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Information and communication technology (ICT): A magical wand in researcher's world

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Abstract
We are living in a knowledge based society and knowledge based global world where knowledge is a great power, economy, strength of an individual and the asset of a nation. We are in need of technologies to have access and proper use of this fast growing knowledge. It can only happen with assistance of science of information and communication technology. ICT may prove quite helpful in helping all the personnel's connected directly or indirectly with the processes and products of education. The students of education desirous to undertake research projects in the field of education are greatly benefitted through the process and products of ICT. They need quite diversified, pinpointed and reliable information and this need can be properly fulfilled through the organized sources of information controlled through IT. Education around the world is experiencing major paradigm shifts in educational practices of teaching and learning under the umbrella of ICT enabled learning environment. Modern ICTs technologies like electronic media (e-mail), Internet, personal computer (PC), Laptops, World Wide Web, online journals, search engines, digital video camera, digital libraries, anti plagiarism tools, hypertext resources and hyper media are helping the researchers all around the world in enhancing and improving their research quality. The paper highlights the role of ICT in review of literature, research design, collection of data, analysis and interpretation of data, etc in the field of research.

Keywords: ICT, facilitator, research

Introduction
ICT has become an integral and accepted part of everyday life for many people. ICT is increasing its importance in people's lives and it is expected that this trend will continue, to the extent that ICT literacy will become a functional requirement for peoples work, social and personal lives. Today from the time we awaken in the morning to the time before we sleep, we are surrounded by media, such as newspapers, radio, television and computers. Sometimes we are not even aware that we are surrounded by these media. All these media come under the overall umbrella of what are known as today's ICTs. Knowing and using ICTs is important in today's fast changing knowledge society, but we very often are confused about what these media are.

ICT in education
ICT in education is the technology that deals with the exchange of information and communication in the teaching learning process. Uses of Electronic learning technology like, teleconferencing, power point presentations, CD ROM, internet are communication technology which is the part of ICT. ICT in education is technology that is applied in the educational process. It encompasses Hardware approach like use of machines and materials, Software approach like use of methodologies and strategies of teaching learning and Systems approach that uses the management technology that deals with the systematic organization of the hardware and the software. ICT encompasses all those gadgets that deal with the processing of information for better and effective communication. The hardware and software like OHP, Television, Radio, Computers and related software are used in the educational process. However ICT today is mostly focused on the use of computer technology for processing the data. ICTs have changed the perception, management, and dissemination of information. The purposes for which ICT is used in research may be divided into the areas such as data collection, review of previous researches, applying statistics, data handling, information, communication, exploration, dissemination of information, etc.

ICT in research
One of the most vital contributions of ICT in the field of research is- Easy Access to Information anytime and anywhere. With the help of ICT, researchers can now browse through e-books, sample examination papers, e-journals, previous year papers etc. and can also have an easy access to resource persons, mentors, experts, researchers, professionals, and peers-all over the world. This flexibility has heightened the availability of just-in-time learning and provided learning opportunities for many more learners who previously were constrained by other commitments (Young, 2002). ICT presents an entirely new learning environment for researchers to have 24x7 access to information. ICT gadgets like laptops, audio recorders and video recorders have minimized and simplified the task of the researcher in improving the quality of his research. Critical thinking, research, and evaluation skills are growing in importance as students have increasing volumes of information from a variety of sources (New Media Consortium, 2007). Some of the ICT techniques that are transforming research are:

❖ Internet
We now live in an age where information is readily accessible from our computer. On the Web, you can find information about any topic you desire. The World Wide Web is a huge database of user–submitted content where the researcher can

access an astronomical number of informative sources, online groups and multi-media. More and more scholars are turning to the Internet when doing research for their assignments, and more and more instructors are requiring such research when setting topics. Internet is a major source for scholarly journals, current news, books, credible magazines, general information and other relevant content. The Net is a tremendous resource, but it must be used carefully and critically. There are a great many solid academic resources available on the Net, including hundreds of on-line journals and sites set up by universities and scholarly or scientific organizations. Using material from those sources is no problem; it's just like going to the Library, only on-line.

Internet Research

Internet research has had a profound impact on the way ideas are formed and knowledge is created. Common applications of *Internet research* include personal research on a particular subject (something mentioned on the news, a health problem, etc.), scholars doing research for academic projects and papers, and journalists and other writers researching stories. Internet research has strengths include speed, immediacy, and a complete disregard for physical distance. The quality of research can be superior to other forms of research with the help of internet.

❖ **Search Engines**

Search engines provide a way of doing research on the Internet, and they can be effective tools. However, to use them effectively for research, one needs to be aware of their strengths and weaknesses, as well as how and when to use them.

Using Search Engines for Research

Most people who are using a search engine are doing it for research purposes. They are generally looking for answers or at least to data with which to make a decision. They're looking to find a site to fulfill a specific purpose. Search engines are naturally drawn to research-oriented sites and usually consider them more relevant than other search engines like shopping-oriented sites. The highest listing search engine for the average query is a Wikipedia page. *Wikipedia* is an open-source online reference site that has a lot of searchable information, tightly cross-linked with millions of back links. Wikipedia is practically guaranteed to have a high listing on the strength of its site architecture alone. Wikipedia is an open-source project, thus information should be taken with a grain of salt as there is no guarantee of accuracy. This brings you to an important lesson of search engines — they base "authority" on perceived expertise. Accuracy of information is not one of their criteria. Famous search engines used by the researchers are google scholar, i-Seek, Scirus, OJOSE, DMOZ.

❖ **Digital Libraries**

Digital libraries are the logical extensions of physical libraries in the electronic information society. Extensions amplify existing resources and services and augmentations enable new kinds of human problem solving and expression. Digital libraries offer new levels of access to broader audiences of users and new opportunities for the library and information science field to advance both theory and practice. The analysis of user logs from large-scale digital libraries offers new opportunities to assess research trends in an institution's user communities. Libraries offer different types of reference and referral services (e.g., ready reference, exhaustive search, selective dissemination of information), instructional services (e.g., bibliographic instruction, database searching), added value services (e.g., bibliography preparation, language translation) and promotional services (e.g., literacy, freedom of expression). Today people want to communicate and collaborate, so digital libraries develop service strategies for connecting people together in information-rich environments are most likely to prosper. The broad goal of the Digital Libraries is to advance the means to collect, store, organize and use widely distributed knowledge resources containing diverse types of information and content stored in a variety of electronic forms which is of extreme importance to the researchers.

❖ **E – journals**

Electronic – journals are becoming quite popular in research because the cost of electronic equipment is falling down considerably, thereby making e-publishing cost effective. The cost of electronic publishing and distribution has also become more economic than paper printing. In addition, e-journals, like e-book have a large number of advantages. (Jones, S.L). E-journals provide 24 hours accessing, downloading and printing facility, irrespective of users' geographic location with the speed of access and quick searching to latest information has led to their popularity. E-journals provide access to other related resources by hypertext link and by linking to and from other resources. Most of the publisher are providing keyword and author search facilities, thus supplement ting the role of indexing and abstracting services. Researchers find it easy to download an article to personal computer for later use or printing. E-journals publish the articles of researchers at much faster speed as, the turnaround time, i.e. the time-lag in submission, processing and dissemination of information is saved.

❖ **E-resources**

E-resources and e-learning are increasingly important to all aspects, and all levels of education. The use of e resources is being done by the researchers for their research benefits. They are felling great as they have resources in their fingertip i.e. they can have right information at right time with less effort and smooth research work. The researchers can have greater and quicker access of the materials to support their learning as it allows 24/7 access to resources, not limited to when the physical library space is open There is a consistent delivery between different members of the team due to shared e-resources e.g. e-mail. By the help of e-resources the researchers, scholars and supervisors have improved and increased communication with each other and others. The information obtained is of good quality, peer reviewed, reliable and customized to meet differing needs of users

❖ **Plagiarism Detection Tools**

Plagiarism is a serious offense in the academic world. The widespread use of computers and the advent of the Internet has made it easier to plagiarize the work of others. Most high schools and universities take extreme action when the person is found of cheating, coping or plagiarizing. Plagiarism has become very common crime in the field of research also due to

very easy and quick accessibility and availability of the information through the help of ICT.Therefore in order to avoid its implementation various Plagiarism detention tools have been made to avoid such crime. Plagiarism detection is the process of locating instances of plagiarism within a work or document.. Most cases of plagiarism are found in academia, where documents are typically essays or reports. However, plagiarism can be found in virtually any field, including scientific papers, art designs, and source code. The aim of such tools is to help to reduce the impact of plagiarism from education and research world. Various plagiarism detection tools such as Anti-plagiarism, DupliChecker, PaperRate etc are available both in free and paid form for the teachers, supervisors and researchers to remove the element of plagiarism from their work.

❖ **Data analyzing with help of statistical tools**

Various data analysis tools have been designed by the experts and used by researchers to analyze their data correctly without any mathematical errors. The presence of such tools have become boon in the field of the research as the bulk of data can be calculated efficiently with minimum errors in minimum time. Some of the famous statistical tools used by the researchers are SPSS, Analyze-it, DataDesk, SAS Analyics; the statistical and data management package for analyst and researchers. They are powerful and accurate statistical analyzing tools. These software's enables educators to teach effectively and helps researchers gain critical analytical skills and supports more accurate and insightful institutional research and decision-making. They are flexible, affordable options that help colleges and universities easily integrate statistical analysis, data and text mining and survey research instruction into the classroom. SPSS is a comprehensive system for analyzing data. SPSS can take data from almost any type of file and use them to generate tabulated reports, charts, and plots of distributions and trends, descriptive statistics, and complex statistical analysis. These software's can be used to perform data entry and analysis and to create tables and graphs and are capable of handling large amounts of data. They perform all of the analyses covered in the text and much more.

❖ **Organization of research material**

Some of the tools such as AskSam, BlueOrganizer, Evernote, Notebook, Pageflakes and Journler can be used by the researchers to take notes and store, find, mine and manage research materials. They are flexible and powerful ways to organize information and create searchable databases from Web pages, Email, PDF files, texts, and Word documents. Their application allows the researcher to capture information of any kind anywhere and synchronize it across all of your devices as these are free social software for managing and sharing of research papers among the people.

❖ **Citation Management Tools**

Citation management tools enable researchers to capture bibliographic information about research materials, create bibliographies, add footnotes, and manage research collections. Some citation management tools like Mendeley, EndNote, Bibus, BibMe, Citeline, MyPeers makes it really easy to share references with other. Researchershey offer online bibliography-maker generating MLA, APA, Chicago and Turabian citations. They also supports the aims of transparency embodied in the open access movement by contributing to a more open sharing of resources, and a notion of impact that goes beyond citation counts. It also allows students to become contributors to collections of resources participate in the development of communities of knowledge and practice. They are web- based reference organizer that gathers, manages, and can create a bibliography of sources by allowing researchers to add documents directly from your computer hard-drive, as well as from books, journals, internet sites, etc. It can also be used to attach images and PDFs to citations added. Citations can be organized into folders specified for various projects, and can be compiled into large bibliographies using either MS word or Open Office. The benefits of using such tools include being able to search the website directly for papers that pertain to the researcher's field of research, and being able to find colleagues to add to dashboard so you can keep up with their research and profile changes. For students and experienced researchers they offer efficiencies that save time and reduce duplication of effort. The combination of desktop and web access, allows the user anytime/anywhere access to the resources they have collected, supporting a variety of personal workflow preferences. They facilitate collaboration among researchers who know each other through the private groups function and more open sharing of information through public groups and resource lists.

Conclusion

With the advancement of ICT, education does not remain restricted within four walls of the educational institutions. Researchers from different parts of the world can learn together by using online and offline resources which has resulted in the enriching learning experiences. Such collaborative learning results in developing divergent thinking ability in researchers. The growing interest to know how computers and internet can best utilized to improve effectiveness and efficiency of education at all levels and in both formal and non formal settings. With the advent of ICTs and its use in research, the research has become very easy. The information can be easily accessed 24x7 by the researcher irrespective of any geographical boundaries.

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