

## Internet as a Digital Revolution in Education and Research: A Global Perspective

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### ABSTRACT

*The present study explored the pivotal role of computer and Internet in educational projects viz. a. viz. research. Nowadays the Internet is pervasive in the lives of students, institutions, and societies all over the world. Due to the exponential proliferation of the Internet in all aspects of life, what has been called the digital culture has had an extensive influence on education. It has affected the field of education at all grades & levels. Its emergence and widespread availability of resources used in educational settings has driven much debate on its usability. With the advent of Internet, a significant transition can be seen in the academic communities, its appearance increasing the means of researches, facilitating the communication and enabling data share. For academic communities, it is easier to search through Internet as compared to the longer stay in the library rooms to collect, consolidate and compile information. It has immense potential to enable the students to get instant information for their research and academics. In the present piece of research attempt has been made to explore the Internet as a digital revolution in the field of research and education and establish its emergence as a source of global network, as a source of communication and information and as a source of availability, accessibility, and affordability in education and research.*

**Key Words:** Internet, Digital Revolution, Education, Research, Global Perspective.

### Introduction

The widespread use of ICT in all areas has a direct effect upon the way in which the world is perceived. The permeating presence of telematic networks in all scopes of life allows unlimited access to information and a flexibilization of time and space barriers. The last two decades have witnessed a revolution caused by the rapid development of Information and Communication Technology (ICT). It is difficult and impossible to imagine future that is not supported, in one way or another, by Information and Communication Technology (ICT). While looking into the current widespread diffusion and use of ICT in modern societies, especially by the young the so-called digital generation then it should be clear that ICT will affect the complete way of life today and in the future. (ICT) at present is influencing every aspect of human life. The way the different fields operate today is vastly different from the ways they operated in the past. ICT plays salient role in work places, business establishments, education, and entertainment. Moreover, ICT proves catalyst for change; change in working conditions, handling and exchanging information, teaching methods, learning approaches, scientific research, and in accessing information. According to Blurton, (2010), the power of information technology has been significantly stronger due to its presence is anytime-anywhere. It has the ability to transcend time and space. While ICT as a general and Internet as a particular has come with an evolution that cannot be compared with the existing technologies that existed before. It is a new and innovative medium that can completely change the lives of people much as television did in fifties. The Internet is only two and half decade old, but it is already the key catalyst of the most extensive and fastest technological revolution in history. The Internet changes people's lives in terms of reaching, disseminating, creating, and evaluating a huge amount of information easily and so

rapidly. Shitta (2002) asserted that the Internet is a communication super highway that links, hooks and focuses the entire world into a global village, where people of all races can easily get in touch, see, or speak to one another and exchange information from one point of the globe to another.

Since Internet appeared before the general public in early 1990s, and its growth rate has been seen unusual. Its penetration had far surpassed the diffusion speed of the traditional media. Internet took nearly three years to reach 50 million users, as compared to radio, and television which reached to general public with 38 and 13 years respectively (Molosi, 2001 & Dholakia, 2004). The changes brought about by the Internet surpassed the impact of television and revived the effects of the printing press. Internet being a global network interlinking millions of computers all over the globe and provides an infinite variety of contents as well as a diverse range of applications (Goggin & Griff, 2001). It is becoming a widely accepted channel for information exchange and powerful networking because it contains the biggest resource of information in the entire world and it enables people to obtain an interactive mechanism to instantly communicate with each other through the Internet using a range of applications. voice-over-Internet-protocol (VOIP), checking traffic news, purchasing cinema tickets, and carrying out online share trading, downloading music and video, chatting and playing games, email, and have access to the encyclopaedia, newspapers, bulletin boards, video arcade, hyper mails, broadcast stations, the movies, mail order, music entertainment, etc, all at one stop in a global village (Kuhlemeier, 2007; Wishart, 2007). It provides that store of information which is not possible for any single entity to hold or manage. Spring (1994) quoted that the “revolution will not be televised, but the proceedings will be available online.” Emergence of Internet as a Global Network.

The ‘Internet’ is formed by conjoining two words that imply an international network: Inter “international” and Net “network” (Isman, 2004). The Internet therefore can be defined as an international computer network of information available to the public through modem links (Bassegy, 2003). Internet emanates from the words “Internet Connection Network”, connecting computers around the world by the use of a standard protocol (Greenfield, 1999a & b). IT Encyclopaedia (2001) in the same vein defines Internet as an essentially whole bunch of computers connected together by wires which they can talk over. Ogedebe (2004) Internet is a large computer network formed out of some thousands of interconnected networks, and it supports a whole range of services such as electronic, file transfer protocol, database access and many others. DiMaggio et al, (2001), the Internet is “electronic network of networks that links people and information through computers and other digital devices allowing person-to-person communication and information retrieval.” Nwafor & Ezejiolor (2004) observe that the Internet is not a single network of computers but a network of nets, a large network that connects many smaller networks to one another. The advent of the computer and the Internet has brought a whole new world in terms of gathering, disseminating, creating, and criticizing information and communicating with people. On the other hand, the “Internet” is a “giant network which interconnects innumerable smaller groups of linked computer networks” or which virtually covers the entire globe. On this network, the World Wide Web provides a global platform for information storage, resource sharing, communication, research, entertainment, education and business transactions etc. The web is actually a collection of electronic documents that are stored on computers throughout the world (World Wide Web, 2002; Howe 2007). Through the use of a web browser these documents can be easily accessed by anyone who knows what to look for and are frequently identified through the use of search engines designed to access these documents

based on key words (Schneider, et.al. 2006). Ezomo (2006) asserts that Internet is the gateway for libraries and information centers to enter the electronic information era and provides information generated by different organizations, institutes, research centers, and individuals all over the world. Nowadays, with the popularization of the network, the on line life is not just for those computer geeks. Also, the Internet network is widely used by people all over the world. More and more people are accustomed to search resources from the Internet which is not easy to realize without the mature network technology. It seems no matter what difficulties people meet, the first reaction is almost to ask Google or Wikipedia. Michael Hart's (1995) pointed out "for the first time we actually have the opportunity for a whole world's population to share not only air or water, but also to share the world of ideas, of art or of music and other sounds...anything that can be digitized. In fact, it is certainly true that life online is inescapable, especially in the information explosion society. The Internet can supply numerous information resources which is renewed and up to date. For instance, you can read the newspaper and books in the online library for free instead of buying a new one. This is very attractive to Netizen ('Netizen', which means net citizen) especially for students. That is why today, the Internet has linked thousands of nations and enterprises across the world. Hence, the world which appears physically large has been made too small by Internet and reference to it as "global village". In addition, Chou (2001) indicated that the most appreciated Internet features included interactivity, simplicity, and availability, viz-a-viz abundant and updated information.

#### **Emergence of Internet as a Source of Communication and Information**

The Internet developed from a United States Department of Defence project (Dawson, 2005). During the Cold War there was concern that in the event of a nuclear attack, US communication systems could be knocked out by missiles hitting key communication centres. The initial core of what would become the Internet was the network that was designed by the defence ministry of America to help informing in the military and top secret projects. The network was linked to some other networks while continuing its work consider its high efficiency, and the scientists as well as research institutions were soon attracted to that. The rudimentary network was abandoned by the American Government but this developed form of network is now transmitting so much diverse and expanded information all over the world to millions of users (Sedigh, 1996).The Internet was originally developed in the 1960s, when several computer scientists were hired by Pentagon at the U.S. Defence Department headed by Dr. Robert W. Taylor (Schneider, Evans, & Pinard, 2006), to build a system to decentralize communication network primarily for military purposes. There was therefore a need to develop a distributed system that could withstand such destruction. In late 1960s, the Internet (under its original name Advanced Research Projects Agency Network–ARPANET) was designed (Hinson & Amidu 2005). ARPANET developed out of the government's effort to connect computers together throughout the country. The main purpose of ARPANET was to secure communication between military organizations and safely store large amounts of critical information in the event of a nuclear holocaust (Bogard, 1996). The researchers soon realised the importance of networking and by 1986, the U.S. National Science Foundation network NSFNET established to extend the network to more research institutions. ARPANET ceased to exist in 1990. Over time the network grew rapidly to interconnect numerous universities, research centers as well as commercial organization. Thereafter, the word and use of the INTERNET expand globally. In 1989, the World Wide Web (WWW) went global, and brought about the instantaneous access of information to every corner of the planet. Internet spread rapidly across the globe and grew to one million users in 1992

(Giovannetti, Kagami & Tsuji, 2003). It has been providing a novel type of communication that enables the user to access large amounts of information with a touch of a finger. The number of Internet-users started to increase in 1993 and has steadily increased since that time. The greatest increase in the number of users accessing the Internet began in 1999. Since then, the continual improvement of the Internet technology has provided an extraordinary level of public accessibility to a wide range of forms of communication, e.g. intra-organisational and inter-organisational email; data storage, management and transfer; social websites like Face book; text messaging such as Twitter, and so forth. Due to the development and spread of cheaper and more user-friendly computer technology and software (e.g., portable computers, Microsoft Word etc), the use of the Internet has increased dramatically. The remarkable growth in the Internet's functionality, capacity, accessibility and convenience, these improvements have encouraged more people to use it more often, and it has become a powerful application in modern society. The Internet access and usage in the world has been proliferating year by year, conservative estimates put the number of Internet-users worldwide. The Internet is estimated to be growing at a rate of 10.15 per month with numbers rising from about 56 million Internet-users worldwide in 1995-96 (Daly 2000), and increased 150 million at the end of 1998 and 200 million people in 1999 and at 500 million by the year 2000 to 2001(Castells, 2001) with an associated exponential growth in the number of web sites. According to the Computer Industry Almanac (2009) the worldwide number of Internet-users surpassed one billion in 2005 (up from 45 million in 1995 and 420 million in 2000). By March, 2006, there were over a billion Internet-users worldwide (Internet World Stats, 2006). The number of Internet-users grew by 114 percent when compared with the figure in 2000 (Central Intelligence Agency, 2006; Internet World Stats, 2006). Burns (2006) predicted that the adoption of various information technologies, including Wi-Fi connectivity, RSS feeds, blog authoring and podcasts, will drive Internet usage worldwide. Statistical research tell us that Approximately 1.11 billion users in 2007, 1.67 billion in 2009, and 1.97 billion in 2010 (Miniwatts Marketing Group, 2010), indicating an upward trend in the number of digitally literate people. Such a rapid growth has been interacted with people's needs and motivation. Within a decade, from 2000 to 2011 the number of Internet-users globally rose from 360 million to 2.267 billion and by the end of June 2012 there were over 2.4 billion Internet-users in the world (Internet world Stats, 2011a).The number of Internet-users in the world has experienced a growth of 480.4% between 2000 and 2011 with the number of Internet-users around the world estimated to be over 2 billion people within a world population of approximately 6.93 billion by March 31, 2011 (World Internet-users and Population Stats 2011).In 2010, the world's Internet use was 28.7% of the population. While this may not seem like a very large portion of the world's population, the growth in Internet use worldwide has increased dramatically from 2000- 2011. In recent years, the number of Internet-users has increased worldwide. The growth of Internet use in Asia is higher than that in Europe and North America. Around 40% of the world population has an Internet connection today. In 1995, it was less than1%.The number of Internet-users has increased tenfold from 1999 to 2013.The first billion was reached in 2005. The second billion in 2010. The third billion is expected by the end of 2015-16. India stands fourth in the world after US, China and Japan in terms of the Internet-users (Internet World Stats, 2010b). In India, the major group of Internet-users belongs to the academic community as the Internet came to India primarily for academicians through Educational and Research Network (ERNET).Internet came to India in the early 1990s for a restricted group of users through some leading Internet Service Providers (ISPs). The Education and Research Network (ERNET), National Informatics Centre Network (NICNET)

and Software Technology Parks of India (STPI) have been offering Internet services with very different charters and growth histories. ERNET was designed to provide Internet access to the Indian educational and research institutions, NICNET was designed to provide Internet access primarily to Government departments and STPI was permitted to serve only the software exporters falling under the Software Technology Park scheme of the Department of Electronics. Later on, Videsh Sanchar Nigam Limited (VSNL), Bharat Sanchar Nigam Limited (BSNL) and Mahanagar Telephone Nigam Limited (MTNL) entered into the market. The Indian Internet services market was opened for private sector participation in November 1998. India's first private ISP is "Satyam Online" launched by Satyam Info way. Thereafter, Sify, Airtel, Netcom, Reliance and Hathway became the major private ISPs of India. The Internet services were introduced in the Kashmir Valley during 1994-95 by Bharat Sanchar Nigam Limited (BSNL). With the passage of time, three more privately owned ISPs- IPEAKS, SLICNET and INFONET were registered but only IPEAKS was operational till 1997, (Chawla, 2003). Presently, six ISPs namely BSNL, AIRTEL, AIRCEL, IDEA, Tata Indicom, Reliance, and Vodafone are operational in the Kashmir Valley. The Commercial Cyber Cafes are also available in all the major towns of the Valley. The population composition of the Internet-users ranges from decision makers to commoners, professionals to students, business giants to common workers, producers to consumers, irrespective of age, gender, generation, religion, region, race and colour. The highest percentage of Internet-users belongs to younger generation. Since its inception, the Internet has grown exponentially over the years and has emerged as the foremost healthy source of disseminating information to a large audience, transcending the limitation of time and space. There has been remarkable growth in the Internet's functionality, capacity, accessibility and convenience. These improvements have encouraged more people to use it more often (Leiner et al., 2000; Singh, 2002).

#### **Emergence of Internet as Source of Availability, Accessibility, and Affordability in Education and Research**

The first decade of the 21st has seen witnessed the dramatic changes due to the exponential proliferation of the Internet in all aspects of life. What has been called the digital culture has had an extensive influence on education. Internet use has become very popular in many areas including education in recent years. It has affected the field of education at all grade levels (Sati and Khalid, 2002). The widespread availability of resources on the Internet and their potential used in educational settings has driven much debate its usability (Sinha, 2004). The use of the Internet in education allows a wide range of international resources to be accessed. Resources can be very well organized on the Internet, which allow for easy information access and exchange (Hicks, 2002). Internet can be used as a supplement to traditional instructional methods, to complement a lecture; instructors may ask students to find specified web sites to gain more in-depth knowledge about a particular topic (Robinson, 2005). Integrating Internet, mobility, and multimedia as well as other software powerful facilities lead to tremendous potential in education process with special impact on students, lecturers, and researchers. It has made considerable and dramatic impact on contemporary educational practice (Chou, et al., 2002; Havick. 2000; Tsai.2001). For example, the Web-based learning where educators integrate the Internet into instructional practice can not only provide learners with distant, interactive, broad, individualized and inquiry-oriented learning activities, but also promote their knowledge construction and meaningful learning (Leflore, 2000). Learners consider Internet as the main and initial source of information (Tuncer, et al. 2011). As the Internet is broadly used for

educational purposes; learners may have more rich experiences of utilizing the Internet. Levin (2003) stated the Internet as a new invented technology that holds the greater promise humanity has known for learning and universal access to quality education. As an educational tool Internet lets access to inexpensive, global, interactive and intensive computer communication and it also enables the student to improve his/her learning experience (Deniz & Coskun 2004).

Information and Communication Technology (ICT) has now broadened the horizon of the opportunities among institutions of higher learning, giving hopes to members of the academic communities to cooperate with their counterparts all over the world (Collis & Wende, 2002; OECD, 2005), and strengthened their mandate of teaching and carrying out research (CHEPS, 2000). Internet use has become a way of life for the majority of higher education students all around the world. It affects the way people learn especially in higher learning institutions (Edmunds & Conole, 2010). It serves as a useful tool in support of the various educational activities that ranged from research to teaching. It also enables scholars and academic institutions to disseminate information to a wider audience around the globe through websites (Luambano & Nawe 2004). Students prepare course assignments, make study notes, tutor themselves with specialized multimedia, and process data for research projects. Most of them exchange emails with faculty, peers, and experts working at distance places. They keep up to-date in their fields on the Internet, accessing newsgroups, bulletin boards, listservs, and web sites posted by professional organizations. Usun (2003) indicated that Internet is appealing to higher education for a number of reasons: it reduces the time lag between the production and utilization of knowledge; it promotes international cooperation and exchange of opinions; sharing information and it helps to promote multidisciplinary research. Students receive the opportunity to use the Internet to seek and obtain scholarly material. Wilkinson et al. (2003) reports that most of the links between universities home pages were associated with information on research or education. Omidian (2011) identified that university students prefer to use the Internet for their information need more than traditional print sources due to being quickly and easily valuable resource. It has been seen that students utilize the Internet for the university education all over the globe (Isman & Dabaj, 2004). Students use Internet because of the perceived effectiveness of the facility in information access on assignments and research projects. It is common to say that more than 50 percent of students' assignments are based on information from the Internet (Norzaidi & Salwani, 2008a, b). Thus, today, academic life without the access to the Internet is hardly imagining (Spennemann et al., 2007). As a matter of fact, majority of higher institutions of learning have now established their online presence with their researchers and students also having access to journals, magazines, newsletters and books (Jagboro, 2003). There are great possibilities for higher education at all levels through the use of the Internet because curricula can be developed collaboratively and educational materials distributed and updated more cheaply, offering additional ways for students to Interact with their study materials as well as their instructors. There are also pressures to make learning more flexible even for those students who have access to the Internet on a university campus (Brown, 2001). Further, there are multiple forces driving Internet expansion in higher education including globalisation and the need for workforce training, learner on-demand services, digitisation, knowledge explosion, and cost effectiveness (Bates, 2000). University students showed a positive attitude toward using the Internet as a teaching and learning tool. Technologies like the Internet to accelerate university students' learning enhance and democratize access to educational opportunities, and support interactivity, interaction, and collaboration (Draper & Brown 2004; Oliver 2006). Schroder (2007)

stated that university students take responsibility more for determining educational learning strategies and think that the reason for this is the quality of the information obtained from Internet is getting higher. Mathew & Schrum (2003) found that university students use the Internet for communicating with the professors through emails by asking for clarification or reporting information, e-mailing papers, and getting feedback. Secondly, they use the Internet to get materials (web links, notes, practice, quizzes, hints for test etc.) from professional websites, checked grades, and accessed resources from Web CT. Adegboji & Toyo (2006) concerned that Internet contributed significantly to the ease of research through downloading course related materials. They relied mostly on Internet sources for the big projects they downloaded study aides.

In today's fast changing world, research has become one of the most important intellectual possessions for every human being to change his way life in accordance to the needs and demands of the society. It is a key ingredient in shaping up the world. It opens new frontiers to many fields like, education, business, economics, medicine and science. Truly, research in itself had made a significant contribution in man's giant leap towards the future. Internet has emerged as a formidable social and cultural institution of global proportions facilitating access to a wealth of information on the web for the academic society to support their academic and research activities. The use of information technology has been reported to increase the research productivity of scholars (Misra & Satyanarayan, 2001). Information is just a 'finger touch' away from the user and it would not be inappropriate to say that the Internet has become the biggest global digital information library, which provides the fastest access to the right kind of information in nano-seconds to end user at any time and at any place in the world. With the advent of Internet, a significant transition can be seen in the academic communities' approach and the way they seek information and the methods they employ for teaching and learning activities. The principal functions of Internet are increasing the means of researches, facilitating the communication and enabling data share. Agarwal & Dave (2009) reported that students depend on the Internet as a veritable source of research information. Kumar & Kaur (2006) indicated that Internet resources are now preferred source of research information to the print resources among the students. Kamba (2008) maintains that the Internet has not only reduced the need to store information resources but has also increased the output of research publications globally. Jagboro (2003) Internet was the fourth most important resources for materials among the postgraduate students with respondents using the Internet to access research materials and for email. Internet use for academic activities would improve significantly with more access in departments and faculties. Fasae & Aladenyi's (2012) stated that students use the Internet for research more than they use it for communication and entertainment. Massaquoi (2006) also confirms that 84 percent of journal articles and 97 percent of completed research works are now available on the Internet. He adds that making use of the Internet helps in conducting research, publishing articles and exchanging ideas. Similarly, Yusuf (2006) stated that the Internet provides wide range opportunities for easy access of relevant and current literature, wide range of instruments, online opportunity for validation of instrument, simulation of an on-going research, and so on. He further adds that collaboration of research (trans-institutional, trans-national and trans-continental) is possible, and wide range of opportunities exist for the dissemination of research findings (journals, personal web page, foundations/organizations' web pages and so on). The only way to pursue knowledge is through research and the Internet is having a profound impact on the research process and dissemination of information. The Internet therefore, be described as a 'sea of information' and 'reservoir of information' containing texts which are not housed between library and bookshop walls and subject areas span across all

fields of knowledge. Restrictions created by distance, availability and access to information have to a large extent been removed. More information continues to become available in electronic format as this medium is embraced by publishers, museums and archives (Schmidt, 2003). It contains more information than the world's largest libraries (Emeagwali, 2000). With access to the Internet one can retrieve information from the world's largest information database. Also, thousands of libraries are connected to the Internet, permitting even casual users to access their catalogues and request learning material through interlibrary programs. In addition to those information services, the number of on-line journals, newspaper and trade magazines increase each month. Much of the information in these publications is free. It is a virtual treasure trove of information. Any kind of information on any topic under the sun is available on the Internet. It is a truly "open technology", allowing users with any hardware and software to derive the necessary information from the network, independently from the location of data and knowledge bases. Hence, Internet can therefore be described as a super highway of information carrier, where information seekers on any subject or area of discipline can obtain current and useful information and knowledge. In the academic perspective, the Internet host and allow access to subject gateways, databases and professional websites which contain various types of scholarly resources like electronic copies of journals, articles, books, datasets, short communications, formula, monographs, encyclopaedia, dictionaries, instructional notes, informative web-pages, with numerous links to search and research related websites. Consequently, researchers all over the world are taking advantage of the Internet. "The Internet has revolutionized our lives!" often heard exclamation.

### **Conclusion**

The role of Information and Communications Technology (ICT) in human development has received growing attention due to the growing proliferation of the Internet, convergence in Information technology and telecommunication technologies. The Internet is referred to as an ocean of information and knowledge which is now globally used in every facet of human endeavour. It is one of the facilities through which information and knowledge can be stored, arranged and transmitted return to its users quickly, timely, and accurately (Adegbija & Daramola, 2007). It has become a global source of information accessible at anytime by anyone from anywhere on this planet. It has converted the whole world into a global information web. Internet has changed our lives in a revolutionary way regardless of any geographical boundaries. Due to Internet use, people across the globe have become part of a networked society, whereby time and distance have lost their meaning (Holtz 2002). The advent of the Internet has brought a whole new world in terms of gathering, disseminating, creating, and criticizing information and communicating with people. It is a communication super highway that links, hooks and focuses the entire world into a global village, where people of all races can easily get in touch, see, or speak to one another and exchange information from one point of the globe to another. From the day of its origin the use of the Internet has increased dramatically. The remarkable growth in the Internet's functionality, capacity, accessibility and convenience have encouraged more people to use it more often, and it has become a powerful application in modern society. The Internet access and usage in the world has been proliferating year by year, conservative estimates put the number of Internet-users worldwide. Internet emerged as a source of security, communication and information and at the same time influenced the way of means, methods, techniques and the approach of education and research. The comprehensive literature available



shows that the Internet plays important functions in education and research as: (i) storehouse of information, (ii) communication without boundaries, (iii) online interactive learning, (iv) electronic/online research, (v) innovation in the new world, (vi) improve interest in learning, (vii) global education, and (viii) information catalogues. As the Internet have many potentials and functions. In fact, the attractiveness of Internet has increased as a result of its availability, accessibility, and affordability. So, the Internet use encourage our students generations to make use of modern technologies to accomplish their academic and research objectives.

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