Mohamed Khider University of Biskra

Faculty Economic Sciences, Management and Commercial Science
first-year Master of Business Management & RHM

Course: Methodology of Graduation Thesis Preparation.

Dr nourhane groun

Nourhane.groun@univ-biskra.dz

Lecture N 01 –
Concepts of Scientific Research Methodology

Definition of Basic Concepts:

a. **Science:** A system of knowledge and concepts that have been verified through a structured, methodical approach. Science is not just information; it is also a human activity aimed at understanding phenomena and discovering relationships between them through observation and experimentation.

b. **Scientific Research**: An organized and systematic process of investigating facts to either confirm old ones or add new ones. Research typically begins by identifying a problem or a question, followed by systematically collecting and analyzing data to reach evidence-based solutions or conclusions.

c. **Method:** The path or technique a researcher follows. More specifically, it is the set of practical tools and procedures used to collect and analyze data, such as experiments, surveys, or statistical analysis.

d. **Methodology:** A broader and more comprehensive concept than method. Methodology is the theoretical framework and overall strategy that justifies the choice of a specific method. It is the "philosophy of research" that connects the choice of tools to the study's overall goal and explains the logic governing the research process.

e. **Epistemology**: Also known as the "theory of knowledge," it is a branch of philosophy that studies the nature of scientific knowledge itself. Epistemology is concerned with how knowledge is formed, its foundations, its principles, and its validity. It asks critical questions about science, such as: How do we know what we know? And what are the limits of scientific knowledge?

Key Relationships and Differences:

1. **The Difference Between Method and Methodology:**

- The method is the tool (the practical "how"), while the methodology is the logic that guides the use of this tool (the philosophical "why").

- The method is a part of the methodology, In the "method" section, a researcher describes the tools used. In the "methodology" section, they explain why these tools were the most appropriate for achieving the research objectives.

2. **The Relationship Between Epistemology and Methodology**:

Epistemology guides methodology, A researcher's epistemological beliefs (their view on the nature of truth and knowledge) directly influence the strategy (methodology) they will choose, which in turn determines the tools (method) they will use for example, a researcher who believes that truth is objective and measurable (a positivist view) will choose a quantitative methodology.

In contrast, a researcher who sees truth as relative and socially constructed (an interpretivist view) will lean towards a qualitative methodology.

3. The Difference Between a Problem and a Problematization:

- **Problem:** A difficulty, an obstacle, or an unclear situation that a researcher observes and that needs a solution or explanation. A problem is usually specific and practical.
- **Problematization (or Research Problem):** The theoretical construction of the problem. It is not the problem itself but rather the "formulation of the problem within a theoretical framework that allows it to be addressed scientifically."

Problematization is broader and deeper than the problem and may include several sub-problems. It involves posing a central question about the problem that connects its different variables and defines the angle of approach the researcher will adopt.

Examples:

- **Problem**: Observing that male students perform worse in mathematics than female students in a specific school.
- **Problematization:** Framing this observation as a research question: "What are the educational and social factors that influence the differences in mathematics achievement between male and female high school students?"

Variables, Research Questions, and Hypotheses:

a. **Research Questions**: Sub-questions that arise from the main research problem, designed to break it down into smaller, measurable parts, The questions should cover all aspects of the main problem.

b. **Variables:** The concepts or characteristics included in the research questions that can change and take on different values (e.g., academic achievement, gender, teaching methods, social status).

c. **Hypotheses:** Temporary answers or intelligent guesses that the researcher proposes to answer the research questions. A hypothesis is formulated as a relationship between two or more variables, and the research is designed to test whether this hypothesis is supported or rejected.

The Pillars of Scientific Research:

This part focuses on the essential requirements for any successful scientific research and the qualities a researcher must possess.

1. Requirements and Conditions for Scientific Research:

For research to be of high quality and reliability, it must meet a set of formal and substantive conditions.

1.1 Substantive Conditions (The Core of the Research):

- **Originality and Novelty**: The research should address a new problem, add a new perspective to an old topic, or correct previous findings.
- **Clarity and Problem Definition**: The study must begin with a clear and precisely defined research problem, as this is the foundation of any successful study.
- **Scientific and Practical Importance:** The problem should have scientific value (contributing to knowledge) or practical value (contributing to solving a real-world issue).
- **Feasibility**: The problem must be researchable, meaning it is possible to collect and analyze data to reach conclusions.

1.2 Methodological Conditions (The Process of Research):

- **Use of an Appropriate Scientific Method**: The chosen method (descriptive, experimental, historical, etc.) must be suitable for the nature of the problem and the research objectives.
- **Accuracy and Reliability**: Using precise tools for data collection, verifying the validity of sources, and recording results as they are, without distortion.
- **Proper Citation:** Adhering to a consistent scientific citation style (like APA or MLA) to acknowledge the work of others and avoid plagiarism.

1.3 Formal Conditions (The Structure of the Research):

- **Logical Organization and Coherence**: The research must follow a logical sequence, from the introduction to the results and conclusion, with a clear connection between ideas and paragraphs.
- **Clear Academic Language**: Using precise and formal scientific language, free of grammatical and spelling errors, and avoiding literary styles or ambiguous phrases.

2. The Scientific Researcher and Their Qualifications:

The researcher is the cornerstone of the research process, and the success of the research largely depends on their qualities and competence.

2.1 Scientific Qualities (Competence):

- **Familiarity with the Field of Specialization:** The researcher must possess broad and in-depth knowledge of their field of study and be familiar with the most recent studies and theories related to it.

- **Knowledge of Research Methodologies:** The ability to select appropriate research methods and tools for the study and apply them correctly.
- **Analytical and Critical Ability:** The researcher's role is not limited to collecting information; they must also have the ability to analyze, critique, and link information in order to draw new conclusions.

2.2 Personal and Ethical Qualities (Integrity):

- **Scientific Integrity**: This is the highest ethical standard for a researcher. It means being accurate in reporting information, giving credit to original authors, and completely avoiding plagiarism.
- **Objectivity and Neutrality**: The ability to set aside personal opinions and biases and to present the results as they are, even if they conflict with one's expectations.
- **Patience and Perseverance**: Scientific research is a long and demanding journey that requires patience and the ability to overcome difficulties.
- **Intellectual Humility:** Being open to criticism from others, acknowledging the limits of one's knowledge, and being willing to revise one's ideas based on new evidence.