Information Technology on Surge: Information Literacy on Demand

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ABSTRACT

Dawn of information technology created a revolution, triggering the information explosion on the digital front. Rapid changes in the technology further gave impetus for digitisation of information, which in turn raised the need for information literacy among the public. The onset of cutting edge technology in telecommunications, on the other hand, also created more opportunities for the creation of new content to further en-mass the expanding digital universe. However, the client or the information seeker, despite having internet accessibility, is far away from information sources. Present paper delves deeply into the possible threats created by information explosion and the necessary action to be taken by library and information professionals in dealing with and managing the information sources to bring them to the mouse click of right information seeker at the right time, thus making them comply with the normative principles propounded by the father of library & information science, Dr S.R. Ranganathan.

Keywords: Information technology, information explosion, information products, social networking sites, social media, library and information professionals, information education, literacy

1. INTRODUCTION

Information technology (IT) is the use of computers and other relevant electronic devices in creating, processing, and delivering the information products. The Information Technology Association of America (ITAA) defines IT as 'the study, design, development, implementation, support or management of computer-based information systems, particularly software applications and computer hardware[1]'. As the adage says, necessity is the mother of invention, so is the need for increased use of information systems, which created an environment for innovation. The IT was shaped by US Defence Forces during the cold-war era. However, the invention of world wide web by Tim Berners-Lee in early 1990s opened up the IT and related services for the use of common man across the globe. Innovation of cutting-edge technology in communications during the late 20th century gave further impetus to the rapid expansion of digitised formats of information easily accessible online. Constant digitisation of information on the other hand led to information explosion and expansion of digital universe, encompassing many fields of study.

1.1 Information Explosion

In its executive summary, the International Data Corporation (IDC) Digital Universe white paper[2] gives clear evidence of expanding digital universe. It reads: 'There's no secret here. YouTube, a company that didn't exist just a few years ago, hosts 100 million video streams a day. Experts say more than a billion songs a day are shared over the internet in MP3 format. London's 200 traffic surveillance cameras send 64 trillion bits a day to the command data center. Chevron's CIO says his company accumulates data at the rate of 2 terabytes– 17,592,000,000,000 bits–a day. TV broadcasting is going all digital by the end of the decade in most countries[2]'.

The IDC white paper also observed that the total amount of digital information increased from a mere 5 exabytes (5 billion gigabytes) in 2003 to $1,288 \times 10^{18}$ bits in 2006. According to computer jargon, it equals to 161 exabytes or 161 billion gigabytes, i.e., equals to almost 3 million times the total information available in books ever published. IDC report forecasted that the new additions to the digitised information per year during 2006-2010 will multiply over 6 times, i.e., from 161 exabytes to 988 exabytes and by 2010 about 70 per cent of the digital information will be created by individuals making a number of business entities, government and non-government organisations to check the reliability, security, compliance, and privacy of the digitised electronic information. The chief research officer behind

the white paper, John Gantz said, 'the number of new digital information bits created in 2008 was 3,892,179,868,480,350,000,000, which should be read as 3 sextillion, 892 quintillion, 179 quadrillion, 868 trillion, 480 billion, 350 million[2]'. The digital universe is expected to expand to 1,800 exabytes of information by 2011[3] (Fig. 1).
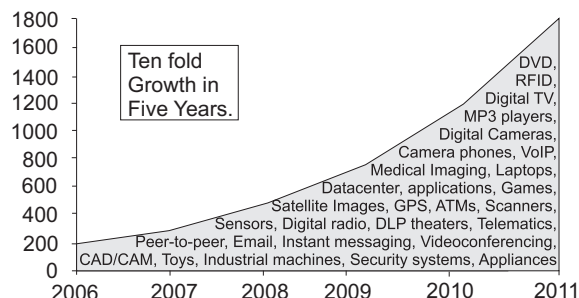
Source: Gantz, F. John[3], *et al.*, pp. 3.

Figure 1. Growth of digital information worldwide.

In addition, the rapid growth in communication technology not only gave space for more telecom operators but also gave subtle encouragement to the growth of digitised information.

2. GROWTH OF COMMUNICATION TECHNOLOGY: CHANGING FACE OF INFORMATION LITERACY

The key force behind the growth of information, expansion of digital universe and the growth of social media is basically the onset and growth of communication technology. In Indian context, during 50 years of its independence, the government took utmost care in giving importance to communication technology to cover every nook and corner of every state, district, and village across India. Thus, starting its nascent steps in 1947, the communication technology has spread across India and by early 1990s almost every region in India was connected with fixed line telecommunications supported by basic infrastructure.

The structural reforms of Indian economy in 1991 aiming for liberalisation and globalisation opened the doors for the private players to enter into the telecommunication and IT. It gave further impetus to the growth of technology and in 1992, the global system for mobile communications (GSM) technology was launched[4]. After launching of GSM, there was a time lag for almost a decade, with the government implementing various measures to develop the basic communication infrastructure to be able to compatible with the forthcoming technologies.

The dawn of the new millennium brought the golden age for Indian telecommunication. The launching of code division multiple access (CDMA)/wireless local loop (WLL) technology in 2001, voice over internet protocol (VoIP) in 2002 and broadband in 2003 enlarged the pipeline through which information can be transmitted without any congestion. The launch of 3G spectrum in 2007 further encouraged the mobile phone devices manufacturers to produce 3G compatible devices supporting national and international telephony, short message service (SMS), multimedia message service (MMS) and accessibility to internet, television, etc. In addition, the mobile phone devices like Apple iPhone created revolution by embedding the technology to automatically switch between different types of networks such as EDGE, 3G, and Wi-Fi to facilitate better accessibility to internet and to fasten the download speed (Fig. 2).
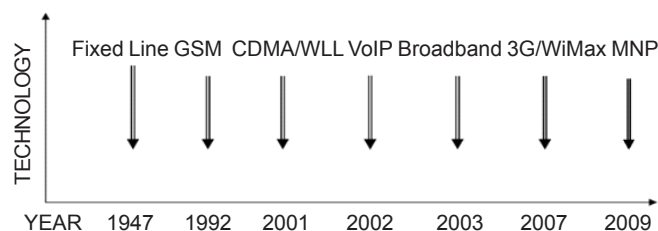
Source: Thalluri, Prashanth Vidya Sagar & Gonela, Saradhi Kumar[4].

Figure 2. Indian communications industry: Technological developments.

Thus, the growth of telecommunication and the availability of high-end mobile phone devices like smartphones supporting the 3G spectrum technology, created avenues for the increased access to information on internet and exchange of ideas simply through mobile phones. Taking this into consideration, a number of big players such as Google and Microsoft launched the software for mobile devices to be embedded in the smartphones. Obviously, the smart-phones encourage the user to surf the internet, check e-mail, uploading videos and pictures, chatting online and even share-market trading. They provide facilities equitable to that of a personal computer. This phenomenon led to the onset of new online segments like micro-blogging, WAP browser and making the websites compatible with the WAP browser, etc. As it is very easy to access internet through their mobile phones, the users started using their mobile phone devices even during their leisure time to enter into social networking sites to exchange their thoughts, opinions, likes and dislikes, etc.

3. SOCIAL NETWORKING SITES

By nature, man is a social and socially cooperative animal. With his intrinsic inquisitiveness, a person, though informally and spontaneously, is eager to know about others, their interests, activities such as listening, watching, reading, writing and so on. This basic nature of human encourages social interaction, which formed the

basis for the 21st century internet applications such as facebook, twitter, myspace, cyworld, bebo, Hi5, etc. These are the social networking and micro-blogging websites, which are increasingly attracting millions of global academicians, industry researchers, intelligentsia as well as common public who have used them into their daily lives.

Boyd & Ellison[5] define social network sites as 'web-based services that allow individuals to (a) construct a public or semi-public profile within a bounded system, (b) articulate a list of other users with whom they share a connection, and (c) view and traverse their list of connections and those made by others within the system. The nature and nomenclature of these connections may vary from site to site[5]'. On the other hand, micro-blogging sites such as 'twitter' allows the user to write and post a small note on any topic and make it instantly available to be read by entire online community, who in turn can reply to these small 'posts', thus providing ground for entering into conversation, making responses, swapping ideas, and offering suggestions.

In both social networking sites and micro-blogging, the information shared by the author is instantly accessed by the author's 'followers'–people who are interested and want to receive all updates from the author. Thus, the social networking sites allow many people to interact with each other and to get connected with the people of same interests. Interaction with one person in a group will automatically create the network with all other people in that group. Hence, the people of same interests always get connected and share their favourites through these social networking sites and micro-blogging. That is the reason why these social networking sites have become the targeted market for many industrialists offering products and services.

Hence, the expanding digital universe is added by a variety of content on daily basis either through social media or micro-blogging whatever the form may be, and this increasing digitised information is attracting more number of people. Thus, by creating vast business potential, the social networking and micro-blogging have become a new mantra for industrialists to promote their products and services.

3.1 Social Media

Social media networking offers free entry and exit of people discussing various topics and sharing their views and opinions. As it is the virtual world where one may or may not show the original or pseudo identity, more and more people express their feelings, emotions, likes and dislikes in this second world, more than they actually do in their day to day life. It is the main reason why the social networking sites such as facebook, myspace.com, blogger, twitter.com, etc., are gaining more number of registrations. In April 2008, the number of minutes spent by the registered users on Facebook was 1,735,698 min which increased to 13,872,640 min by April 2009 recording nearly 700 per cent growth (Table 1).

3.2 Micro-blogging

In addition to social networking sites, the micro-blogging made the information sharing and querying quite easy bringing the work even to the finger tips. These micro-blogs helped in writing short essays, sharing ideas, thoughts, opinions, beliefs, posting content, videos, photos, pictures, etc., giving scope for sharing and seeking information and to develop virtual friendship-wise relationships.

3.3 Marketing Potential of Social Networking and Micro-blogging

The social networking sites are gaining more importance for promotion of products, goods, and services. The increasing online traffic raised the importance of the social networking sites such as facebook, twitter, etc. As large number of people use social media, even the big companies and the marketing professionals are also targeting their consumers through the social networking sites rather than the media like television. For example, Vodafone has created an

Table 1. Top US social networking and blog sites by time spent

Rank	Website	April 2008 minutes (000)	April 2009 minutes (000)	Year-over-year % growth
1	Facebook	1,735,698	13,872,640	699
2	Myspace.com	7,254,645	4,973,919	-31
3	Blogger	448,710	582,683	30
4	Tagged.com	29,858	327,871	998
5	Twitter.com	7,865	299,836	3712
6	MyYearbook	131,105	268,565	105
7	LiveJournal	54,671	204,121	273
8	LinkedIn	119,636	202,407	69
9	SlashKey	N/A	187,687	N/A
10	Gaia Online	173,115	143,909	-17

Source: http://blog.nielsen.com[9]

exclusive webpage on the social networking site, facebook, before launching its new *Zoozoo* campaign intended to create a new brand name for the company. Similarly, Hindustan Unilever Ltd also focused more on creating a separate online page on facebook rather than media while promoting its own social networking site, sunsilkgangofgirls.com. By the end of first decade of 21st century, even the media also started concentrating on social networking sites such as facebook to advertise and promote its programmes. It clearly reveals that the social networking sites are becoming the core areas than the media, from which the lava of information can be poured out through various vents to reach the audience or customers or clients.

3.4 Social Media: Creating Environment for Evolution of Virtual World

Social media has become powerful paving the way for the creation of virtual worlds where the real feelings are shared and genuine friendships can be made between the people who otherwise never could have been met. These virtual worlds are at the summit of internet and social media. A number of virtual worlds based on different themes are at increase on internet. Some of them are based on casual gaming and role-playing, while some of them are intended for education, content creation, etc. Even the software frameworks are also available that help in creating users' own virtual worlds and to host them on their own servers (Table 2).

However, the press release presenting the highlights of IDC's Worldwide Digital Marketplace Model and Forecast, 2009, gave more insights and expected expansion of digital universe by 2013. It reads: 'More than 1.6 billion people–a little over a quarter of the world's population–used the internet in 2009. By 2013, over 2.2 billion people–more than one third of the world's population–are expected to be using the internet. More than 1.6 billion devices worldwide were used to access the Internet in 2009, including PCs, mobile phones, and online videogame consoles. By 2013, the total number of devices accessing the internet will increase to more than 2.7 billion[6]'. It means that the online user community and the information seekers are expected to grow exponentially. It means that the library and information professionals–if committed to achieve the principles propounded by the *father of library science*, Dr S.R. Ranganathan–are obliged to put strenuous efforts to capture the online user community.

Commenting on the expansion of digital universe, John Gantz stated, ''with a wealth of information and services available from almost anywhere, internet-connected mobile devices are reshaping the way we go about our personal and professional lives. With an explosion in applications for mobile devices underway, the next several years will witness another sea change in the way users interact with the internet and further blur the lines between personal and professional''[6].

4. SNOWBALLING EFFECTS ON INFORMATION INSTITUTES, AND INFORMATION PROFESSIONALS

The report titled, IDC's Worldwide Digital Marketplace Model and Forecast, 2009, states, 'The most surprising

Table 2. Types of virtual world

Type of virtual world	Purpose	Examples
Social media	Offers tools for users to create and customise their own virtual rooms or spaces, enables 3-dimentional Chatroom facility for conversations and also offers sale of virtual goods and services	Kaneva, There, Lively, Vivaty, IMVU
Gaming	Allows users to play smaller and casual games	Club Penguin, Habbo, Neopets, Dizzyworld
Role-playing	Seeks the user to assume a role and play accordingly in a themed world of Massively Multiplayer Online Role-Playing Games (MMORPGs). In addition, offers trading in goods and services through the medium of in-game currency	World of Warcraft, Age of Conan (fantasy themed); EVE Online, Ultima Online (science fiction themed); Gaia Online
Content Creation	Enables users to create their own content on education, politics, gaming, business, etc., share it or sell the content to other users.	Second Life, HiPiHi
Education	Aimed to educate children on certain topic, these websites also contain features for casual gaming	Whyville, Handipoints HandiLand, MinyanLand
Interest-based	These are based on the tastes, interests and hobbies of the users such as sports, dance, music, etc.	vSide, Stardoll
Branded	Created around certain real world brands, these websites seeks the user to buy a real product before they enter into the virtual world of that particular brand	vMTV, Webkinz, Barbie Girls
Mirror Worlds	Uses 3-D maps and pictures of earth, mirroring the real world, thus, in turn promote the tourism	Unype, Twinity, Amazing Worlds
Virtual Worlds Platforms	They are software frameworks that enable users to create their own virtual worlds. platforms even enable the users to host virtual worlds on their own servers.	Active World, Croquet, Some Multiverse, OLIVE, Metaplace, Project Darkstar

Source: 'Introduction to virtual worlds'[10].

fact is that, in 2008, the amount and pace of information passed over the internet, phone networks, and airwaves actually increased faster than IDC had predicted last year–to the tune of millions of gigabytes. This is a problem for businesses[7].

Thus, the information technology has created a snowballing effect on the digital universe making it to expand rapidly and thereby, to increase the demand for virtual libraries and information repositories or databases, rather than the real physical existence of library and information institutes and their professionals. Hence, the demand for virtual information sources overshadowed the need for physical availability of books and other print materials. At this juncture, a number of questions come to the forefront: how the increasing technology can be better utilised to deal with varied formats of information literacy expanding in the digital universe? How to manage and market the information to attract a potential information seeker and turn him/her into a habitual information seeker? How the library and information professionals have to deal with the social media to reach the right client at the right time, thus, serving the purpose of librarianship and complying with the five laws of library science pronounced by Dr S.R. Ranganathan.

4.1 Effect on Physical Existence of Libraries

Growth of online information literacy has a cascading effect on the physical existence of information sources and their repositories, i.e., libraries. Information technology and increasing online readership has reduced the demand for physical form of newspapers, books, and other print materials. It even forced a number of book publishing agencies and newspaper agencies which could not upgrade their technology for internet compatibility to shut down[8]. The impending crisis cautions the library and information professionals to wake up at this early stage and adapt the information technology at the earliest.

4.2 Reducing Relevance of Subject Keywords and Subject Headings

Expanding Internet usage also started reducing the relevance of the subject keywords. It is only through the search engines that a person can search online information. These search engines are user friendly and optimised to search the information from generic terms. Accordingly, most of the people use generic terms rather than specific keywords or subject headings to search their favourite information on internet. This concept of using common terms and words that we use on a daily basis to search online information is turning the Library of Congress Subject Headings (LCSH) and Sears List of Subject Headings (SLSH) into mere decorative pieces of Library and Information Science. This may even demand the optimisation of existing subject keywords compatible

to the online way of searching and also may seek a change in assigning the class numbers.

4.3 Changing Role of Library and Information Professionals

Till now the library and information professionals served physically - whenever a user wanted a book, they used to search their shelves and bring it to the client. And once the book is returned by the user, the library professionals replace the book or document or paper in the proper position based on the class number and catalogue. With the growth of technology, the library and information professionals are forced to constantly adapt the expanding technology. The library and information officials, hitherto, were sitting in the libraries managing the documents to serve the clientele. However, it is the need of hour that they involve in continuous online search to reach out to the right information seeker, as it not only provides easy access for users and library professionals to deal with each other, but also saves the time.

4.3.1 Empowering the Library and Information Professionals

The main purpose of empowering the library and information professionals is to carry out their duties efficiently in the digitised community and to effectively face the challenges posed by ever expanding digital universe. It is very important for them to have strong knowledge and skills need to deal with the application of information and communication technology in library and information services. If library and information professionals have committed spirit to execute the obliged duty of reaching the right information seeker at the right time, they have to adapt many changes in their daily working style, which in turn will empower them to deal with the demands of expanding digital universe.

4.4.1 Technology Upgradation

Library and information professionals should be well equipped with the technology to steer the information to the right information seeker. Even today, after the end of first decade of 21st century, there are many Indian librarians, who do not even know how to search online and how to send information through e-mail. This indigestible situation demands a forcible and mandatory computer literacy programme for all the library and information professionals, because there is a chance that those who cannot adapt this information technology revolution, may not only remain at the back seat, but also force their institution into obscurity.

4.4.2 Targeting the Social Media

The library and information professionals have to target the clients through social media networks to attract more demand for the information sources at hand. In the

modern days, when even television is also promoting its programmes on social media networks, the library and information professionals are not immune to that. They have to search for the potential avenues offered by social media networks, so as to find and target various online communities and groups interested in different fields of study.

4.4.3 Changes in the Curriculum of Library and Information Science

As the library and information professionals need to know the search engine optimisation, they should be equipped with the subject thoroughly. That means, the information professionals have to be taught the basic requirements of search engine optimisation from the very early stages of their study including the certificate course on library & information science. For the already working library and information professionals, the search engine optimisation knowledge has to be made mandatory to go for the future promotions.

5. CONCLUSIONS

At the backdrop of infinite expansion of digital universe and the possible threats created by information explosion, it is the need of the hour for the library and information professionals to take action. It is now or else never, because the explosion of digitised information at enormous levels may burgeon to such an extent where it may even sideline the library and information science. The current scenario of digital universe provides both opportunities as well as threats to library and information science and the library and information professionals. The situation calls for the technological up-gradation of library and information professionals and deserves them to steer the information effectively to the right user. If the library and information professionals cannot manage and organise the expanding digitised information properly and efficiently to bring themselves and their repositories of information to the mouse click of the right information seeker, then the main normative principle propounded by the father of library and information science, Dr S.R. Ranganathan–providing right information to the right information seeker at the right time–can never be achieved.

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