<b>Comprehension(Understanding)</b>					
a) Print resources	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Digital resources	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Concentration</b>					
a) Print resources	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Digital resources	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Absorption</b>					
a) Print resources	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Digital resources	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

21. How comfortable are you while reading print and digital resources? (Please tick)

Resources	Not at all comfortable	Uncomfortable	Moderately comfortable	Comfortable	Very comfortable
Print	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Digital	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

22. Please indicate your choice of reading media for the following circumstances (Please tick)

Sl. No.	Circumstances for reading	Print resources	Digital resources
1	For reading short documents	<input type="checkbox"/>	<input type="checkbox"/>
2	For depth and concentrated reading	<input type="checkbox"/>	<input type="checkbox"/>
3	For casual reading (News & Entertainment)	<input type="checkbox"/>	<input type="checkbox"/>
4	For most recent information	<input type="checkbox"/>	<input type="checkbox"/>
5	For lengthy documents	<input type="checkbox"/>	<input type="checkbox"/>
6	Something that is difficult to understand	<input type="checkbox"/>	<input type="checkbox"/>
7	Need information at the last minute	<input type="checkbox"/>	<input type="checkbox"/>
8	For one-time reading	<input type="checkbox"/>	<input type="checkbox"/>
9	For speed reading	<input type="checkbox"/>	<input type="checkbox"/>
10	For taking notes (annotation)	<input type="checkbox"/>	<input type="checkbox"/>
11	For relaxed reading	<input type="checkbox"/>	<input type="checkbox"/>
12	For reading something very important and interesting	<input type="checkbox"/>	<input type="checkbox"/>

23. In your opinion, what are the advantages and disadvantages of digital reading? (Multiple options permitted)

Sl. No.	Advantages	Please Tick	Sl. No.	Disadvantages	Please Tick
1	24 hours access	<input type="checkbox"/>	1	Restricted accessibility	<input type="checkbox"/>
2	Quick access to information	<input type="checkbox"/>	2	Unwanted information	<input type="checkbox"/>
3	Portable	<input type="checkbox"/>	3	Eyestrain	<input type="checkbox"/>
4	No limit on storage	<input type="checkbox"/>	4	Physical strain	<input type="checkbox"/>
5	Ability to browse	<input type="checkbox"/>	5	Outdated materials	<input type="checkbox"/>
6	Up-to-date information	<input type="checkbox"/>	6	Distraction	<input type="checkbox"/>
7	Link to additional information	<input type="checkbox"/>	7	Lack of awareness	<input type="checkbox"/>
8	Time saving	<input type="checkbox"/>	8	Power problems	<input type="checkbox"/>
9	Download possibilities	<input type="checkbox"/>	9	Software bugs	<input type="checkbox"/>
10	Multimedia information	<input type="checkbox"/>	10	Not robust	<input type="checkbox"/>
11	Any other (please specify)	<input type="checkbox"/>	11	Any other (please specify)	<input type="checkbox"/>

24. In your opinion, what are the advantages and disadvantages of print resources for reading? (Multiple options permitted)

Sl. No.	Advantages	Please Tick	Sl. No.	Disadvantages	Please Tick
1	Tangibility (physical existence)	<input type="checkbox"/>	1	Difficulty of getting updated information	<input type="checkbox"/>
2	Portable	<input type="checkbox"/>	2	Outdated Materials	<input type="checkbox"/>
3	No power is required	<input type="checkbox"/>	3	Difficulty of indexing the contents	<input type="checkbox"/>
4	No vision problem	<input type="checkbox"/>	4	Storage problem	<input type="checkbox"/>
5	Content quality	<input type="checkbox"/>	5	Physical damage	<input type="checkbox"/>
6	Flipping pages	<input type="checkbox"/>	6	Difficult to search	<input type="checkbox"/>
7	Physical comfort	<input type="checkbox"/>	7	Cost	<input type="checkbox"/>
8	Sentimental value	<input type="checkbox"/>	8	Lack of additional information	<input type="checkbox"/>
9	Any other (Please specify)	<input type="checkbox"/>	9	Any other (Please specify)	<input type="checkbox"/>

#### IV Attitudes towards Digital Reading

25. Here are some statements on digital reading. Please indicate your degree of agreement towards each statement

Sl. No.	Statements	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1	Digital reading is one of my favourite activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	I get really excited about what I have read digitally	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	I spend a lot of my spare time for digital reading	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Digitally I read a lot, when I am at home	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	I like to read digitally whenever I have free time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6	I can access up-to-date information through digital reading	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	Digital reading helps me to get information in 24 X 7 hours	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	I quickly forget what I have read digitally even if I have just read it	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	I try very hard, but I just cannot read digitally very well	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	I get upset when I think about having to read digitally	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	Encountering unfamiliar words is the hardest part of digital reading	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	When I read digitally I usually get tired and sleepy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13	I often feel anxious when I have a lot of digital reading to do	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	I need a lot of help in digital reading	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15	Digital reading is one of the best ways for me to learn new things	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16	There are better ways to learn new things than by digital reading	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17	Digital reading makes me more relaxable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18	It is easier for me to understand what I read digitally if pictures, audio & video are included	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19	I like digital reading very much	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20	Digital reading is a very difficult exercise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21	I get a lot of enjoyment from digital reading	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22	Digital reading is very informative	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23	Digital reading gives me more fun	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24	Digital reading needs a lot of hard work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### V Influence of Digital Resources on Reading

26. Please indicate whether the following facilities have made any change in your reading?

Sl. No.	Facilities	Increases	Decreases	No change
1	Availability of Laptop, Netbook, Mobile phone, I pad	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Availability of Open Access Resources	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Availability of the Internet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Availability of computer networks (LAN, Wi-Fi)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Availability of E- reader	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Any other (please specify).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



27. Do you get distracted by the links, advertisements, and colours of digital materials while reading?

a) Yes

b) No

c) Sometimes

28. Please indicate whether the following features helped your digital reading?

Sl. No.	Features	Helped me	Did not help me	No difference with or without these features
1	Scroll bar	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Cursor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Hyperlinks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Tagging	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Bookmarking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Save & Download	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	Copy& paste	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	Highlighting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	Search, Find	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

29. Please indicate whether the following factors influence your digital reading?

Sl. No.	Factors	Not at all influential	Slightly influential	Somewhat influential	Very influential	Extremely influential
1	Font colour	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Font size	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Typeface (Font type)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Text layout	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Background colour	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Any other (Please specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

30. Here are some statements about changes on reading practice by reading digital resources. Please indicate your degree of agreement towards each statement

Sl. No.	Changes on reading practices	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1	Increased interactive reading	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Decreased browsing & scanning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Increased sequential reading	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Decreased keyword spotting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Increased superficial (Quick) reading	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Decreased one time reading	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	Increased concentrated reading	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	Increased extensive reading	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	Decreased sustained attention	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	Increased reading selectively	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	Increased in-depth reading	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

31. To what extent the following factors hinder the effective use of digital resources for reading? (Please tick)

Sl. No.	Factors	To a great extent	To some extent	Not at all
1	Slower reading comprehension	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Lack of Internet access	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Difficult to formulate search term	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Lack of knowledge about proper sites	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Difficult to evaluate the sources	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Difficult to read on screen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	Lack of interest	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	Difficult to save and download	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	Lack of skill/competency in ICT	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	Any other (Please specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

32. Please indicate your opinion about the influence of digital resources on reading

Sl. No.	Influence of digital resources on reading	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1	It improves my reading	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	It reduces my reading interest	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	It has expanded my reading possibility	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	It decreases the time spend on reading	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	It makes reading more enjoyable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Reading digital resources is a waste of time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Digital resources badly effect my reading habit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	It has improved my independent and life-long reading skills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	It decreases my dependence on print resources	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	It increases my access to wide variety of information sources	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

33. Please give your opinion and suggestions for improving/promoting reading in digital environment

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*Thank You Very Much*