Chapter 2. Documentary Research in Information and Communication Technology (ICT)

2.1. Introduction to Online Information Research

Online information research is the process of searching, identifying, evaluating, and using information available on the Internet, particularly from academic and reliable sources. In higher education and engineering studies, online research plays a central role in building scientific knowledge and developing analytical thinking.

Today, the Internet provides access to millions of documents, including scientific articles, conference papers, technical reports, books, and theses. However, not all online information is reliable. Therefore, students must learn how to search efficiently and critically evaluate sources before using them in academic work.

Online research is not limited to typing keywords into a search engine. It is a structured and methodological process that requires defining a clear research question, selecting appropriate keywords, using specialized databases, and verifying the credibility of the information found.

A. Importance of Documentary Research in ICT

In Information and Communication Technology (ICT), documentary research is particularly important because technology evolves rapidly. Engineers and students must continuously update their knowledge in areas such as Artificial Intelligence, Internet of Things (IOT), Data Science, and Telecommunications. Documentary research in ICT allows students to:

- ✓ Follow technological developments and recent innovations
- ✓ Prepare academic projects, laboratory reports, and final-year dissertations
- ✓ Solve technical and engineering problems
- ✓ Compare existing technological solutions
- ✓ Understand theoretical foundations before practical implementation
- ✓ Support arguments with scientific evidence

B. University Academic Databases

Academic databases are specialized platforms that provide access to peer-reviewed and scholarly publications. Unlike general search engines, academic databases offer reliable and scientifically validated information. Some important academic research tools include:

- ✓ Google Scholar: An academic search engine that indexes scholarly literature across many disciplines, including engineering, computer science, and telecommunications. It allows users to search for articles, theses, books, and conference papers. It also shows citation counts, which help measure the scientific impact of a publication.
- ✓ Persée (www.persee.fr): A French academic portal that provides access to scientific journals, mainly in humanities and social sciences. Although it is not specifically technical, it is useful for research methodology, digital transformation, and technology management topics.
- ✓ Digital Libraries: Digital libraries provide online access to academic books, journals, and research materials. Many universities offer access to digital libraries through institutional subscriptions. These platforms ensure access to high-quality and peer-reviewed documents.

2.2. Using Boolean Operators

Boolean operators are logical connectors used to refine and improve search results in academic databases and search engines. They help increase search precision and efficiency by controlling how keywords are combined. The three main Boolean operators are:

- ✓ **AND Operator**: The AND operator is used to combine two or more keywords. It narrows the search results by retrieving only documents that contain all specified terms.

Example: Artificial Intelligence AND Chemistry

This search will display results that include both “Artificial Intelligence” and “Chemistry.”

- ✓ **OR Operator**: The OR operator is used to include synonyms or related terms. It broadens the search results by retrieving documents that contain at least one of the specified terms.

Example: IOT OR Internet of Things

This search will display results that include either “IOT” or “Internet of Things.”

- ✓ **NOT Operator**: The NOT operator is used to exclude unwanted terms from the search results.

Example: Machine Learning NOT Deep Learning

This search will retrieve documents about Machine Learning but exclude those specifically focused on Deep Learning.

2.3. Basic Digital Skills

For an engineering student, it is essential to master three main digital tools: word processing software, spreadsheets, and presentation software. These tools are fundamental for academic success and professional development.

For an engineering student, it is essential to master three main tools:

- ✓ **Word processing**: Word processing software allows users to write, format, and organize written documents. It is one of the basic digital tools for students and engineers.

  Examples include Microsoft Word and Latex.

- ✓ **Spreadsheets**: Spreadsheets are software tools that allow users to enter, organize, calculate, and analyze data in tabular form.

  Example: Microsoft Excel.

- ✓ **Presentation Software**: Presentation software allows users to create slides to present a project, report, or idea in a clear and visual way.

  Example: Microsoft PowerPoint.