Application of ICT in research,Different Tools & Role of ICT

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Application of ICT in research

Heads up! *This topic has been added first time by UGC NET IN PAPER 1 2019 Syllabus.*

In the 7 Parts series which can be referred using below, the first six parts contain important short study notes useful for your paper 1 preparation while the 7th part contains solved question papers of last almost 12 years MCQ Question which is asked in the previous examination.

Please sequentially go through them to understand them in better ways.

Unit-II Research Aptitude

The **Information and Communication Technology (ICT)** is an umbrella term that includes any communication device or application, encompassing: radio, television, cellular phones, computer, and network hardware and software, satellite systems and so on, as well as the various services and applications associated with them, such as videoconferencing and distance learning.

ICTs in higher education is not only used in research and academic works but also be used for developing online course material; delivering study

content and sharing content with remotely located students; communication between learners, teachers and the outside world; creation and delivery of presentation and lectures; academic research; administrative support, enrollment, test, evaluation and many more.
Generally, ICT helps the researcher in the following research-related tasks-

- Identify research areas & identify appropriate information sources through searching various online portal
- Literature survey & critically analyses known information for further reading
- use the information to extend and communicate knowledge across subject area fields with the wide community
- Choose Methods for research (Q&Q)
- Data Collection – manage information/data collectively
- Referencing
- Present/share / disseminate Instantaneous information exchange despite geographical distances, cost less accumulation of data and documents
- Search multiple databases and electronic resources simultaneously
- retrieve results in a common format to consume
- link to other individual databases for more specialized searching &
- select favourite resources and e-journals, save searches and records, and set up email alerts.

The role & application of ICT in research and Higher Education academic work can be broadly divided into 4 major areas: –

- **Communication** – How ICT has changed the way the researcher communicate with other parties
- **Information sharing** – How quickly & easily information can be shared across the globe
- **Simulation** – Virtual Lab & robotic experiments
- **Evaluation**– Various tools and technology for feedback and evaluation

Let's go through a few important ICT products/Digital tools for researchers

Application of ICT in research, Tools & Services for Research

There are thousands of digital tools for researchers to help you through your journey to find an interesting fact. Covering details of each tool is beyond the scope of this article. We have covered most important ICT products which helps you in exploring the literature, content curation, share data and code, connect with others, tools required for data collection & evaluation, writing and publishing the paper.

#1. Search Engine & Research Papers

Google/Bing/Yahoo and many other search engines help you to find useful and relevant contents. This also helps you to explore the millions of thesis and already published articles and keeps you up to date with the latest happenings in your area of interest.

Below are important Online Tools to explore millions of research article across the globe.

- **Google Scholar** – Provides a way to broadly search for scholarly literature across disciplines and sources.
- **Microsoft Academic Search** – Find information about academic papers, authors, conferences, journals, and organizations from multiple sources.
- **Science scope** – Innovation in the exploration of papers and authors.
- **ResearchGate** – ResearchGate is the professional network for scientists and researchers. Over 15 million members from all over the world use it to share, discover, and discuss research.
- **Biohunter** – Portal with literature search, data statistics, reading, sorting, storing, field expert identification and journal finder.
- **edu** -is a platform for academics to share research papers. The company's mission is to accelerate the world's research.
- **SSRN** – Multi-disciplinary online repository of scholarly research and related materials in social sciences.
- **DeepDyve-** provides simple and affordable access to millions of articles across thousands of peer-reviewed journals. Content from the world's leading publishers including Reed Elsevier, Springer, Wiley-Blackwell, and more.
- **Wiki Journal Club** – Open, user-reviewed summaries of the top studies in medical research.

#2 Shared Dataset & Code

- DataBank– Analysis and visualization tool that contains collections of time series data on a variety of topics.
- Google- Google periodically releases data of interest to researchers in a wide range of computer science disciplines.
- GitHub– Online software project hosting using the Git revision control system.
- Open Science Framework– Gathers a network of research documents, a version control system, and collaboration software.
- SlideShare– Community for sharing presentations and other professional content
- **gov.uk-**The British government's official data portal offers access to tens of thousands of data sets on topics such as crime, education, transportation, and health
- **gov-** The USA government's official data portal offers access to tens of thousands of data sets

- **gov.in-** Open Government Data (OGD) Platform India – is a platform for supporting Open Data initiative of Government of India. The portal is intended to be used by Government of India Ministries/ Departments their organizations to publish datasets, documents, services, tools and applications collected by them for public use. It intends to increase transparency in the functioning of Government and also open avenues for many more innovative uses of Government Data to give a different perspective.
- Code Ocean– Cloud-based computational platform which provides a way to share, discover and run published code.
- Peer Evaluation– Open repository for data, papers, media coupled with an open review and discussion platform.
- org offers open government data from US, EU, Canada, CKAN, and more.
- Google Finance 40 years' worth of stock market data, updated in real-time.
- You can also use https://toolbox.google.com/datasetsearch to search the required data set.

#3 Connect & Communicate with experts and researchers

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Prev Next 1 of 3

- Academia– A place to share and follow research and researchers.
- net – Online platform for professional networking and sharing of knowledge in life sciences.
- Open Science Framework– Gathers a network of research documents, a version control system, and collaboration software.
- ResearchGate– Social network for researchers.
- AcademicJoy– Sharing research ideas and story in research and innovation.
- Experiment– Crowdfunding Platform for Scientific Research.
- Linkedin- Connect with people in your area of interest.
- Thinkable– Platform to mobilize knowledge and fund breakthrough ideas.
- ScienceOpen– Freely accessible research network to share and evaluate scientific information.
- **Communication tools**– web-ex, skype, TeamViewers, anywhere,

#4 Free Digital Library

- The National Digital library of India is a project under the Ministry of Human Resource Development, India. The objective is to integrate several national and international digital libraries in one single web-portal. The NDL provides free access to many books in English and the Indian languages.

- Internet Archive is a non-profit library of millions of free books, movies, software, music, websites, and more. The Internet Archive offers over 12,000,000 freely downloadable books and texts. There is also a collection of 550,000 modern eBooks that may be borrowed by anyone.
- The Ministry of Human Resource Development (MHRD), Government of India has launched a National Repository of Open Educational Resources (NROER). The development of it has been a combined effort of the Department of School Education and Literacy, Ministry of Human Resource Development, Government of India, the Central Institute of Educational Technology, National Council of Educational Research and Training and Metastudio, which is the platform that hosts the Repository.
- The ultimate goal of the Open Library is to make all the published works of humankind available to everyone in the world. While large in scope and ambition, this goal is within our grasp. Achieving it will require the participation of librarians, authors, government officials and technologists.
- ManyBooksprovides **free ebooks for your PDA, iPod or eBook Reader**. You can randomly browse for an ebook through the most popular titles, recommendations or recent reviews for visitors. There are 21,282 eBooks available here and they're all free!
- GetFreeEBooksis a free ebooks site where you can download free books free. All the ebooks within the site are legal downloadable free ebooks.

#5 Simulation/Lab and project management

Internet of things is coming to laboratories and connecting instrumentation to the internet allowing us to perform experiments from anywhere in the world.

- **Virtual Labs** project is an initiative of the Ministry of Human Resource Development (MHRD), Government of India under the aegis of National Mission on Education through Information and Communication Technology (NMEICT). This project is a consortium activity of twelve participating institutes and IIT Delhi is coordinating institute. It is a paradigm shift in ICT-based education. For the first time, such an initiative has been taken-up in remote-experimentation.
- Lab Suit– Inventory Management, orders Management, materials Trade-In, Price Comparison.
- Life technologies Lab Management Tool – Management tool for lab equipment and services.
- LiveLabSpace– Collaborative research tool that lets you plan experiments, replicate outcomes and generate research papers.

#6 Write & publish research papers

Various online available writing tools are the needs of researchers. Tools are required to store and manage references, collaborations across labs and continents, **collaborative writing tools** & track of the modifications done by others to the manuscript.

- CitationStyles – Find and edit CSL citation styles.
- Papers – helps you collect and curate the research material that you're passionate about.
- Zotero – helps you collect, organize, cite, and share your research sources
- Draft – Version control and collaboration to improve your writing.
- Typewrite – A simple, real-time collaborative writing environment.
- ScienceOpen – Freely accessible research network to share and evaluate scientific information.

ICT in Research Sponsored by Govt. of India

- India has been ranked 121st among 157 countries in terms of progress in the realm of information and communication technology (ICT) in a newly-released report of the International Telecommunication Union (ITU), which makes an annual assessment based on a wide range of parameters and data
- National Mission on Education through ICT (NMEICT) is a major initiative of the Govt. of India in this direction intending to leverage the potential of ICT in providing high quality personalized and interactive content, free of cost, to all the learners.
- The National Mission on Education through Information and Communication Technology (ICT) has, under its aegis, created **Virtual Labs, Open Source and Access Tools, Virtual Conference Tools, Talk to Teacher programs, a Non-Invasive Blood Glucometer** and also for simulated lab experiments, a Di. Electric frequency shifts the application development of resonator for low-cost oscillators.

You can read more about the various **Digital Initiative in Fields of Higher Education** here.

This being a truly multi-disciplinary effort, its success will entirely depend on good teams in technological and knowledge content areas. For the technological part, NIC and its various collaborators have to come forward as a strong and committed team whereas, for the knowledge content part, various institutions under the Ministry of Human Resource Development (MHRD) worked as a catalyst to the occasion.

So far, institutions like IITs, IIMs, NITs, Central Board of Secondary Education (CBSE), Kendriya Vidyalaya Sangathan (KVS), Navodaya Vidyalaya Samiti (NVS), National Institute of Open Schooling (NIOS), Indira Gandhi National Open University (IGNOU), All India Council for Technical Education (AICTE) and National Council of Educational Research and Training (NCERT) have been actively participating.

If you wish to read more details about online tools for research here.

References –

- http://connectedresearchers.com/online-tools-for-researchers/

- https://www.sciencedirect.com/science/article/abs/pii/S1057231705000664