Role of Information and Communication Technology (ICT) in Research: An analysis

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Abstract

The ICT is an umbrella term which stands for Information and Communication technology. The Information and Communication Technology includes a wide range of digital tools and systems. The aim of Information and Communication Technology (ICT) is to enhance communication, efficiency and productivity and access to resources across various sectors. Research is the scientific investigation to find out original information. Research is a systematic investigation to discover new knowledge or information and to solve the problems. Research is systematic, objective, evidence based and find out new facts. The objective of research are clarity, realistic, specificity, measurability. The aim of this research paper is to analyses the role of information and Communication Technology in Research.

Introduction

Information and Communication Technology (ICT) provides wide range of benefits for various sectors. The benefits of Information and Communication Technology in education sector are mainly better communication, enhanced learning opportunities, makes learning more engaging with motivate for students, efficiency in administration, etc. ICT is important for both people and society also. The people can access information related to education and research more easily and quickly. The people can communicate with their relatives with the help of information and communication technology. The information and communication technology helps the people to acquire new skills for their career development. The information and communication technology improved public services in which the people can easily access. The information and communication technology has succeeded to improve the learning efficiency and increase the student motivation.

Research means to find out something new. Research is an organised investigation to find out new information and new facts. It is a systematic investigation to solve the problems and discover new knowledge. Research is basically evidence based, systematic, logical, objective, analytical, empirical, purposeful, valid and reliable.

Objectives

To understand the importance of information and communication technology. To analyse the role of Information and Communication Technology in Research.

Methodology

The current literature review related to research and information and communication technology. The descriptive method has been applied to conduct the present study. Data has been collected from secondary scorces namely books, articles, research paper, and other existing literature.

Concept of ICT

The term ICT stands for Information and Communication Technology. The information and communication technology is an umbrella term for the diverse range of resources and technological tools used to store, create, manage and disseminate information and to facilitate communication. The key aspects of information and communication technology
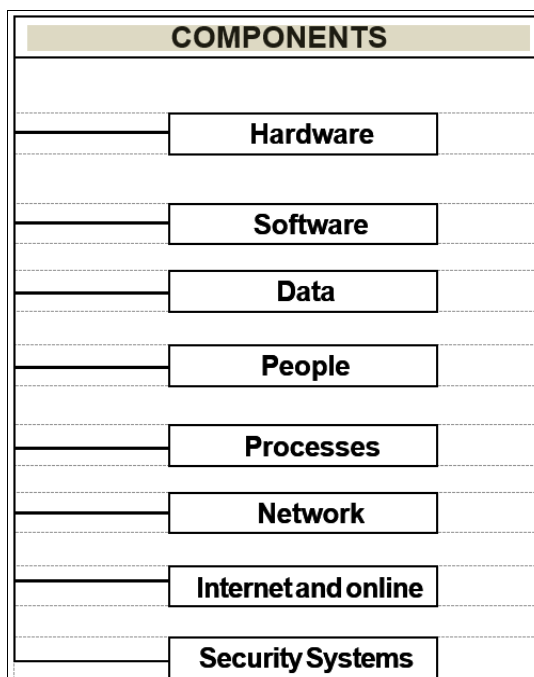
(ICT) are information, communication and technology. The information and communication technology (ICT) includes a wide range of digital tools and systems which are hardware, software, networking and communication systems. The information and communication technology plays a vital role in various sectors by connecting people, improving education, driving business, etc. The major components of information and communication technology system are software, hardware, cloud computing, transaction, data, internet communication technology. The information and communication technology has some important features namely connectivity, integration, automation, communication and collaboration, accessibility, information storage and retrieval.

Concept of Research

Research is the scientific investigation to find out original information. Research offers a large number of benefits which are mainly developed critical thinking, enhanced decision making, skill development, enhancing understanding and knowledge. Research plays a crucial role in enhancing knowledge which improves academic fields. The information and communication technology is an important in research due to below mentioned reasons:

- Enabling global collaboration
- Sharing of knowledge among researchers
- Comprehensive

Components of ICT

- Accessible world wide
- Improving data collection
- Digital database
- Enhancing efficiency
- Data storage and processing
- Access to review of literature
- Enhanced access to information

Role of ICT in Research

These days, ICT, or information and communication technology, is also very useful for research. ICT is God's blessings for researchers. It makes their work easier and faster, allowing them to find information, analyze complex data, and share their findings more effectively. Researchers can quickly get the information they need for their work and also keep it safe and organized for later when they need it again. Now a days researchers necessarily need technology to do their proper work. Technology helps to get information in very quickly and most of the time correctly. Internet and computer are very useful to researchers to access any kind of article and books from all over the world.
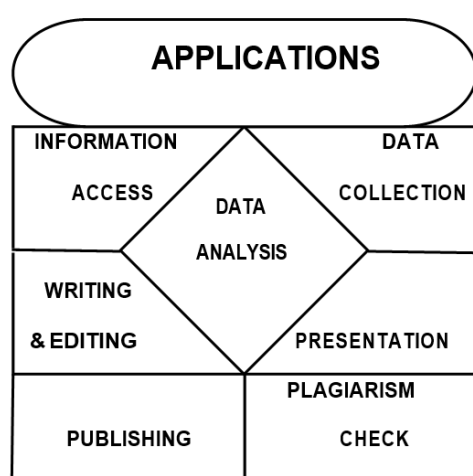
ICT can collaborate researchers from all over the world through calls, video calls, emails, messages, and many online platforms. In simple words, ICT has made research much easier and faster. It helps researchers stay organized, share their findings, and complete their projects smoothly.

- **Hardware:** It refers the physical parts of computer, mobile phones, laptops, tablets those are include in ICT system. Keyboards, mice, scanners are the input devices by using these we can give information to the device. Similarly monitors, printers, projectors are the output devices, and pen drive, hard disk are the storage devices.
- **Software:** It refers the internal parts of ICT system like computer, mobile phones etc. It includes System Software, Application Software and Specialized Software. System software is the basic software that makes device work and allows to run other software. Operating systems Windows or Android are the examples

of system software. Application software is used to perform specific tasks or activities. Microsoft Excel, Google docs are used to writing and editing texts. Microsoft Excel, Google sheets are used to calculating and organizing data in tables. Microsoft PowerPoint, Google Slides are used to create presentations. Chrome, Firefox etc. used to view websites on the internet.
- **Data:** It is a collection of raw facts, figures, numbers, images, texts. It can be appear in various formats like text, numbers, images, audio, video etc.
- **People:** It refers the users who operate the ICT system. It includes students, teachers, researchers and general users.

Without users ICT cannot work because people give instruction and use the output.

- **Processes:** It is refers to the steps followed to collect, process and communicate the information. It includes decision making, problem solving, data management etc.
- **Network:** It is the communication system which connects computers and devices. It includes Local Area Network (LAN), Wide Area Network (WAN) and Internet. It allows sharing information.
- **Internet and Online Services:** It is the largest global network that connects millions of devices. Through it we can access to websites, emails, social media and various e-learning platforms.
- **Security System:** It refers to those tools that protect ICT system from dangers. Antivirus, passwords, backups, firewalls are the parts of security system that ensures the safe use of ICT and protects user's valuable information.

Applications of ICT in Research

- **Information Access:** Using ICT, researchers can search books, journals, research papers, reports online within a few seconds. They can also use digital libraries and databases.
- **Data Collection:** Google forms, online surveys and digital tools are the part of ICT. By using these tools researchers can collect data from large number of people across the world.
- **Data Analysis:** ICT software like Excel, MATLAB, C-programming helps researchers in complex calculations, analysis large amount of data and can analysis graph also.
- Writing and Editing: Researchers can write their research paper, theses, report, papers using word processors and can check grammatical mistakes by grammar checkers. It helps researchers to write a proper and correct report on their particular field.
- **Presentation:** ICT helps researchers to create graphs, charts, slides and digital posters. This makes their research more attractive and easy to understand for readers.
- **Publishing:** Researchers can publish their research work in online journals and websites in very fast as compare to the older traditional methods. Online publications are available to people all over the world.
- **Plagiarism Check:** There are various websites and tools like Turnitin or Grammarly check. It helps to prevent copying from other work and gives honesty and quality in their research work.

Effectiveness of ICT in Research

- **Easy Access to Information:** ICT gives us a very quick and easy entry to digital libraries, e-books, research papers etc. Instead of searching books in library ICT gives information within seconds.
- **Faster Communication:** ICT tools like email, video calls, messages help researchers to communicate with friends, mentors and experts all over the world. It helps in idea sharing and problem solving.
- **Safe Data Storage:** Researchers can store their research data safely in computers, external drives like pen drive, or cloud storage. It keeps our data safe so we can find in anytime.
- **Accurate Data Analysis:** ICT offers software like R, c-programming, MATLAB and Excel that help researchers in complex calculation, data analysis etc. These tools save times and reduce error.
- **Time Saving:** Using ICT reduces time in complex calculation and data analysis. Researchers can find any data, reports, research papers, publications within a minute.
- **Global Collaboration:** ICT can connect researchers from all over the world. Researchers can work together on their projects, they can share resources and exchanges their ideas.

Shortcomings of ICT in Research

- **High Cost of Technology:** Using ICT in research we need computers, smart phones, laptops, high internet connection. These can be costly for many students and researchers.
- **Technical Problems:** Problems like slow internet connections, software error, frequently power cuts, can impact in research work and can make it delay.
- **Need for Technical Skills:** ICT is not for beginners. There are many tools like c-programming, MATLAB or SPSS require proper training. Without any digital skills researchers may face difficulties in using these tools effectively.
- **Data Security Issues:** Storing research work or sensitive data online or in cloud services may face hacking, data loss and privacy problems.
- **Misuse:** Using ICT researchers can access various research work of others. Although it is helpful, it also increases the chances of copying without proper reference.
- **Distraction:** While using ICT, researchers may get distracted by social media, games, or various websites. This reduces focus and wastes valuable times.

Conclusion

The information and communication technology in research has an important role because ICT enhance quantity in research and provides better quality, limited complexity and lower the expensive of research. The ICT hepls to reduce the research duration. The researchers can develop their learning skill due to ICT and the ICT helps the researcher as it provides a platform to enhance the research and academic efficiency at the local, regional and national levels. The information and communication technology can be used in research to enhance academic design of research. In the related literature, the ICT in research assists to make the creative information to the researchers. The ICT has a vital role with its probability and usefulness in research.

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