People's Democratic Republic of Algeria
Ministry of Higher Education and Scientific Research

University of Larbi Ben M'hidi – Oum El Bouaghi
Institute of Science and Techniques of Physical and Sports Activities

Course Handout for the Module: Research Project

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General Information about the Course

Unit Title: Methodological Unit
Course Title: Research Project
TypeofInstruction: Lecture
Credits:05
Coefficient: 02

Learning Objectives

To enable students to design and complete a scientific research project in the field of sports using a methodological and scientific approach, while enhancing academic writing and presentation skills.

Prerequisite Knowledge

- Research methodology
- Use of office software applications
- Basic understanding of statistics

Course Content

1. Selecting a research topic and formulating the research problem.
2. The introductory part of the study.
3. Developing the theoretical framework and reviewing previous studies.
4. Preparing the methodological procedures of the study.
5. Scientific referencing and citation of sources.
6. Preparing the final research report.
7. Using technology and artificial intelligence in drafting the research project.

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Lecture One

Method of Selecting a Research Topic

1. Selection of the Research Topic

Selecting a research topic is a step that precedes the collection of scientific material and takes place simultaneously with the collection of academic sources.

- It is considered one of the fundamental steps in scientific research.
- It represents the organizational structure and the initial framework of the research.
- It can be regarded as the conceptual or “engineering” plan for the sections of the research.
- The selection of the topic involves implicit and continuous discussion with the supervisor, as well as consultation with specialists in the research field in order to benefit from their expertise and opinions.
- It reflects a clear conceptualization of the research problem upon which information is collected.
- The research topic is preferably selected by the researcher or in collaboration with the supervisor.
- The researcher must identify relevant sources and references that help develop a sense of the research problem and lead to the formulation of an appropriate research issue.

2. Conditions for Selecting a Research Topic

- **Originality and innovation:** the topic should not have been previously addressed.

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- **Interest, motivation, and willingness:** the researcher should ask the following questions:
    - Does the topic attract my interest and inclination?
    - Am I capable of undertaking this research and preparing a thesis on this topic?
    - Is it possible to cover the topic from all relevant aspects and conduct the required field study?
- The topic should not be too narrow or excessively broad.
- It should not be overly complex or require advanced techniques beyond the researcher's capabilities.
- It should not be vague, as ambiguity leads to unclear ideas and results.
- It should not be among highly controversial topics.
- Accuracy and clarity in defining the topic are essential; the research title should be concise and include clear scientific keywords, avoiding literary or rhetorical styles.
- The topic should be flexible enough to allow modification if necessary.
- There should be sufficient scientific references and sources to support the completion of the research.

3. Points to Consider When Choosing a Research Topic

- The time period required to complete the research.
- The researcher's competence and expertise in relation to the research topic.
- Ensuring the possibility of addressing the research problem comprehensively with the availability of all relevant information.

- The availability of assistance and support needed by the researcher.

4. Foundations for Selecting the Research Topic

- The extent to which the topic is researchable.
- The importance of the topic and its potential benefit to society.
- Determining whether the topic is outdated and over-researched or novel and original.

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Lecture Two

Theoretical and Conceptual Framework of Scientific Research

1. Concept

The theoretical framework represents the main and fundamental structure of the idea or phenomenon under investigation. It is considered the backbone of scientific research, as it addresses the references and sources that have discussed the topic under study. The theoretical framework defines the relationships among variables; therefore, it constitutes the foundation upon which scientific research is built. It consists of a set of theoretical sections written in the thesis or dissertation according to the plan adopted in modern scientific research methodology. It also relies on previous studies that contribute to a deeper understanding of all aspects of the research problem.

2. Importance of the Theoretical Framework

- It determines the nature of the research questions.
- It defines the manner in which research questions are formulated.
- It specifies how concepts are defined.
- It guides the processes of data analysis and the writing of results.

3. Basic Components of the Theoretical Framework

- Identifying and naming the variables related to the research within the proposed research framework.
- Through reviewing available literature, the researcher determines the nature, type, and direction of the relationships among the variables.
- Identifying the reasons that led the researcher to assume the existence of such relationships among the variables.

4. Conditions for Preparing the Theoretical Framework

- The researcher must develop a research framework that is consistent with the main research problem.

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- The theoretical framework should include scientific terminology that clarifies and explains the scientific phenomenon to the reader.
- Enriching the theoretical framework with appropriate scientific terms is the responsibility of the researcher.
- The theoretical framework must include the concepts and definitions used in the scientific research.
- It should be sufficiently comprehensive to cover the scientific phenomenon under investigation and its requirements throughout all stages of the research.

5. Previous Studies

- Previous studies are among the most prominent elements of the theoretical framework. They consist of the references and literature reviewed by the researcher to obtain the information required for the study. The researcher must review the most recent works in the field, as they provide valuable ideas and research tools.
- The findings of previous researchers may be used to formulate new hypotheses and general research questions that contribute to the research topic.
- Previous studies enrich the field of scientific research by helping the researcher diversify sources and reach accurate, sound, and satisfactory results and recommendations.
- When using previous studies, proper documentation is essential as a matter of objectivity and academic integrity. This is achieved by citing references within the text and listing them comprehensively at the end of the research.
- Previous studies are presented immediately after the theoretical framework and focus on compiling the most important information related to the research problem.
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6. Conditions to Be Observed When Writing Previous Studies

- Previous studies must be closely related to the topic of the study being prepared and conducted by the researcher, in order to avoid inconsistency between the research content and the cited studies.
- The cited studies should fall directly within the scope of the research field under investigation.

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Lecture Three

Introduction, Objectives, Significance, and Terminology

1. Introduction

The introduction represents a general entry point to the research topic and is closely linked to the research problem. It includes an explanation of the reasons for selecting the topic, an indication of the value and significance of the research, clarification of key terms, identification of the research methodology adopted by the researcher, reference to previous studies related to the topic, mention of the difficulties encountered during the research process, and an outline of the research plan upon which the study is based.

2. Conditions for Writing the Introduction

- The introduction should accurately reflect the content of the research.
- It should serve as a gateway leading to the research problem.
- It must clarify the reasons behind the researcher's choice of the problem.
- The more the introduction relies on previous studies and objective recommendations, the more rigorous and credible it becomes.
- It should address the significance of the study through clear points that support and justify the research.

3. Method of Writing the Introduction

- The discussion should proceed from general to specific and from whole to part, while remaining closely related to the study topic.
- Logical connections should be established among all aspects of the topic and the indicators of the study variables.

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- Quotation and citation should be used to support and strengthen the topic through theories, expert and scholarly opinions, as well as the researcher's own perspective.
- Scientific thinking and methodological approaches should be employed to organize and structure ideas, demonstrating the researcher's level of understanding and mastery of the research subject.
- The reasons and motivations for selecting the research topic should be clearly stated.
- The significance of the study should be clarified to highlight its scientific value.
- Relevant previous studies should be incorporated for reference and support.

4. Significance and Reasons for Choosing the Topic

The importance of a study lies in the scientific benefits, contributions, and services it offers to the original population and to the various groups directly related to the research topic. Consequently, the results of the field study can be directly utilized to propose solutions to various problems and challenges faced by concerned institutions or stakeholders.

In this section, the researcher clarifies the reasons for choosing the topic, through which the importance of the subject becomes evident. The topic may be novel, thereby enabling the researcher to establish an important informational foundation in the field.
The significance of the topic may also emerge from the primary data used by the researcher or from the methods employed to analyze primary or secondary data.

The researcher must convince the supervising bodies of the importance of the topic, whether they are supervisors, funding

agencies, academic institutions, or other relevant entities. The significance of the study may be personal to the researcher, institutional (university or funding body), national, or even global, depending on the nature of the research.

5. Research Objectives

Research objectives are derived directly from the research problem questions and correspond to them, enabling effective control over the research plan and ensuring its success. Objectives are formulated immediately after defining the research problem, with the aim of measuring relationships among the study variables, identifying the nature of these relationships, and controlling the indicators and factors influencing the phenomenon under investigation.

This allows the researcher to observe and measure these factors empirically, uncover scientific facts, and reach results that may serve as proposals and solutions to the research problem. These results may also be adopted as a model for studying and addressing other issues related to the current research topic.

Many scholars consider research objectives to be the goals, facts, or useful information that the researcher seeks to achieve within a specific field of knowledge or specialization. Objectives should be formulated in clear, concise, and precisely defined statements.

6. Considerations When Defining Objectives

- Objectives should be stated clearly and accurately.
- Objectives must be achievable.
- Objectives should be consistent with the content of the research.
- A main objective may be identified, from which several sub-objectives can be derived.

7. Concepts and Terminology

Research concepts and terminology must be clearly defined. These concepts and terms constitute the scientific language that the researcher should consistently use throughout the study, leaving no

room for ambiguity, confusion, or side debates regarding the intended meaning.

The researcher must ensure the consistent use of these concepts and terms according to their predefined meanings, thereby establishing a shared language between the researcher, readers, and audience.

Key concepts and terms are typically embedded in the research title, which defines the subject of the study and clarifies the nature of the research problem. The researcher first presents linguistic and terminological definitions as proposed by various scholars, then arrives at an operational definition for each concept or term based on personal understanding and intellectual capacity. This understanding is derived from extensive exploratory reading of the theoretical framework of the research and should be closely related to the applied aspect of the study.

This process demonstrates the researcher's level of control over the study indicators and reflects a thorough understanding of the research topic.

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Lecture Four

The Research Problem in Scientific Research

1. Definition of the Research Problem

The research problem consists of a set of issues that form the core content of scientific research. It provides the researcher with information about something unknown or not yet fully understood. These issues or questions are formulated based on a research plan developed by the researcher and incorporated into the structure of the scientific study.

The research problem may also be defined as any phenomenon or topic that requires investigation, diagnosis, interpretation, or represents an issue subject to debate, controversy, or disagreement, often based on a correlational relationship.

2. Sources of Identifying the Research Problem

- **Work Environment and Scientific Experience:** Professional experience and scientific practice often raise questions for the researcher about issues that lack clear explanations or reflect problems worthy of investigation.
- **Extensive and Critical Reading:** Various references and scholarly sources contain ideas and viewpoints that may stimulate questions, which the researcher can explore when opportunities arise.
- **Previous Research:** Researchers typically present specific recommendations at the end of their studies to address problems encountered during the research process, encouraging other researchers to consider and investigate these issues further.
- **Institutional Assignment:** A research problem may arise from an assignment by an institution to diagnose and solve a particular problem scientifically. Universities may also assign research projects and theses at the graduate level.

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3. Formulating the Research Problem

The research problem aims to investigate the effect of the independent variable on the dependent variable within a specific population. When formulating the problem, the statement or question must clearly reflect three key elements:

- The variables involved
- The relationship between the variables
- The population under study

It is preferable to formulate the problem in a clear and concise statement that helps clarify the study indicators and facilitates the research process. The problem is often expressed in the form of a research question that may direct the study toward examining differences among variables or exploring relationships between them. Descriptive, relational, or comparative questions may be used.

4. Stages of Formulating the Research Problem

- **Stage of Problem Awareness:** This stage involves the researcher identifying the relevant knowledge domain and defining the research title, transforming an initial sense of interest into a scientific concern that the researcher seeks to address.
- **Stage of Survey and Exploration:** This stage focuses on collecting data, information, and evidence related to the research problem and exploring it within real-world and field contexts.
- **Stage of Analysis:** The researcher analyzes and dissects the collected data and information in order to identify and define the core elements of the research problem.
- **Stage of Problem Formulation:** This is the stage of verbal and written expression of the research problem, based on the elements derived from the previous stages. The problem is articulated in the form of scientific questions and inquiries.

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Lecture Five

Research Hypotheses

1. Definition of Research Hypotheses

Research hypotheses are potential answers or expected outcomes to research questions. They represent relationships between two or more variables, including dependent and independent variables. These hypotheses are not random conclusions; rather, they are inferences based on prior knowledge, theory, or specific scientific experience.

Hypotheses are intelligent propositions grounded in existing knowledge, yet they are not definitive and require empirical testing. When supported by evidence, hypotheses are transformed into established facts. Therefore, hypotheses constitute one of the fundamental pillars of scientific research.

2. Characteristics of Research Hypotheses

A well-formulated hypothesis is characterized by precise wording and the possibility of statistical testing. A hypothesis addresses variables and the relationships between them, and its validity or invalidity can be empirically verified. The main characteristics include:

- **Plausibility:** The hypothesis should be consistent with established scientific facts and not be unrealistic or contradictory, which requires the researcher to possess broad knowledge of the field.
- **Testability:** The hypothesis must be measurable and verifiable through appropriate statistical indicators and testing methods.
- **Explanatory Power:** The value of a hypothesis increases with its ability to provide a comprehensive explanation of the phenomenon or to offer meaningful generalizations.
- **Consistency with Related Theories:** The hypothesis should be wholly or partially aligned with existing theories relevant to the research topic.

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- **Simplicity:** Hypotheses should be clear and free from unnecessary complexity.

3. Importance of Research Hypotheses

- They stimulate observation and encourage systematic study and investigation, contributing to the development of theories that explain the phenomenon under study.
- The function of hypotheses lies in revealing relationships between variables and linking specific laws that precede their discovery, ultimately leading to theory formation.
- They save time and research costs by directing the researcher's efforts and thinking toward clearly defined objectives.
- They organize ideas and diverse interpretations into concise propositions that facilitate the formulation of laws governing the phenomenon.
- They serve as indicators of gaps and limitations in previous research.

4. Types of Research Hypotheses

- **Direct (Alternative) Hypotheses:** Indicate the existence of a relationship between two variables; they are also known as declarative or alternative hypotheses.
- **Null Hypotheses:** Indicate the absence of a relationship between variables.

Some scholars further classify hypotheses into four main types:

- **Null (Zero) Hypothesis:** The study demonstrates that the result equals zero, indicating the absence or invalidity of the claim contained in the hypothesis. This does not imply a lack of scientific value; rather, the absence of an effect is itself a scientific finding.
- **Correlational Hypothesis:** Based on the assumption that a correlational relationship exists between two variables, which

the researcher seeks to demonstrate through quantitative measurement.

- **Directional Hypothesis:** Refers to a hypothesis involving two variables moving in opposite directions; as one increases, the other decreases.
- **Causal Hypothesis:** Concerns the existence of a cause-and-effect relationship between the independent variable and the dependent variable, meaning that the former leads to or produces the latter.

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Lecture Six

Field (Applied) Research Procedures

1. Pilot Study

The researcher visits the field where the empirical part of the study will be conducted in order to verify that the phenomenon under investigation actually exists in reality and to determine whether the research setting is suitable for implementing field procedures without obstacles or difficulties that may arise during the research process.

- The researcher also conducts interviews with individuals who have a direct relationship with the research topic, benefiting from their experience and collecting information and data related to the problem or phenomenon.
- In addition, the researcher ensures the validity of the research instrument by testing it on a pilot sample and establishing its scientific properties (validity, reliability, and objectivity).

Validity:
Refers to the extent to which the research instrument measures what it was designed to measure.

Reliability:
Is verified by administering the research instrument and re-administering it to the pilot sample within a period of less than two weeks. If similar results are obtained, the instrument is considered reliable.

Objectivity:
Refers to the avoidance of personal bias and subjective tendencies by those administering the research instrument during data recording and processing, in order to promote scientific and logical thinking.

2. Research Method Used

The nature of the research topic and the formulation of the research problem determine the appropriate research method.

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3. Population and Sample

The research sample represents the target population. The variables of the sample members (such as age, gender, and experience) must be carefully controlled.

Study Population:
Refers to all individuals or elements sharing common observable characteristics. Sampling units are the basic elements of the population and form the basis for sample selection. These may include individuals, organized groups, or institutions. The defining criterion of a population is the presence of at least one common observable characteristic.

Research Sample:
Is a subset of the population that shares common characteristics.

Steps for Selecting the Research Sample

- **Defining the population:** Identifying at least one characteristic that distinguishes the population from others and determining its scope.
- **Identifying population characteristics:** Preparing a list of characteristics relevant to the study (e.g., age, gender, region, educational level, marital status).
- **Determining sample size:** Selecting a sample large enough to represent the population's characteristics, often through tables that include the number of sample members and their attributes. This depends on the nature of the sample population.

Factors to Consider When Selecting the Research Sample

- **Type of research:** Descriptive studies should include no fewer than 30 participants, while experimental studies comparing groups should include at least 10 participants per group.
- **Expected differences:** If small differences or weak relationships are expected, a larger sample size is required.

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- **Research costs:** High research costs may necessitate a smaller sample size; therefore, costs should be determined in advance.
- **Importance of results:** Small samples are acceptable in pilot studies, whereas larger samples are preferable in main studies.

Types of Samples

Probability Samples

Simple Random Sample:
A method that ensures all population units have equal and known chances of selection, following scientific rules. It is considered the best sampling method in terms of accurately representing the population and minimizing differences between population and sample characteristics.

Stratified Random Sample:
Increases the likelihood of representing population characteristics by dividing the population into strata based on specific characteristics (e.g., males and females). It includes:

- **Proportional stratified random sampling:** Selecting a number of units proportional to the size of each stratum.
- **Equal stratified random sampling:** Selecting equal numbers of units from each stratum.

Cluster Random Sample:
Involves selecting groups rather than individuals, such as schools or geographical areas, where each cluster shares similar characteristics. Individuals are then selected from each cluster when populations are large and widely dispersed.

Area (Geographical) Random Sample:
Similar to stratified sampling, where geographical areas are selected randomly, provided that each area represents variables expected to be related to the research topic. This type requires complete lists of population elements in each geographical area.

Systematic Random Sample:
Individuals are selected at regular intervals from a population list. For example, if the population consists of 500 individuals and a sample of 50 is needed, the sampling interval is determined, and a random starting point (e.g., number 3) is chosen. The sample would then include individuals numbered 3, 13, 23, and so on, until 50 individuals are selected. This method is simple and cost-effective; however, once the first individual is chosen, the selection of the remaining individuals follows a fixed pattern.

Non-Probability Sample

Biased(Non-Random)Samples:
Any sampling method that does not rely on random selection results in a biased sample.

Types of Biased Samples:

- **Convenience Sample:** Selecting cases that are easily accessible or readily available.
- **Quota Sample:** Selecting a predetermined number of participants from specific categories to reflect population diversity.
- **Purposive Sample:** Selecting individuals based on specific criteria relevant to the research topic.
- **Extreme or Deviant Cases:** Selecting individuals who differ significantly from the average or dominant pattern.
- **Sequential Sample:** Selecting cases consecutively until data saturation is reached, meaning no new information is obtained.
- **Judgmental Sample:** Relying on the researcher's personal expertise in selecting the sample.
- **Cluster (Single-Group) Sample:** Selecting one entire group as the sample, such as all students in a single class or all residents of a specific residential area.

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4. Research Instruments

The researcher explains how the research instruments were developed. Measures and tests may be used, and their items, content, scoring keys, target population, and supporting studies used in their development should be specified. The possibility of adapting the instrument to the Algerian context should also be addressed.

5. Field Application Procedures

The researcher describes in detail the steps followed in conducting the study, specifying the location, time, and date, and organizing them according to each research phase.

6. Statistical Methods

The researcher presents the statistical formulas and methods used to process, analyze, and interpret the study data.

7. Presentation, Interpretation, and Discussion of Results

Data collected through field application are organized into statistical tables, transforming theoretical information into quantitative data. Based on the theoretical background, conceptual framework, and previous studies, the researcher links these results to the field findings and discusses them in light of the hypotheses, providing evidence and justification. This stage highlights the researcher's analytical skills, critical thinking, and ability to interpret, link, evaluate, and infer results, demonstrating mastery of all aspects of the research.

8. Conclusions and Recommendations

The researcher presents general conclusions and summaries of the study topic, along with recommendations as proposed solutions to the research problem and suggestions for future research directions.

9. References List

All sources and references, whether in Arabic or foreign languages, including books, scientific journals, theses, dissertations, official

publications, and regulations, must be listed to ensure academic integrity and proper documentation.

10. Appendices List

This section includes survey forms and questionnaires (both initial and final versions), lists of experts and reviewers, official documents proving the conduct of the field study, and any appendices that support the research.

Lecture Seven

The Experimental Method

1. Definition

The experimental method is based on controlling all variables that may affect the research problem, except for one specific variable whose effect is studied under newly created conditions. This change and control of real-life conditions is referred to as experimentation. The experimental method is distinguished from other research methods by the researcher's direct intervention in the studied phenomenon, as the researcher influences and controls variables in order to accurately measure their effects on the research problem.

2. Foundations of the Experimental Method

- Experimental (Independent) Variable: The variable whose effect on the dependent variable is measured, and whose changes and outcomes are observed.
- Intervening (Extraneous) Variables: Other independent variables that may affect the dependent variable during the experiment, apart from the experimental variable. These variables must therefore be controlled during the experiment.
- Control: Refers to fixing or neutralizing all side effects of extraneous variables.
- Control of the Degree of Change in the Experimental Variable: The researcher controls the magnitude and level of change in the experimental variable, whether in quantity or value, and determines the results accordingly.

3. Study Groups

Study groups are defined as the groups that constitute the phenomenon under investigation. There are several methods for using group-based designs:

- Single-Group Method:
  This method focuses on examining the effect of one experimental

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factor on the performance of the group under study. It typically involves a pre-test and a post-test for the same group. A comparison is then made between the results to identify the effect of the experimental variable. Any differences between pre-measurement and post-measurement results are attributed to changes in the experimental factor.

- Experimental and Control Group Method: According to this method, the researcher conducts the study on two homogeneous groups. One group is exposed to the experimental factor and is called the experimental group, while the other group is not exposed to the experimental factor and serves as the control group. Measurements are then conducted and compared between the two groups to assess the extent of the experimental variable's impact on the research phenomenon.

4. Steps of the Experimental Method

- Formulating the research problem and defining its dimensions.
- Formulating research hypotheses and identifying their various relationships.
- Selecting appropriate measurement tools and instruments that help measure experimental outcomes and ensure their validity.
- Conducting preliminary tests to identify weaknesses in the formulated hypotheses.
- Determining the location, date, and duration of the experiment.
- Ensuring the accuracy of results by designing significance tests to assess their reliability.
- Preparing the experimental design that clarifies the relationships among the variables to be used, and selecting a representative sample of the research population.
- Identifying the independent variables to be subjected to experimentation.

Lecture Eight

The Descriptive Method

1.Introduction

The descriptive method aims to collect data about a particular phenomenon in order to interpret it through data analysis. These data must be classified and analyzed accurately, and based on this analysis, conclusions can be drawn and generalized to the original population.

2.Concept of Descriptive Research

Descriptive research is a procedure used to obtain facts and data along with an explanation of how these data relate to the research problem. This method is employed when there is prior knowledge and sufficient information about the phenomenon under study. The descriptive method is considered scientific because it involves analyzing and interpreting the phenomenon, producing in-depth results, which can contribute to establishing a scientific law or theory.

3.Objectives of Descriptive Research

- Provide an accurate depiction of the characteristics of the phenomenon under study.
- Reveal the theoretical background of research topics and pave the way for conducting further studies.
- Collect data related to the phenomenon to derive meaningful insights, which can inform the design of studies on similar phenomena.

4.Characteristics of Descriptive Research

- Descriptive studies are non-experimental because they deal with the relationships between variables without manipulating them in their natural settings.
- They always employ random sampling methods, allowing estimation of errors when inferring characteristics of the population from the observations made on the sample.

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- Hypotheses are formulated and tested.
- Variables and procedures are described accurately, enabling other researchers to replicate the study.

5.Types of Descriptive Research

1. **Survey Studies**
2. **Case Studies**
3. **Comparative Studies**
4. **Correlational Studies**

6.Advantages and Disadvantages of the Descriptive Method

Advantages:

- Provides factual information that helps in interpreting human and social phenomena.
- Has a wide range of applications.
- Offers clarification of relationships between phenomena.
- Observes phenomena as they naturally occur without researcher interference.

Disadvantages:

- May rely on distorted information.
- There is a possibility of researcher bias influencing results based on personal opinions and beliefs.
- Research assistants may not fully understand the objectives of the study.
- Hypotheses are difficult to prove, as they are tested through observation and collection of supporting and opposing data rather than experimental verification.

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Lecture Nine

Documentation in Scientific Research

1. Definition

Documentation in scientific research refers to proving the sources of information and attributing them to their original authors in order to ensure academic integrity and adherence to research ethics.

2. Types of Scientific Documentation

2.1 In-text Documentation

This type of documentation is mentioned within the body of the research. It is essential that it fully corresponds with the references list. According to the American Psychological Association (APA) style, in-text citation is done by placing the author's last name, followed by a comma, then the year, followed by a comma, and finally the page number (in the case of direct quotation), all enclosed in parentheses.

2.2 Documentation Using Footnotes

Footnotes are scholarly materials that appear at the bottom of the page, at the end of a chapter, or at the end of the research. They are also known as endnotes. They usually appear as closely spaced lines and aim to clarify an idea or provide information about a reference that the researcher has cited or quoted from.

3. Importance of Documentation in Scientific Research

Documentation plays a major role in scientific research and can be summarized as follows:

- It represents the fundamental pillar upon which researchers rely in the pursuit of truth.
- It serves as a link connecting the present with the past.
- It enables the identification of the level of development achieved by a society in various fields.

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- It facilitates the implementation of similar activities, highlights the importance of the topic, and focuses on providing appropriate information to beneficiaries, allowing quick access to information and its presentation in the most suitable form.
- Documentation helps the researcher verify several key aspects, including:
    - Ensuring that the quoted text has been accurately transferred without distortion or alteration of meaning.
    - Verifying that any typographical errors exist in the original source.
    - Ensuring that paraphrasing, when necessary due to text length, has been done without altering the meaning or content, which can be confirmed through proper documentation.

4. In-text Documentation According to APA 7

Scientific material is incorporated into research using two methods:

4.1 Direct Quotation

This refers to verbatim citation, where the researcher نقل the text exactly as it appears in the original source, using the same wording and structure.

4.2 Paraphrasing

This is known as indirect quotation, where the researcher نقلs the idea from the source and rewrites it in their own words without changing the meaning or content.

5. In-text or Textual Documentation

5.1 In-text Documentation for Direct Quotations of Fewer Than 40 Words

- Page numbers must be indicated.
- If the quoted text contains fewer than 40 words, it should be enclosed in quotation marks (“…”).

- If part of the quoted text is omitted, ellipses (…) should be used.
- If a correction is made to an error in the original source, the correction should be placed in square brackets […].
- A researcher may not quote more than 500 words verbatim from a single source without the publisher's permission.

Illustrative Examples:

- Citation at the beginning of the paragraph: Author's last name (year) "text" (p. 45). Example: Al-Hazzaa (2004) "text" (p. 45).
- Citation at the end of the paragraph: "text" (Author's last name, year, p. 90). Example: "text" (Al-Hazzaa, 2004, p. 90).

5.2 In-text Documentation for Direct Quotations of More Than 40 Words

- The quoted text should be indented 1.25 cm from the right margin, similar to paragraph indentation.
- Quotation marks are not used when the text exceeds 40 words.
- Line spacing should be single-spaced, and double-spaced in foreign-language texts.

Illustrative Examples:

- Citation at the beginning of the paragraph: Al-Hazzaa (2004) states that: …… text (p. 56).
- Citation at the end of the paragraph: …… text (Al-Hazzaa, 2004, p. 56).

➢ When citing an electronic source, the paragraph number is used instead of the page number. The symbol (p.) is replaced with the word *paragraph* or *(para.)*.

5.3 Indirect Quotation (Paraphrasing)

In the case of indirect quotation, the following rules must be observed:

- The quoted text should be rephrased using the researcher's own language and style while preserving the original meaning and content.
- Quotation marks should not be used.
- Page numbers are not required, although they may be included if desired.

Illustrative Examples:

- Citation at the beginning of the paragraph: Al-Hazzaa (2004) believes that …
- Citation at the end of the paragraph: … (Al-Hazzaa, 2004).

➢ If there are two authors, both surnames should be cited and separated by *and* or *&*.

Example:

- At the beginning: Al-Hazzaa and Darwish (2004) …
- At the end: … (Al-Hazzaa & Darwish, 2004).

➢ If there are more than two authors, only the first author's name is mentioned, followed by *et al.*

6. General Documentation of a Book in the References List According to APA 7

The author's last name is written first, followed by a comma, then the author's first name, followed by a period. The year of publication is written in parentheses, followed by a period. The book title is written in italics, followed by a period, then the edition number, followed by the publisher's name and a final period.

Lecture Ten

The Final Research Report

1.Definition

The final research report is the document prepared by the researcher that presents the outcomes of their research activities, including the results reached by the study. There is a close relationship between the research plan and the research report, as several sections of the report are often almost identical to those included in the research plan.

2.Conditions for Preparing the Research Report

- Each chapter should begin with a brief introduction that clarifies its objectives and outlines its main contents.
- Logical sequence and coherence among the different parts of the research must be observed.
- The report should be written in a clear, simple, and direct style, avoiding unnecessary complexity, to ensure ease of understanding.
- The third-person style should be used rather than the first person.
- Verbs should be written in the past tense.
- Additional details that were not known at the time of preparing the research plan should be included.
- The report must be carefully revised to eliminate linguistic, spelling, and typographical errors.
- Proper use of punctuation marks according to accepted conventions must be ensured.

3.Components of the Research Report

The research report consists of four main sections:

- Preliminary pages

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- Main text (body)
- Sources and references
- Appendices

3.1 Preliminary Pages

These include the title page, dedication page, acknowledgment page, table of contents, list of figures and illustrations, and the research abstract. These pages are not numbered using Arabic numerals; instead, alphabetical letters are used.

3.2 Main Text (Body)

The main text consists of the following sections:

Section One:
Includes the introduction, research problem and questions, research hypotheses, significance of the study, research objectives, previous studies, and research terminology.

Section Two:
Includes the theoretical framework of the research.

Section Three:
Covers the field research procedures, including the research methodology, population and sample, research limitations, pilot study, research instruments, and statistical methods.

Section Four:
Focuses on the presentation, analysis, and discussion of data, including tables and graphical representations, commentary on tables, and discussion of results.

Section Five:
Includes the conclusions and recommendations.

3.3 Sources and References

The researcher relies on a variety of sources and references in the study for citation purposes, such as books, journals, articles, and electronic resources.

3.4 Appendices

The appendices appear at the end of the research and are devoted to information and documents used by the researcher that need not be included in the main text, such as correspondence, questionnaires, samples of regulations, forms, and documents.

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Lecture Eleven

Artificial Intelligence and Scientific Research

1. Definition of Artificial Intelligence

Artificial Intelligence (AI) is a branch of computer science concerned with the creation of intelligent machines capable of performing tasks that typically require human intelligence. These tasks include:

- **Learning:** The ability to acquire knowledge and skills through experience or data.
- **Reasoning:** The ability to draw conclusions from available information.
- **Problem Solving:** The ability to identify problems and develop solutions.
- **Pattern Recognition:** The ability to identify patterns within data.
- **Decision Making:** The ability to evaluate different options and select the best course of action.
- **Communication:** The ability to interact with humans in a natural and effective manner.

2. The Role of Artificial Intelligence in Scientific Research

Artificial intelligence is revolutionizing scientific research by providing new tools and capabilities that support researchers at various stages of the research process.

2.1 Data Analysis

- **Processing large volumes of data:** AI can process vast amounts of data quickly and efficiently, surpassing human capabilities, enabling researchers to extract new information and insights from large datasets.
- **Discovering hidden patterns:** AI techniques, such as machine learning, help uncover complex and non-obvious patterns in data, leading to new scientific discoveries.

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- **Data classification and organization:** AI can automatically classify and organize data, saving researchers time and effort and allowing them to focus on analysis and interpretation.

2.2 Experimental Design

- **Designing more efficient experiments:** AI can analyze data from previous experiments to design new experiments that are more efficient and accurate.
- **Simulating complex phenomena:** AI-powered computational simulations allow for accurate modeling of complex phenomena, reducing the need for costly and complicated experiments.
- **Automating experimental tasks:** AI can perform many experimental tasks, such as data collection and analysis, saving time and reducing errors.

2.3 Modeling Phenomena

- **Building accurate models of natural phenomena:** AI can construct precise models of complex natural phenomena, such as climate systems and biological processes.
- **Predicting the behavior of phenomena:** AI models enable highly accurate predictions of natural phenomena, supporting fields such as climate change, medicine, and engineering.
- **Understanding underlying mechanisms:** AI models help researchers gain deeper insight into how natural phenomena function, leading to new scientific discoveries.

2.4 Knowledge Discovery

- **Extracting information from texts and images:** AI can extract meaningful information from textual and visual data, enabling deeper analysis.
- **Linking information from multiple sources:** AI techniques connect data from diverse sources, such as scientific articles and databases, helping uncover new relationships.

- **Generating new hypotheses:** AI can generate new research hypotheses based on data analysis, guiding scientific research toward new directions.

2.5 Scientific Communication

- **Publishing research findings:** AI assists researchers in disseminating their findings through automatic abstract generation and translation of scientific papers.
- **Collaboration with other researchers:** AI technologies facilitate communication and collaboration among researchers from different disciplines, enhancing idea exchange and joint projects.
- **Creating educational content:** AI can generate interactive educational content that supports the dissemination of scientific knowledge to the public.

3. The Impact of Artificial Intelligence on Research Ethics

Artificial intelligence is transforming scientific research by offering immense potential to accelerate discoveries and improve the accuracy of results. However, these rapid advancements raise new ethical concerns that must be addressed to ensure the integrity and reliability of research practices.

Key ethical issues include:

- **Algorithmic bias:** AI systems may reinforce existing biases present in the data used for training, leading to unfair outcomes, such as favoring certain researchers or institutions in academic evaluation or research assessment processes.
- **Data theft:** Easy access to large amounts of data via the internet increases the risk of data theft or unauthorized use, threatening the privacy of research participants.
- **Scientific misconduct and fabrication:** AI technologies can be used to fabricate images, data, or research results, posing a serious threat to research integrity and potentially deceiving reviewers or manipulating study outcomes.

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- **Responsibility for outcomes:** As AI systems become more complex, determining responsibility for errors or harmful outcomes becomes increasingly difficult. It is essential to clarify accountability, whether it lies with developers, users, or data owners.

Addressing Ethical Concerns

These challenges can be mitigated through the following measures:

- **Establishing clear ethical guidelines:** The scientific community must develop explicit ethical guidelines for the use of AI in research, including rules on data bias, data access, transparency, and accountability.
- **Enhancing education and training:** Researchers should receive appropriate training on the ethical use of AI technologies, including awareness of risks related to bias, plagiarism, and scientific misconduct, as well as strategies to mitigate these risks.
- **International collaboration:** Addressing ethical concerns related to AI is a global effort that requires cooperation among researchers, institutions, and governmental bodies to develop and implement shared ethical practices.

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