An Overview of Mobile Reading Habits

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ABSTRACT

Reading is a multidimensional cognitive method of decrypting symbols to build and develop meaning from the recommended text. Mobiles and smartphones are transforming human lives at fast pace. One of the new refined inclinations of the 21st century has been the gradual change in reading habits. The extensive usage of the internet at a global level and the use of various forms of reading materials particularly hypertext and hypermedia resources have made radical shift in reading different forms in addition to printed text materials. Reading style is not the same as a decade back. Now, people are reading electronic documents and the latest form of electronic books (e-books), electronic journals (e-journals), electronic mails (e-mails) and online databases. Digital content has broken the physical boundaries of homes, libraries, and offices. This paper reviews all the developments related to mobile reading from print to online reading, online reading habits, students' attitude and behaviour to e-books, the move to mobile reading and it advantages and disadvantages. Also looked into are the roles of several independent variables such as gender, age, culture, and socioeconomic background of mobile users and their impact on mobile reading habits. Though mobiles are convenient to use, using them on a daily basis for longer hours, will cause a lot of health related problems such as cancer, stress, and neck pain. The microwave radiations (MWR) from mobile phones is harmful to all people particularly on children and unborn babies. Higher level mobile phone use is associated with sleep disturbances and symptoms of depression in men. Overall this paper provides a detailed review of mobile reading habits and how people shifted from printed form to online then to mobile form along advantages and disadvantages.

Keywords: Mobile reading, online learning, reading habits, problems of long time mobile reading, impact of mobile reading

1. INTRODUCTION

The history of reading can be dated back to the beginning of the script during the 4th millennium BC. Reading is the only way to access information. Reading is a multidimensional cognitive process of decrypting symbols to build and develop meaning from the recommended text and the context. There are no concrete rules for reading, rather reading permits readers to produce or reproduce their own ideas introspectively. It is a way of semantic acquirement, communication, distribution of information and thoughts. Till the end of 2000 many individuals could not afford to buy cell phones; computers and the internet are new technologies but these are now widely available and easily connectable. Information technology and its convenience has changed human lives and led to deviate in reading quality and reading habits. This change played a dramatic role in the revolution in learning and thinking, quality, quantity of reading and developed inclination toward reading. Eventually, this led to lifelong learning, thereby making an open-minded revolution in the society[1].

2. LITERATURE REVIEW

Reading habits have made an adverse impact on people due to various types of advancements in digital communication. Increasing digital information has led readers to spend more time on reading devices and that has big affect on the reading behaviour of many readers. As the technology of mobile phones has developed to a much more advanced level and gained popularity, the number of users has increased as well[2]. Digital information and content has contributed to shift of reading printed books to digital reading. Electronic books can be

grouped into two classes: hardware devices used to read the content and the content itself[3].

Akanda, Hoq & Hasan[4] stated that for the overall development of a human being, reading is vital. They stated that with the arrival of contemporary digital technologies, particularly mobile phones, tablets, e-readers, television, and other means of entertainment, the reading habits, particularly in the younger generation, is undergoing changes at a faster pace. Davis[5], *et al.,* conducted a survey on mobile reading habits and found that most of the people that read on a web browser prefered to make notes and highlight in document. Users are not satisfied with 'navigation within the document,' 'in-text search,' 'document storage and organisation' in current applications. Users do not stick to one program for their reading.

UNESCO[6] conducted a study on mobile reading in developing countries and found that mobile phones are helping as a gateway to long-size text. Mobile phones are permitted to access the same book the PC accesses, even the least expensive mobiles allowing users to access and read books. Mobile devices are the most favourable reading devices to millions of people in the world. People read more when they read on mobile devices.

Usage of smartphone for reading is expected to go higher as the latest mobile phone support Android, Tizen, Windows, etc., operating systems. In a study[7], it was found that 85 % of people claim that mobile devices are a central part of their daily life. Mobile phones or smartphones travel along with their owners from table to workstation to shops and home again with efficiency, proximity and convenience. Nowadays most of the youth below 30 years are using mobile applications for organising their lives better as wireless technology has been youth's entertainment option (Market Analysis & Consumer Research Organisation (MACRO)[8], Devarajan[9] reports that irrespective of the socio-economic background, the majority of the people are interested in reading books using mobile phones (51.96 %) especially fiction followed by Science (34.66). The new report on 'The Mobile Economy: 2015', forecasts that the number of unique mobile subscribers' will increase from 3.6 billion at the end of 2014 to 4.6 billion. By the year 2020, almost 60 % of the global population will subscribe to mobile services (GSMA)[10].

3. ONLINE READING

'Online' has precise denotation with respect to information technology (IT). The common perception for 'online' denotes to an Internet connection and connectivity. This concept has now stretched from (IT) to the area of human interaction and conversation. Online reading primarily means the content may only be read while the reader is online. An online book or e-book is a resource in book-like form that is only available to read online. Thus, the reader's involvement is similar to that of a printed book, except that the book is read in a mobile or computer and is only reachable or accessible when the reader is online. Online reading is also a virtual learning environment in which information is presented in pages, and they are read serially and inertly with little interaction and multimedia[11]. Alliance for Telecommunications Industry Solutions (ATIS)[12] considered the following criteria which must be fulfilled for online reading: (a) Devices like mobile or computer should be under the direct control of other device(s); (b) Devices must be functional and prepared for facility and services; and (c) Devices must be available for instantaneous use on demand by the system without human intervention.

3.1 Reading in Print and on E-reader

During the early 2010s, there was a migration from traditional print media reading to e-reading on mobiles. Digital connectivity has greater impact in day-to-day work communication, shopping, and even leisure. With developments in technology and production of smart phones, life is becoming more rewarding and day-to-day activities are either directly or indirectly connected with mobile devices. Reading printed books and reading on an e-reader give a different satisfaction. Now the choice of choosing reading in physical printed book form and on e-reader is eventually up to the reader. Many voracious readers choose technology as their choice for reading as it is more suitable, while still many decided to choose printed books as they love to feel the weight and read in their own relaxed way wherever they are. Reading physical printed books is easy as it will not be hurting the reader eyes with backlight. A printed book does not require e-readers or batteries for reading and has no warranty period. Printed physical books are more convenient to read and for consumption of information. Readers use printed documents for in-depth reading. Generally, involving marking and underlining. this indicates that paper is doubtful of disappearing even in the digital era.

E-reader is smarter and more interactive and playing an increasingly important role in the worldwide book market. E-readers are easy to carry, save space, convenient, save money and time, and ease-of-use[13]. The e-reader provides rich navigation such as tables of contents, searching by field or indexes or internal and external hyperlinks, and user notes and bookmarking[14]. E-readers permit readers to switch in between titles with ease[15]. Many researchers from different fields including psychology, computer science, and library and

information science have investigated about various issues related to online reading and published over 100 papers in the literature. All the studies before 1992 found that people read slower, less accurately and less comprehensively on screens than on paper[16]. Studies published since the early 1990's however, have produced more inconsistent results: A slight majority has confirmed earlier conclusions, but almost as many have found few significant differences in reading speed or comprehension between paper and screens. Recent surveys suggest that although most people still prefer paper—especially when reading intensively—attitudes are changing as tablets and e-reading technology improve and reading digital books for facts and fun becomes more common[17].

According to a UK survey, young people are now much more likely to prefer to read on a computer screen rather than a printed book or magazine. BBC reported in the news that The National Literary Trust[18] studied almost 35,000 8 to 16 years old. The number of youngsters purchasing mobile phones, computers and tablet devices has gone up so much, accordingly reading on screen also gone up. Of the total surveyed, 52 % preferred to read on screen compared with 32 % who preferred print, with the remainder having no opinion or preferring not to read at all. As well as social networking and browsing websites, the study indicates almost a third of youngsters read fiction on online devices[19].

3.2 Online Reading Habits

One of the new refined inclinations of the 21st century is the change in reading habits. The extensive worldwide usage of the Internet and the use of other reading sources particularly using hypertext and hypermedia resources have made radical deviations in reading forms. Online reading has become popular and penetrated into all types of people and their learning styles. With a massive and immediate quantity of accessible digital information to people, predominantly the young, they are spending additional time in reading electronic resources[20]. Additional time is spent on scanning and surfing for facts on the internet. They are also spending more time on scanning and surfing for information result into development of discerning innovatively and critically. The progress of electronic mass media destructive effects on reading with that people are less involved in a wide-range of reading skills and lack the capability to read intensely and withstand a lengthy in reading.

3.3 Reading Behaviour in Digital Environment

Evolution and development of digital mass media has influenced the reading behaviour of readers. Reading style is not the same as a decade back. Now readers are reading things like eBooks, e-journals, e-mails and online databases. Digital content has broken physical boundaries of the home, libraries and office[21]. Digital publishing has significantly increased the number of documents, and information. Digital content has changed the reading behaviour of readers who are more inclined toward digitised contents as it offers various new facilities such as interactivity, non-linearity, and easy access to information. Contemporary readers steadily advance to screen-based reading behaviour, and use many strategies such as browsing and keyword identifying to manage with the increase of information in the digital environment[20]. Users reading from screens devote less time for in depth and concentrated reading as they spend additional time for scanning, skimming, keyword spotting, onetime reading and nonlinear reading.

3.4 Students Attitudes and Behaviours towards Digital Textbooks

Now the developments in digital technology have touched the highest level. In the education sector, digital books are introduced in the form of electronic textbooks, adoption of e-books has been growing dramatically and is expected to grow at a much higher rate in the near future[22]. Often these digital textbooks are web-based, digital replicas of printed textbooks.

Students often favour to read print copies over a digital version when reading for longer time. Digital textbooks are more suitable for quick reference purpose rather than for long and continuous reading purpose. Students consider digital textbook as a learning object as it support learning and they are reusable. As digital text provides a variety of advantages such as lower costs, easy accessibility, and up-to-date content, students are inclining towards digital textbooks because of their superior delivery techniques, not a better way to read[23]. Accepting and understanding the type of reading device and its usability is based on user's acceptance of digital textbooks. Usefulness and ease of use considerably and positively influence these students to buy digital textbooks. Computer experience of a student also decides their behavioural acceptance of digital textbooks.

3.5 Shifts towards Online Learning

The present period is driven by digital technology. Reading and literacy has been largely restructured due to technological advancements, particularly the introduction of digital and information and communication technologies (ICTs). Digital advancement cannot be overlooked as a mere change. Shifting from printed physical books to online learning does not mean the end of physical learning habits. Through internet

and World Wide Web, virtual learning has evolved and is already spreading all over the world. Online learning provides new ways of writing, searching, and reading. Digital media played a major role in shifting from printed physical books to online learning by providing facilities which are not available with the printed form such as non-linearity, interactivity, immediacy of accessing information, coverage of information, audio and video contents[20]. Nowadays through online mode a user can educate himself or herself in their own time[24].

4. MOBILE READING

The literature offers different definitions of ebooks extending from an electronic monograph in the form of electronic text, regardless of size or composition (a digital object), but excluding journal publication made available electronically (or optically) for any device (handheld or desktop) that includes a screen[25]. According to China Publishers[26] mobile reading is 'the act of reading and consuming digital content on mobile devices' such as phones, tablets, PCs, e-readers, etc., and which covers e-books, e-newspapers, e-magazines, and mobile cartoons. The rapid development of mobile reading promoted the mobile publishing industry in a big way.

Physical printed books are facing lot of challenges after the introduction of online reading particularly mobile reading tools. The literature provides various definitions of e-books, ranging from simple electronic monograph up to any piece of electronic text, regardless of size or composition reads on any e-reading device that includes online screen[25]. A mobile reader is a digital device with written content which is a product by assimilating the familiar idea of a book along with features that are provided in an electronic environment. A mobile reader typically provides reading along with other features such as search and cross reference functions, hypertext links, bookmarks, annotations, highlights, multimedia objects and interactive tools[27].

About 91 % of adults and 60 % of teens in US own mobile devices and on an average spend 144 minutes a day using his or her phone during a 16 hour period[28]. According to December 2013 statistics, of the total Indian population, 1/120 are tablet users, 1/10 are mobile internet users, 1/13 are social media users and 1/6 are internet users. Of the total, during the same period the online population grew in India to 73.9 million; out of those who surf the Web at home or work on a computer grew over previous year, i.e., March 2012[29]. The average connection speeds in India is only 1.7 Mbps compared to Singapore with 9.1 Mbps and the UK follow 8.1 Mbps, and Broadband connections (i.e., 4 Mbps or higher) still account for less than 5 % of all internet connections. The connections of 10 Mbps or more are very much limited to just 0.7 % of all users. Therefore, mobile connectivity in India is going up in a big way thus, 70 % of internet page views in India come from mobile devices. Despite the slow speed networks, an average Indian internet user spend almost 5 hours on the internet every day, with 40 % of that time spent on social media.

According to the 35th Statistical Report on internet Development in China[30] the number of internet users in China reached 649 million in December 2014, of which the number of mobile internet users had reached 557 million (85.8 %). It is found that the percentage of Chinese consumers aged 16+ with a mobile phone at 89 %. Thus, China's mobile reading increased phenomenally with a total of 600 million users having revenues of £656 million. Mobile reading devices are technological innovations that is changing the concept of book and publishing industry. The Kindle, Nook, and iPad are the most commonly used mobile reading devices that are capable of providing wireless technology and the internet facilities.

5. GENERAL MOBILE READING HABITS

Reading habits have been cultivated by human being since time immemorial. Through reading, the words of wisdom and knowledge have been passed on from one generation to another generation. Reading enhances innovative vision to the eyes and novel knowledge to the mind. The vital factor for intellectual and emotional growth is reading.

5.1 Reading Habits Variations with Gender

Reading was the empirical and theoretical area of study for a long time[31]. Gender and age are the two primary independent variables affecting reading habits[32]. Boys and girls show a number of reading-related differences that go beyond performance differences on large-scale assessments. Moyes[33], Zickuhr[34], *et.al.,* and Miller, Kristen & Lee[35] stated that females are more substantial readers than males. Boy's inclining to negative approaches towards reading, while girls enjoy reading better than boys[1]. Hassell & Rodg[36] reveal that girls have more favourable attitudes than boys for both recreational and academic reading. Girls tend to do more non-assigned reading, reading for pleasure, or reading for general interest than boys. Girls perform more out-of-class reading, sharing and conversation of reading resources and spend more time doing homework than boys. Boys on the other hand, prefer watching television or movies rather than reading[37]. Boys spend less time reading than girls, are not that much motivated to pick up a book and do not value reading as an activity are less self-confident readers and judge themselves

as having lower reading skills than girls[38]. Boys' underachievement in reading is a significant concern for the UK schools. In a National Literacy Trust survey, 76 % of UK schools indicated that boys in their school and did not do well in reading compared to girls. To tackle these problems, 82 % of schools have developed their own strategies[18]. Worldwide literacy marks also shows that boys don't do as well as girls[39].

Gender is another factor that is often reported to affect reading development. In general, boys are believed to have more aptitude for using computer and information technologies, and it is also true when using e-books in an educational context. In a study, two investigations were conducted to explore children's attitudes, reading behaviours and outcomes to find out if there were any gender differences in the reading of e-books. The results show that while the girls mostly had the behaviour of skimming during the reading process, they outscored the boys in the retrieval tests. The gender differences are still a substantial and considerable factor in children's reading of e-books[40]. Another study explored the effect of age and gender on second-grade children's reading performance and discuss them in a neurobiological point of view. It was found that older children have better reading scores than younger, but gender does not affect second-grade children's reading performance. Results showed a significant effect of age in reading performance, with the older children having better scores than younger ones for reading fluency, reading comprehension, and the total reading performance. Here, gender was not found to play an important role in reading performance[41].

Smith & Wilhelm[42] identified common judgments about boys, girls, and their reading habits: (a) Girls understand fiction better than boys; (b) Nonfiction, magazines, and newspapers are prefer by boys; (c) Boys incline to favour short texts or texts with short divisions; (d) Girls relish leisure reading more than boys; (e) Sports, hobbies, fantasy and science fiction are common for boys; and (f) Graphic novels and comic books are more popular with boys than girls.

5.2 Teenage Readers' Attitudes and Preferences

The growth and reconstruction of technology has made teenagers lives easier. Mobile technology is ubiquitous and now well-known to teenagers. Almost all teenagers are aware and have access to mobile phones. Mobile phones not only enable spoken communication but are also used by many teenagers heavily using them for reading purposes. Teenagers have an inclination toward mobile reading as it replaces feelings of aloneness, separation or dullness. Teenager readers spend more time on mobiles on weekend than on casual week days[40]. Teenagers prefer mobile phones with built-in rich multimedia features as they want interactive user interfaces for reading.

5.3 Cultural Reading

In an anthropological word, culture can be defined as how a group of people do things, how they greet one another and communicate, how they dress, eat, work, and play. A cultural reading means that reading is done in a specific culture and is a habit that is common and valued highly by that particular society[43]. Heyes & Frith[44] indicated that most probably all humans neurocognitive skills are formed by culture and many are culturally inherited. Cultural reading is a inherent skill that enables the cultural inheritance of other, more precisely skills. The differences in cultural reading are associated with the demographic composition of different kinds of culture and communities. Cultural familiarity simplifies understanding, reading accomplishments and stimulates schematic knowledge and promotes strategic reading behaviours, and the influence of cultural familiarity remains intact. Cultural reading is more established in urban areas than rural counterparts[31]. Cultural representation is required by a reader to fully understand and comprehend a text.

5.4 Socio-economic Groups–Rural vs. Urban Readers

Socio-economic factors play a big role on reading habits. Families with higher socio-economic position living in urban areas start school with higher achievement levels than their peers from rural background. The dissimilarities in reading habits between rural and urban are associated with the demographic composition of different kinds of socio-economic groups—the age of the population, their overall level of educational background, and the general level of household income. The educational achievement of the adults and parents in the community, earning capacity, community employment rate, and requirement of education are the main factors for differentiating rural and urban readers[45]. The reading habits of rural and urban college students of the 21st century show that reading values are more established in urban students than their rural counterparts[31].

5.5 Impact of Mobile Reading on People

According to UNESCO, mobile reading will certainly play a big effect on two thirds of illiterates in the world. However, out of these people, women are less likely to own mobile devices those own mobile devices are more likely to read than men. So, UNESCO is working to use mobile devices and

other ICTs to transform illiterates to literates. It was found that one third of mobile device women users are reading stories to their children on them. Since most of the mobile reading market demands English language literature, there is also a need to provide more access to literature that is written in local languages by local authors. They feel that most of the governments are not utilising the full potential of mobile devices to improve education and literacy in developing countries. They suggested that publishing companies should consider digital first content strategies to reach new readers in these growing markets. They also estimated that the cost of an open access copyright eBook can be made available for 2-3 cents (US) against the cost of a paperback book is around US$10. Since physical printed literature is much more difficult to distribute, especially in rural areas, digital literature is an easier, cheaper, and quicker alternative. They felt that mobile devices may play a positive impact on the eradication of illiteracy in the world[6].

6. TYPES OF MOBILE DEVICES

A mobile phone is a hand held device and also called as a cellular phone, cell phone, hand phone, or simply a phone which can be used as telephone over a radio link while moving around a wide geographical area. Modern mobile phones called smartphones which have general computing capabilities besides making calls, provide wide range of other amenities such as text messaging, multimedia messaging service (MMS), e-mail, internet access, short-range wireless communications via infrared and bluetooth, business applications, gaming, photography and reading.

Some of the most common forms of mobile reading devices are:

(a) Portable computers: They are easy to carry along with us anywhere. They have a full keyboard and mainly run with software such as laptops, notebooks, notepads, etc.

(b) Personal digital assistant (PDA): It is also called as a handheld PC or palmtop, a mobile device that combines computing, telephone/fax, internet and networking features.

(c) Ultra-Mobile PC: It is a hand-held computing device capable of running a Windows OS, larger a PDA but smaller than a laptop.

(d) Smartphone: It is like a mobile phone that performs many of the functions of a computer, typically having a touchscreen interface, Internet access, and an operating system capable of running downloaded apps.

(e) Tablet computer: It is a wireless, portable PC with a touch screen interface, smaller than a notebook computer but larger than a smartphone which is expressively used for communication and online reading.

(f) Global Positioning System (GPS) navigation device: It is a device that accurately calculates geographical location by receiving information from GPS satellites. Initially, it was used in cars, boats, cell phones, mobile devices and even personal heads-up display (HUD) glasses.

7. ADVANTAGES OF MOBILE READING

A decade back, a mobile phone or cell-phone signified fashion, symbol of richness, money and success. Nevertheless, today, every one finds it a necessity in day-to-day life and has become a basic need for every individual. Mobile devices are faster, easier and more effective way to share information[46].

A mobile is widely used for reading. Today people are moving from old-fashioned paper-based books to e-books and mobile reading. By using mobile phone you can purchase, download and read any book. Advantages of using mobile phone for reading are as follows[47].

(a) Portability: Mobile device is light and small. It can fit easily in our pocket. Therefore, users can take anywhere allowing them to carry hundreds of books without worrying about weight. It can be carried from one place to another as it breaks physical boundaries.

(b) Capacity: Mobile devices allow users to receive information immediately by browsing and downloading books. Mobile reading is interactive as it contain audio, video and animations. Its interface allows novice users to perform and function with ease for better reading. Users can easily search for any information instead of turning page after page.

(c) Better reading: While reading fonts size can be resized, making it easier to read for different readers. Latest technology in mobile devices provides additional software to turn some of the books into audio books.

(d) Avoiding annoyances: Mobile reading reduces the annoyance of flipping pages to avoid distraction and concentration.

(e) Free books: Mobile reading saves money and time; there is no need to go to the book store. Thousands of free books are available on the Internet which can be read by using mobile devices.

(f) Gain of space: Mobile reading required less memory and space. Users do not need any extra space to store downloaded books. User

can store hundreds of books on mobile devices for reading.

8. DISADVANTAGES/BARRIERS OF MOBILE READING (USER EXPERIENCE)

Developments in information technology during the past years have led to maximum exploration of mobiles usage. Using mobile devices for reading purpose has become a lifestyle. Besides many advantages, every product has a defect and way to improve. Mobile devices when used for reading purpose have its own problems such as:

8.1 Usability

Surpassing the classic book over eBooks largely depends on its usability. The usage of mobile has potential in different areas in the field of education. Usability play a critical role in mobile reading. App developers devote time, effort and money in getting the usability of their products and services right for users. Providing a clean, clear and pleasant look is vital to retain users from leaving mobiles. Interfaces and navigation are the prime problem areas to any mobile user while reading. Many mobile users are not satisfied with the navigation as it is non-intuitive and reading non-linear texts for example newspapers reading on mobiles is not comfortable. Usability is the quality of a user's experience when interacting with mobile devices and it is about the effectiveness, efficiency and the overall satisfaction of the user.

8.2 Acceptance

Acceptance and loyalty in service industries and its potential, i.e., mobile phone impact on the development of sustainable competitive edge from others[48]. Prior domain knowledge and lack of technical skills of naive users led to many problems in selection of suitable mobile devices for their reading. Mobility, support, connectivity, immediacy, collaborative, readability, usefulness and text satisfactory plays an important role in accepting mobile devices for reading purpose.

8.3 Reading Speed Variation Among People

Normally an average person reads at about 200-400 words per minute but speed readers can read around 1000-1700 words per minute. The average reading speed increases as an individual grows in age and develops in intellect and cognition. Reading on a computer screen is more visually demanding than reading printed text. The speed of online reading depends upon the eyes movement from word to word and from line to line. Online reading requires longer time eye movements and imposes continuous focusing and position demand

which is both visually and physically tiring. They felt that font size played an important role when reading texts on the Internet. Being able to take notes and leave marks or underline text when reading documents on the computer screens were also important. In a study it was found that the factors that affected the students' online reading behaviours were eyestrain and headache[49].

8.4 Health-related Problems due to Mobile Reading

Mobile devices should offer pagination that matches with original text. Use of color especially red and green as differentiators must be avoided. Reading with mobile devices before sleeping causes health related problems[50]. Reading by using mobile devices in dark place before bedtime took readers to keep awake for longer hours, having a lower quality of sleep. Mobile devices produce light, the blue light produced from mobile screen suppress the production of sleep inducing hormone melatonin[51] thus, resulting in sleep deficiency, disrupting daily work, which eventually influence on performance, health and safety.

The potential harm from microwave radiation (MWR) from wireless devices is more, particularly on children and unborn babies. Several studies have found that children absorb more MWR than adults. One found that that the brain tissue of children absorbed about two times more MWR than that of adults, and other studies have reported that the bone marrow of children absorbs 10 times more MWR than that of adults[52], Kuster[53]. Thus, children are at greater risk than adults when exposed to any carcinogen because MWR exposure can result in degeneration of the protective myelin sheath that surrounds brain neurons[54]. Some of the governments like Belgium, France, India, etc are proactive and already passing laws about children and teens need to know how to use these devices safely.

Mobile devices should not be kept in children's bedrooms at night, particularly under their pillows. The Pew Research Center[55] has reported that 75 % of preteens and early teens sleep all night with their cell phone under their pillow or keep a mobile phone in their front pants pockets. There is danger to exposure to MWR. At the same time, for girls it can lead to breast cancer.

The high frequency of mobile phone use can have negative effects on our stress levels. The constant ringing, vibrating alerts, and reminders of cell phones may feel stressful. Researchers found high mobile phone use was associated with stress and sleep disturbances for women, whereas high mobile phone use was associated with sleep disturbances and symptoms of depression in men.

By sending frequent text messages and e-mails with hand and fingers, users may cause pain and inflammation of the joints and sometimes neck and shoulders pains. Long hours of reading on smaller screens of mobiles lead to vision problems in the later part of life[56]. Researchers found that the artificial indoor-light used in the rooms suppresses the rise of melatonin, making the people feel less sleepy, and thus more inclined to delay their bedtime. This is because when the people alter the colour of light, by reducing blue light and increasing the red and yellow, the disruptive effects of the light were minimised[57]. Therefore, doctors advised to avoid late night use of technology particularly use of electronic equipment in the bedroom, however there is increasing evidence that late-night use of mobile devices are more disruptive to sleep than watching television. This can particularly affect teenagers.

The exposure to the radio frequency (RF) fields emitted by mobile phones is generally more than a 1000 times higher than from base stations. So, many studies have been conducted in this area to know the greater risks due to mobile phone exposure. Research found strong evidence of developing cancer, electromagnetic interference, traffic accidents and other health effects among the mobile devices users so precautions must be taken to use the same safely.

9. ROLE OF READING DEVICES AND INTERFACE AFFORDANCES

The most commended affordances of the reading devices are their capability to hold a complete library and thus reducing the weight of reading material. Reading devices are used to assist people to carry books all over the places, for commercial or pleasure, college or holiday, etc. Reading devices are good for the environment as they do not use paper or ink. Interfaces of reading devices discovered that reading skills were hindered by not being able to swiftly and materially judge the text. Possible navigation is addressed by designers in reading devices, by addition of functions to shows page numbers, hyperlinks, chapter titles to tables of contents, and adding of automatic bookmarks.

10. FUTURE TRENDS IN MOBILE READING

The age of mobile technology has reached a new height. A decade back mobile applications or cloud technology were unknown arenas. The mobile phone that we presently use, know and carry in pockets will shortly take advanced forms.

10.1 Technological Trends

Mobile technology is now focusing on the development of computing environment in these devices. Wearable technology has started to and will become the subsequent mobile technology. Smartphones, glass screens, holograms and augmented reality will become the future technologies of mobile phones. Use of hologram and large screen devices will not be too far. In future, technology will authorise to recognise its user and differentiate much more proficiently than contemporary passports do. Credit cards will be substituted by mobile phone payment when biometrics is fully developed and implemented. In the near future, electro vibration will be featured in touch-screen devices allowing smartphone to offer electrostatic controls to fingers that will have the result of conning our brain into thinking as feeling a texture.

10.2 Business

Future mobile business should emphasis on recognising mobile user experiences. Mobile companies have to develop an effective mobile business policy that will increase expansion of value to the business, decreasing time to launch a new product in the market, growth in scale to meet current and future needs, minimising product developments costs, generating new revenue streams, improving customer relationships and increase in productivity. The evolving mobile technologies like Bluetooth, General Packet Radio System Network (GPRS) and Global System for Mobile Communication (GSM) are expected to accelerate mobile business[58] to greater heights.

10.3 Pricing of Hardware and Content

Knowing the details about today's mobile device is vital for all. Nowadays, no business is ignoring mobile device users. A few years from now, mobile web search will definitely overtake desktop. Nowadays, the companies frequently update the hardware models to achieve their business targets. Whether their enthusiasm is justified or not, people get excited about higher resolution screens, front facing cameras and quad & octa-core processors. Mobile phone producers are adventuring into 3D bandwagon. 3D cameras offer new input sensor for three-dimensional relationships. The price of an iPhone start from Rs.45,000/-. Android smartphones, Windows smartphones and others smartphone price start with Rs. 8,000/- and above. However, the present price is likely to drop with the advancement in technology. Comparing to other smartphones, Android phones are considerably lower in price. Quality of the mobile phone should not be compromised with its price. Displays and processors that are used in high-end smartphones are feasible and used in lower-cost smartphones[59].

Decreasing price of a smartphone is directly proportional to decreasing price of electronic content

and hardware. As the price of a smartphone is becoming cheaper, more and more consumers are moving towards smartphones nowadays. The content on the web is easily accessible when connected to the Internet. Publishing companies are rapidly moving towards electronic age as they understand the requirements of today's users and overtake physical publishing, though not rooting it out completely.

10.4 Curriculum of Future

Social networking, social media, technology and virtual classrooms have transformed the way teachers demonstrate and students acquire knowledge. Abdullah & Siraj[60] stated that advancements in technology have transformed how we live our lives. Today the developed and underdeveloped countries are separated by technology. Technology has made a wide learning gap between privileged and underprivileged countries. Students from developed countries are learning through mobiles and computers while in underdeveloped countries, they are learning using torn printed textbooks.

Mobile learning is the solution to fill up this gap. Mobile technologies aids in learning and will further enhance the development of new educational method which simplify students-centered or self-access learning involvement, thus escalating chances to flourish the education anytime and anywhere. In the future, mobile learning will produce additional carriers and professions worldwide. This is because mobile devices are light, not costly and easily access when compared to desktops or other devices.

11. CONCLUSIONS

In this fast changing digital world, readers are estimated to progressively change the screen-based reading act to stay alive with knowledge-rich environments. Mobile reading is extensively used for information seeking purposes. Usage of mobile reading is higher in urban areas. Reading devices support reading of a particular text and the extensive scanning of manifold texts. However, it has not overcome the serious obstacles of supporting the tangled reading, note making, and arrangement practices that are the basis of producing novel and significant texts. Further improvements and research is required in mobile technology to introduce adaptable user interfaces, faster processors, ergonomically best designs with time and users needs, hands free operations, etc.

UNESCO's recent study found that illiterate girls and women are more attracted to the literacy courses offered through the mobile phones, computers, Internet and TV. Also noticed are the potential for mobile phones and other mobile devices like e-readers to aid in literacy programs[6]. With the result that larger number of people is carrying small mobile devices with them that are capable of holding and reading tens or thousands of eBooks that are useful for the promotion of literacy and reading. New technologies like smartphones can play important roles in helping to enable efforts and activities to teach people to learn how to read.

Reading requires books which are non-accessible to millions of people in the world and thus do not read. However, today mobile phones and cellular networks are filling up that gap and helping these people out of reach. It is estimated that over 6 billion now have access to a working mobile phone which is still used primarily for basic communication. It is often possible to provide access to printed books through a mobile device for a fractional cost. Today's smartphones are less expensive and allow users to store large number of books and access and read them. Nowadays women and men, girls and boys around world are reading many books on mobile phones. UNESCO conducted a comprehensive survey of mobile reading in developing countries like Ethiopia, Ghana, India, Kenya, Nigeria, Pakistan and Zimbabwe and found that people read more when they have access to text on mobile devices, that they enjoy reading more, and that people commonly read books and stories to children from mobile devices[6].

By the year 2020, 90 % of the world's population over six years old is predicted to have a mobile phone of which 6.1 billion will have a smartphone subscription. The fastest growth rate to new mobile subscriptions was found in India with 18 million and China with 12 million in the third quarter of 2014. The falling cost of handsets, coupled with improved usability and increasing network coverage, are factors that are making mobile acceptance to the majority of the world's population, regardless of age or location. The Ericsson Mobility Report[61] estimated that by 2020, the world will like never before.

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