**Research**

Research is a systematic way of solving a research problem or extending understanding through the use of socially accepted research methods. The word systematic refers to the structured and well-informed procedures that lead to good results, such as how to problematize, collect and analyse data, and interpret results. The concept of socially accepted methods refers to the use of methods that have been proven effective through frequent use by researchers. Such methods include case studies, observations, surveys, and interviews.

The third key element in research is solving a problem or extending knowledge. This means understanding a real-world issue or puzzle that presents itself as a problem. Any research aims to produce knowledge or contribute to existing understanding.

Social research involves people on both sides: the researcher is a human being, and the participants or subjects are also humans. This characteristic has both advantages and limitations. The advantage is that the subject can inform us about the research problem directly. However, it can also be problematic because humans change their opinions, hold different views, and evolve in their thinking. Therefore, it is sometimes difficult to clearly define or objectify the problem in order to study it.

Human sciences include fields such as sociology, psychology, geography, anthropology, nursing, accountancy, business, education, and some areas of medicine.

**Research Design**

A research design is the plan that outlines the steps and procedures for conducting research, while considering factors such as time and available resources. Catherine Hakim (1987) defines it as the set of aims, objectives, and intentions within practical constraints such as time, location, funding, and the availability of staff.

She also compares a researcher to an architect who creates a plan but expresses it in his or her own style. Similarly, a researcher projects the research questions and approaches the problem in a personal way — for example, by choosing a qualitative instead of a quantitative approach, or by using a diary instead of an interview. At the end, like an architect, the researcher produces a finished work that is correctly done, yet different from that of others.

**Definition of Research Methodology**

Research methodology is a systematic way of defining a problem, identifying a sample, choosing the right data collection tools, and choosing the right data analysis tools in order to interpret the data.

This systematic process means that the researcher is not going to do research in an informal manner and answer the problem, but rather to go through various steps gradually and use various tools and procedures to answer the problem.

For example, in devising a questionnaire, we need to consider certain basic precepts and principles for devising a questionnaire. Not anyone with good common sense can devise a good questionnaire. So we have to read more and use certain methods.

**Research Philosophies**

There are two main research philosophies: positivism and interpretivism.
Positivism is the oldest philosophy and is mainly associated with the natural or "hard" sciences such as biology and physics. It often relies on experiments and, sometimes, surveys. Research in this tradition usually begins with a hypothesis that is tested deductively through experimentation. Positivism is also linked to measurement, objectivity, and numerical data. It assumes that the object of study is stable and exists independently in the external world.

In contrast, interpretivism views reality as socially constructed, mainly through language and human interaction. Therefore, it is not static but open to different interpretations depending on people and cultures. Interpretivist research generally involves qualitative data and methods such as hermeneutics (the study of texts and meaning), case studies, participant observation, and interviews.

**Research Strategies**

According to Robson (2011), research studies generally fall into three main types: surveys, case studies, and experiments.

**1. Survey**
A survey involves collecting information in a standardised form from a large number of participants (usually between 100 and 1000) through questionnaires or structured interviews. It typically provides limited but broad information compared to the depth obtained in case studies. In terms of methods, surveys often use systematic observation and close-ended questionnaires, though questionnaires are the most common tool.

**2. Case Study**

A case study is an in-depth examination of a single case or a small group of cases. The "case" could be an institution, such as a school or hospital, or a small group of people sharing certain characteristics — for example, patients with HIV. Case studies usually involve a small number of participants, taking into account contextual factors, and they use qualitative methods such as interviews, observation, and document analysis.

A case study can be traditional, focusing on one or very few subjects, or broader, as Yin (2014) explains. It can include a larger sample (around 20 to 30 participants) or an institution such as

a school from which one or two classes are studied. A case study aims to achieve a deep understanding of a research problem from multiple perspectives.

This definition includes several sub-strategies such as ethnography, grounded theory, action research, and archival or historical research.

## 3. Experiment

An experiment usually involves a relatively small number of participants. One group (the experimental group) receives a new treatment or condition, while another group (the control group) remains unchanged. The purpose is to compare both groups to determine whether the new treatment produces a measurable effect. Randomly assigning participants to different groups increases the reliability of results and allows the researcher to establish a cause-and-effect relationship.

**References**
Robson, C. (2011). Real World Research (3rd ed.). Oxford: Blackwell.
Yin, R. K. (2014). Case Study Research: Design and Methods. Sage.

## The Limitations of Social Research

These are the aspects to consider when deciding whether a research paper is of good quality or methodologically flawed.
The research process involves collecting information in a structured and socially approved manner. There are certain criteria that determine whether research is socially acceptable (proper research) or poor research. This depends on the type of data collected, how it is collected, and how it is analysed.

## 1. Reliability

If the investigation were carried out again by different researchers using the same methods, would the same results be obtained?
Reliability tests whether the study, if repeated under similar circumstances, would yield the same results. If it does not, and something unexpected happens, then it is not reliable.

Several threats can affect reliability.
Firstly, participants may give different answers on different occasions simply because they have changed their opinions. Therefore, the researcher is encouraged to focus on more stable facts.
Secondly, subjects may show bias in their responses. They might give different answers to different researchers. For example, if they like the researcher, they might offer the answers they think the researcher wants. Consequently, a skillful researcher should respect the participants but should not pamper them.
Thirdly, researcher bias is another threat to reliability. Researchers sometimes tend to focus only on what they want to observe—that is, they see the data they expect to find.

**2. Validity (Internal Validity)**

Question: Does the evidence reflect the reality under investigation? Has the researcher really found what they claim to have found?

Sometimes, we want to describe a certain reality in the outside world, but that external reality may change because of other factors. For example, suppose we conduct a program to eradicate the fear of flying, and a plane crash happens on the same day. This event will undermine the treatment efforts and affect the validity of the study.
Characteristics of Good Research

**A good research displays many fundamental characteristics.**

1. Systematicity

The first characteristic is systematicity.

2. Replicability

A good research is repetitive and replicable. That is, other researchers would be able to redo and rerun this research by reading your research.

For example, in order for other researchers to be able to replicate a study, they need to read, and the initial researcher needs to give details about how he investigated the problem, what materials he used. So he should describe those materials in detail.

3. Validity

Validity is one of the most important characteristics of good research. A research study is valid when it investigates exactly what is wanted to be investigated. That is, if the research is focusing specifically on the given problem or topic, then it is valid. If the research is not focused on the given problem or topic, then it is not valid.

Valid research is a chain of consistent steps which are harmoniously tied up. First, the title should match the type of approach, the type of research questions, the type of the hypothesis, and all this should also match.

The biggest problem usually occurs in the research questions. Sometimes the students tend to explain the problem rather than addressing the problem. So if the research questions do not match the title or the problem, then the study will be invalid.

4. Reliability

Another important characteristic of a good research is reliability, because we see that a piece of research is reliable if it is rerun again in the same context with the same people using the same procedure and gets the same results, then we can say that the study is reliable.

5. Practicality

Practicality is another important characteristic of a good research. A research study is practical if it is achievable with the available means and within the time framework allotted to this study.

Novice researchers usually make the mistake of being too ambitious and ignoring the practicality of research. A good research should be achievable, as said above, within the available means, time, and methods.

6. Value

Value is an important feature of a good research. A good piece of research or investigation is usually valuable. If we are investigating a problem which will not benefit the readers, the latter will not be interested in reading that piece of research.

7. Originality

Originality is an important trait of good research. We see that a study is original if it addresses a new niche, a new gap in research, an aspect of a problem that has never been covered by other studies. The importance of originality is because we are doing a new research, and we are not repeating it.

8. Objectivity

Objectivity is important in research because the study does not report subjective opinions of researchers or people. Rather, the researcher is using objective procedures and is dealing with the problem in a fair and objective manner.

Objectivity, for example, can be seen in the way questions are asked, whether the research questions or the interview questions or the questionnaire questions. For example, if the researcher is asking leading questions or questions in a way that respondents will answer them in a certain way, then the researcher is not fair; he's biased, and he is violating objectivity.

9. Credibility

Credibility is another important feature of good research. We see that a researcher is credible, meaning he is trustworthy, if he has credentials. But usually novice researchers and unknown researchers are probably less credible than others because they have little credentials or no credentials.

## 10. Accuracy

Accuracy is very important in research. Any research study should not be broad in terms of the framing of the title, the framing of the research questions, or the operationalization of the definitions and the variables. So if the variables are broad, if the research questions are broad, if the questions in the questionnaire are broad, then we are not being accurate.

## 11. Generalizability

Generalizability is a key feature that could determine the validity of a study. If the findings of a study can be generalized and used beyond the target sample, then the study is valuable and more valid. But if the findings of a study cannot be generalized and cannot go beyond the target sample, then the study is not valuable.

## 12. Transparency

Transparency means the researcher is documenting the whole process of research, including a detailed report of the different steps undertaken in research and all the scientific procedures used to validate the research tools and, for instance, to select the sample.

## 13. Ethics

Ethics in research means that the researcher should inform the participants about all the risks that could result from their participation in the study, should not conduct the research without their prior consent, and should not disclose their identity.

**Threats to Reliability**

3. Instrumentation
The way the instruments are administered by researchers might be problematic. For example, they might rate participants differently, which would lead to inconsistent results that are not actually due to the participants' behaviour.
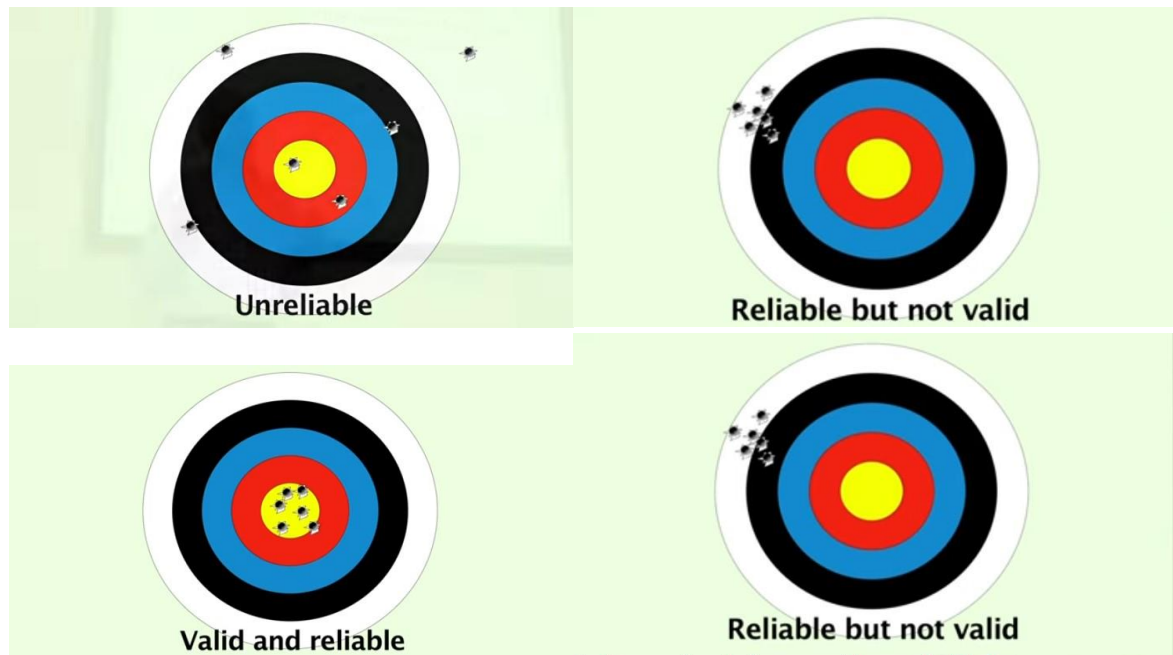
4. Regression Effect
Sometimes regression to the mean might not result from the participants' abilities or backgrounds, but from extraneous factors such as poor sleep, a stressful journey, or health conditions on the day of the test. In addition, it is more likely for top scorers to regress toward the mean and for low scorers to progress toward it. Therefore, a good researcher has to be careful not to draw conclusions too quickly.

5. Compensatory Equalisation
This occurs when the teaching staff of the control group, knowing that they are part of a comparison and that the experimental group is receiving special treatment, work harder to make

up for the missing treatment by spending more time and effort developing their participants' skills and behaviours.


Unreliable


Reliable but not valid


Valid and reliable


Reliable but not valid

## Stages of Research

### 1. Conceptualization of the Issue
The researcher identifies and defines a problem, reviews relevant literature, and formulates the research questions or hypotheses.

### 2. Choosing a Research Strategy
A suitable research strategy (e.g., case study, experimental, or survey) is selected to guide the overall design of the study.

### 3. Selecting Research Methods
The researcher chooses specific methods (e.g., questionnaire, interview, observation) that align with the chosen strategy and research objectives.

### 4. Organizing Practicalities
This stage includes preparing the research instruments (e.g., designing questionnaires or interview schedules) and planning logistics such as sampling and scheduling.

### 5. Data Collection
The researcher gathers data from the field through the selected methods.

### 6. Data Analysis
Collected data are organized, processed, and analyzed to identify patterns, themes, or relationships.

### 7. Reporting

The findings are written up, discussed, and presented, linking them back to the research questions and existing literature.

**Types of Research**

Research can be divided into two types: basic research and practical research.

**Basic Research**

Basic research is a kind of research that does not solve any concrete world or life problem. It is actually trying to give an understanding, a theoretical understanding of the problem, maybe to extend knowledge.

An example of this type is, for instance, investigating the causes of classroom anxiety without looking for ways to apply them in the classroom, without looking for solutions to address the problem in the classroom.

**Practical Research**

Practical research, on the other hand, is more concerned with the practical side, that is, finding solutions for real-world problems, for instance, applying a teaching methodology and looking at how that methodology could be applied in the classroom in order to maximize EFL learners' learning.

**Research Approaches**

Basically, there are two major research approaches: qualitative and quantitative. When these two are combined, we call them mixed methods.

**Quantitative Research**

Quantitative research is based on the positivist view of the world, which considers knowledge as observable, quantifiable, and measurable.

It is a deductive approach that starts with a hypothesis derived from the literature or observation and which is objectively investigated in order to refute it or to validate it.

It uses quantities, as its name indicates. It is more interested in describing quantities or in quantifying the frequencies, as well as establishing causal relationships between different variables.

**Qualitative Research**

Qualitative research, on the other hand, is more concerned with the quality of the answers—I mean, the richness of the responses that we get from other people or from the informants of individuals. And it is based on the subjective opinion and view of the words of the informants.

This research starts with data that we gather in order to build a theory. It is the reverse of quantitative research in that it is inductive.

This bottom-up process starts with collecting massive data from which we observe, examine, and get patterns which will be investigated and, of course, sharpened in order to build correct theories.

This approach could be considered as relatively new. It goes back to the 1960s, and it came as a reaction to positivism. So this interpretivist view is based on the premise that reality is socially built by the people. For instance, the way people view something is very important.

Reality and knowledge are socially constructed, so what is acceptable in certain societies might be unacceptable in other communities. For instance, the way Muslims view life as a passage to a second life is quite different from the way atheists view life as unique, which should be lived to the fullest.

Consequently, according to this approach, there is no one reality to test, but we have different opinions, and what we try to do is to study those opinions in order to arrive at a good understanding of the social phenomenon or phenomena.


**Mixed Methods Research**

Mixed method research is the combination of quantitative and qualitative approaches. It is used according to Creswell in order to take the advantages of each of them and to overcome the disadvantages of each of them. For instance, using just qualitative data could lead to little evidence about the problem.

Likewise, using quantitative research findings would inevitably lead to statistics without a rich understanding or a deep understanding of the problem. So the statistics could be flat and dry and do not give a lively or vivid understanding of the problem.

According to Creswell, there are three major types of mixed methods:

1. Parallel Sequential Design – Two parallel research designs are running together. One is quantitative, with all its data collection tools, data analysis tools, and interpretations. The parallel quantitative and qualitative paradigms, carried out separately, meet only in data analysis. They are then integrated to interpret and solve the problem.

2. Explanatory Sequential Design – It starts with a quantitative phase to investigate the problem and is followed by a qualitative phase to further explore and understand the findings. For example, if 80% of students are anxious in an EFL classroom, we can carry on the study qualitatively to explore their experiences.

3. Exploratory Sequential Design – It starts with a qualitative investigation of a problem, then the findings are used to design a quantitative research tool for further study.

**Other Types of Research**

Types of research can also be classified into descriptive, causal, correlational, and exploratory.

Descriptive Research describes a problem without looking at relationships between variables or causal effects. It takes a snapshot of the phenomenon, describing frequencies, causes, or motives without manipulating variables.

Causal Research investigates cause-and-effect relationships. Variable A is assumed to cause a change in Variable B. This type is usually experimental.

Exploratory Research explores a new problem, usually with qualitative data. It does not start with a hypothesis; rather, it starts with the data and builds a theory from it, like in grounded theory.

Correlational Research establishes relationships between different variables. For example, it may examine the relationship between introversion and classroom participation to determine whether the association is positive or negative.

**A Model for an Introduction: Creswell's (2018)**

The deficiencies model of an introduction is an approach to writing an introduction to a research study that builds on gaps existing in the literature. It includes the elements of stating the research problem, reviewing past studies about the problem, indicating deficiencies in these studies, and advancing the significance of the study. It is a general template for writing a good introduction. It is a popular approach used in the social sciences, and once its structure is elucidated, the reader will find it appearing repeatedly in many published research studies (not always in the order presented here). It consists of five parts, and a separate paragraph can be devoted to each part, for an introduction of about two pages in length:

1. State the research problem.

2. Review studies that have addressed the problem.

3. Indicate deficiencies in the studies.

4. Advance the significance of the study for particular audiences.

5. State the purpose statement

**Sample Introduction**

*The competency-based language teaching approach is used worldwide to prepare future citizens who are competent and equipped with modern skills. Algeria introduced competency-based teaching in its school reform of 2002 to modernize the educational system and prepare competent citizens and academically qualified students. However, it appears that this competency-based language teaching approach, as applied in the Algerian context, is not fully effective. Many schools still rely on traditional methods of teaching, which focus mainly on language forms rather than developing broader competencies such as problem-solving, communication, and collaboration. Previous studies have examined different aspects of the Competency-Based Approach (CBA) in Algeria. For instance, Boukhentache (2019), Boudouaia (2021), and Nebbou (2022) focused on the persistence of traditional language-centered pedagogy and the challenges teachers face in implementing the new approach. These studies revealed that, despite curricular reforms, classroom practices remain largely teacher-centered and exam-oriented, showing little evidence of the intended shift toward learner autonomy and real-life language use. Although several studies (Boukhentache, 2019; Boudouaia, 2021; Nebbou, 2022) have focused on the persistence of traditional language-centered pedagogy in Algerian schools, few have investigated the underlying reasons behind this persistence or how teachers and inspectors understand and apply the Competency-Based Approach in their classrooms. The voices of teachers, inspectors, and learners are still largely absent. Therefore, there is a need for a deeper investigation that explores how the Competency-Based Approach is practiced and experienced in Algerian EFL secondary schools from multiple perspectives. Such a study is valuable as it can clarify the real implementation of the 2002 reform, offer insights for improving teacher training, and guide future curriculum development in the Algerian context.*

**Stage 1: The Research Problem**

According to Creswell, the first sentence in the introduction should have two functions. First, it should serve as a kind of narrative hook, a term drawn from English composition, meaning words that attract, engage, or "hook" the reader.
The second function of this entry sentence is to state the distinct problem.
According to Creswell, in order to learn how to use these hook sentences, one needs to read journal articles and observe how professional writers attract or "hook" their readers in magazines or scholarly pieces.

Secondly, Creswell used the metaphor of lowering a barrel into a well. The beginning writer plunges the barrel into the depth of the well too quickly — the reader sees only unfamiliar material and may lose interest.

The experienced writer, on the other hand, lowers the barrel slowly, allowing the reader to adjust to the depth of the study. This process begins with a narrative hook of sufficient generality so that the reader can understand and relate to the topic.

This means that the writer or the scholar should start from broad and general ideas without giving details too early. Details will be given later in the introduction.

Identifying the Issue or Problem

Third, it is important to identify the issue or the problem that leads to the need for the study.

We arrive at stating the problem and the need for studying this problem by asking questions such as:

What is the need for this study?

What problem influenced the need to undertake this study?

For example, in the simple introduction stated above, the need for this study is that Algerian schools are not properly applying competency-based language teaching (CBA), although it was meant to encourage the development of modern competencies.

Guidelines for Writing a Good Statement of the Problem

A. Write an open sentence that stimulates the reader's interest and conveys an issue that a broad audience can relate to.

B. At this stage, refrain from using quotations, which might be difficult for readers to understand so early.

C. Stay away from idiomatic expressions or trite phrases, such as "the lecture remains a sacred cow."

D. Use numeric information or statistics for impact.
For example: "80% of the teachers are still unfamiliar with the basic precepts of CBA."

E. Clearly identify the research problem that is guided by the issue leading to the study. Ask yourself:
"Is there a specific sentence in which I convey the research problem?"

F. Make sure that the problem is framed in a way that is consistent with the approach to research in the study — whether exploratory, qualitative, or quantitative — or whether it uses a mixed-method or inquiry-based approach.

G. Consider whether the study is addressing one single problem or multiple problems. Often, studies may involve multiple interrelated problems.

**Stage 2: Studies Addressing the Problem**

It is imperative to start citing and sharing studies that have previously addressed the problem. However, at this stage, the review should not be extensive. It should summarize the major studies on the topic in the form of themes or topics.

It is later, in the literature review chapter, that the researcher will extensively review most or all studies related to the topic.
The function of reviewing previous studies in the introduction is:

1. To justify the importance of the current study.

2. To distinguish the present study from previous ones.

In terms of what types of studies should be included, Creswell recommends that the review should include empirical studies — those that use clear research questions, data collection, and analysis.

In the case of a qualitative study, however, there may be no directly related or narrowly linked studies to the topic. In that case, it is important to review neighboring or related studies that can illuminate the topic from similar perspectives.

1. Review studies by summarizing groups of studies, not individual ones.

2. Review studies that used quantitative, qualitative, or mixed-methods approaches.

3. Find recent literature, preferably published in the past ten years, and cite older studies only if they are valuable or widely referenced.

4. Start with a clear purpose: to justify the study, show what is known, and identify what is missing.

5. Organize by themes, not by author names.

6. Move from general to specific ideas.

7. Be critical, not descriptive — evaluate strengths and weaknesses.

8. Identify the research gap (missing population, context, method, or perspective).

9. Use academic databases (ERIC, Scopus, Google Scholar, JSTOR) and prioritize peer-reviewed works.

10. Use numeric information and statistics for impact.

11. Relate the review to your own study after each theme.

12. Be concise in the introduction; save detailed discussion for the full literature review.

13. Focus on empirical studies with actual data and analysis.

14. For qualitative research, review related or neighboring studies carefully.

15. Use a consistent citation style throughout.

16. End with a summary paragraph highlighting key insights and the research gap.

17. Clarify whether your study addresses a single or multiple problems.

**Stage 3: Deficiency in the Previous Studies**

After presenting or discussing previous studies in groups or series that represent different topics, it becomes necessary to critically examine those studies in order to identify the research gap and justify the need for a new and original investigation. If the scholar does not highlight the weaknesses or limitations of previous works, there will be no clear reason to continue researching the same topic.

There are several ways in which a researcher can identify a niche or gap to justify further study. The first way is to discover an unexplored aspect of the research problem. For example, if earlier studies examined the causes of classroom anxiety such as peer criticism, teacher feedback, lack of self-confidence, and low language proficiency, the researcher might find it valuable to explore the effect of students' social background.

Secondly, regarding the sample, the researcher could choose to study the same topic with a completely different group of participants. Thirdly, the researcher may adopt an alternative research approach, such as using a qualitative instead of a quantitative design. Fourth, applying different research methods, for example conducting an experiment instead of a case study, is another possible way to fill a research gap. Finally, the researcher may employ a different research tool, such as using interviews instead of questionnaires.

**Stage 4**: **The Significance of the Study in the Introduction**

Creswell explains that after establishing the research problem and stating the purpose of the study, the introduction should address the **significance of the study**. The significance section answers the implicit question: *Why does this research matter?* It demonstrates the value of the study and justifies why it deserves scholarly attention.

The significance of the study is typically developed through **three interrelated stages**.

**1. Identifying Who Will Benefit from the Study**

The first stage involves identifying the **audience or beneficiaries** of the research. Creswell stresses that researchers should explicitly state who will gain from the findings. In social research, these beneficiaries may include researchers, educators, policymakers, institutions, practitioners, or specific social groups.

By identifying beneficiaries, the researcher clarifies the relevance of the study beyond personal interest. This stage situates the research within a broader social, educational, or academic context.

**2. Explaining How the Study Will Benefit Them**

The second stage involves explaining **how** the study will contribute to these audiences. Creswell highlights that significance should not be stated in vague terms, such as "this study is important," but should be supported with specific explanations.

In quantitative research, significance may lie in testing or extending existing theories, validating instruments, or providing empirical evidence. In qualitative research, significance may involve offering in-depth insights into lived experiences, uncovering new perspectives, or giving voice to underrepresented groups. In mixed methods research, significance often stems from providing a more comprehensive understanding of a problem by integrating numerical trends with qualitative explanation.

This stage demonstrates the practical, theoretical, or methodological contributions of the study.

**3. Linking the Study to Gaps in Existing Literature or Practice**

The final stage involves linking the significance of the study to **gaps or limitations in existing research or practice**. Creswell emphasizes that significance is strongest when the researcher shows that the study addresses an area that has been neglected, underexplored, or inadequately understood.

By positioning the study as a response to a gap, the researcher reinforces its necessity and originality. This stage also strengthens the logical flow of the introduction, connecting the problem statement, the purpose, and the contribution of the research.

Stage 5: **The Aim (or Objectives) of the Study in the Introduction**

According to Creswell, the introduction of a social research study establishes the overall direction of the inquiry by clearly stating the **aim or purpose of the study**. The purpose statement occupies a central position in the introduction because it informs the reader of what the researcher intends to accomplish and how the study will contribute to knowledge.

The **aim of the study** is a broad declaration that captures the general intent of the research. It identifies the central phenomenon, process, or relationship under investigation and situates it within a specific context or population. In social research, the aim often reflects the researcher's attempt to explore, describe, explain, or understand a social issue.

Creswell emphasizes that the purpose statement should be **clear, concise, and aligned with the research approach**. In quantitative studies, the aim typically focuses on examining relationships among variables, testing theories, or determining the effect of one variable on another. In qualitative studies, the aim centers on exploring meanings, experiences, or social processes from participants' perspectives. In mixed methods research, the aim explicitly integrates both quantitative and qualitative components, indicating how they will work together to address the research problem.

From the general aim, more **specific objectives** may be derived. Objectives break down the overall purpose into manageable components and clarify what the researcher will do in concrete terms. These objectives guide data collection and analysis and ensure coherence between the research questions, methods, and expected outcomes.

In Creswell's framework, a well-formulated aim or objective:

- reflects the research problem,
- signals the methodological orientation,
- and prepares the reader for the research questions that follow in the introduction.

## Research questions

In qualitative research, investigators formulate **research questions** rather than objectives or hypotheses. These questions aim to explore meanings and experiences rather than test variables. A qualitative study typically includes **one or two broad central questions** supported by **five to seven subquestions** that guide interviews or observations.

The **central question** should be open-ended, beginning with *what* or *how*, to encourage exploration rather than explanation. It should focus on **one main phenomenon or concept**, allowing a deep understanding of participants' perspectives.

Subquestions narrow the focus but remain flexible. They often form the basis of interview questions and evolve throughout the study, reflecting the **emerging design** characteristic of qualitative research.

The phrasing of questions should match the **research approach**:

- **Narrative research:** report or reflect on stories
- **Phenomenology:** describe the essence of an experience
- **Grounded theory:** discover or generate a theory
- **Ethnography:** seek to understand cultural meanings
- **Case study:** explore a process or issue

Researchers should avoid cause-and-effect terms like *influence* or *determine* that suggest quantitative reasoning. Instead, they should use exploratory verbs such as *describe*, *discover*, or *explore*.

Questions may be revised as the study progresses, and unless the design requires it, they should not refer directly to existing theory or literature. A typical qualitative question identifies the **phenomenon**, **participants**, and **site** of the study (e.g., "What is the meaning of [phenomenon] for [participants] at [site]?").

Examples include ethnographic studies exploring cultural beliefs or case studies examining individuals' lived experiences, all emphasizing open inquiry and participants' voices.

**Quantitative RQ**

In **quantitative research**, investigators use **research questions**, **hypotheses**, and sometimes **objectives** to clearly define and focus the study's purpose. These elements seek to examine **relationships among measurable variables**, make **predictions**, and test **theoretical assumptions** using statistical procedures.

Quantitative research questions typically ask about:

- **Descriptions** of variables (e.g., frequency or variation of scores),
- **Relationships** between variables (e.g., correlations), or
- **Differences** between groups (e.g., experimental comparisons).

**Hypotheses** are predictive statements about expected relationships or differences:

- **Null hypotheses ($H_0$)** predict no significant relationship or difference.
- **Alternative hypotheses ($H_1$)** predict the presence of a relationship or difference.

- o **Directional hypotheses** specify the expected direction (e.g., "Group A scores higher than Group B").
- o **Nondirectional hypotheses** state a difference exists without specifying direction.

Researchers are advised to write **either research questions or hypotheses**, not both, unless hypotheses build upon the questions. The choice depends on the study's purpose, theoretical framework, and prior literature.

Variables are classified as:

- **Independent variables** (causes or predictors),
- **Dependent variables** (outcomes),
- **Mediating variables** (explain the relationship), and
- **Moderating variables** (influence the strength or direction of the relationship, often demographic factors).

Quantitative studies usually follow one of three approaches:

1. **Comparing groups** (experimental design),
2. **Relating variables** (correlational design), or
3. **Describing variables** (descriptive design).

When writing hypotheses, researchers should use consistent wording and order—placing the **independent variable first**, followed by the **dependent variable**—to make relationships clear.

Ultimately, quantitative research is **theory-driven**, **variable-focused**, and **statistically tested**, aiming to verify or reject predictions about measurable relationships in a population.

**Descriptive and inferential model**

**Summary**

This model provides a structured way to write **quantitative research questions and hypotheses** by combining **descriptive** and **inferential** elements.

Researchers first pose **descriptive questions** to outline and measure key variables—**independent**, **dependent**, and any **moderating** or **mediating** variables. These questions describe the characteristics or current state of each variable (e.g., "How do students rate on critical thinking skills?").

Next, they formulate **inferential questions or hypotheses** to examine **relationships** or **comparisons** among these variables and to test predictions derived from the data (e.g., "How does critical thinking ability relate to student achievement?").

The model emphasizes:

**1. Introduction: What Is a Research Hypothesis?**

A **research hypothesis** is a specific, testable prediction about the expected relationship between variables in a **quantitative** or **mixed methods** study. Creswell describes hypotheses as "signposts" because they direct the researcher toward what will be tested and what the results might show.

A hypothesis tells us **what we expect to find**.

A strong hypothesis must be:

- **Testable with data**
- **Based on theory or previous research**
- **Clear and specific**
- **Focused on measurable variables**

Hypotheses do *not* appear in qualitative research, because qualitative studies explore rather than predict.

**2. Components of a Hypothesis**

Every hypothesis contains:

**1. Independent Variable (IV)**

The variable that predicts, explains, or influences something else.

**2. Dependent Variable (DV)**

The outcome you measure.

**3. Possibly other variables**

- Mediating variables
- Moderating variables
- Control variables

Creswell emphasizes the importance of listing variables in the order:

**IV → DV → (others if needed)**

**3. Major Types of Hypotheses**

Researchers may use different types of hypotheses depending on the purpose of the study. Below is a full classification including *all* the categories used in standard methodological literature and Creswell's framework.

## A. Null Hypothesis ($H_0$)

Predicts **no relationship**, **no effect**, or **no difference**.

Used in statistics to test whether any observed effect occurred by chance.

**Examples**

- *There is no significant difference in reading scores between male and female EFL learners.*
- *There is no relationship between motivation and speaking fluency.*

## B. Alternative Hypothesis ($H_1$)

Predicts that **a relationship or difference exists**. This can be either **directional** or **nondirectional**.

### 1. Directional Alternative Hypothesis

Specifies the direction of the effect or relationship.

**Examples**

- *Students taught through cooperative learning will achieve higher scores than those taught traditionally.*
- *There is a positive relationship between study time and exam scores.*

Use when theory or prior research strongly supports a direction.

### 2. Nondirectional Alternative Hypothesis

Predicts the existence of a relationship or difference, **but without direction**.

**Examples**

- *There is a difference in vocabulary achievement between students using digital dictionaries and those using paper dictionaries.*
- *There is a relationship between anxiety and oral performance.*

Use when literature is insufficient to predict direction confidently.

## C. Descriptive Hypothesis

Predicts a **value**, **level**, or **state** of a single variable.

It does not examine relationships or differences.

**Examples**

- *Students' self-efficacy scores will be moderate.*
- *Most Algerian EFL learners will use translation as their primary vocabulary learning strategy.*

Useful in surveys and descriptive studies.

**D. Correlational Hypothesis**

Predicts an **association** between two or more variables. It does **not** assume causation.

**Forms:**

- Positive correlation
- Negative correlation
- Zero correlation

**Examples**

- *There is a positive relationship between learners' motivation and their speaking fluency.*
- *Test anxiety is negatively related to reading comprehension.*

Used in correlational (relationship-based) research designs.

**E. Comparative (Difference) Hypothesis**

Predicts a **difference between two or more groups** on a DV.

**Examples**

- *Female students will score higher than male students in writing proficiency.*
- *Students taught through blended learning will outperform those taught through face-to-face instruction.*

Used in comparative and causal-comparative research.

**F. Predictive Hypothesis**

Predicts that one variable can **predict** another variable.

Often uses regression analysis.

**Examples**

- *Students' attitudes toward English will significantly predict their willingness to communicate.*
- *Vocabulary size will predict reading comprehension levels.*

Used in predictive correlational designs.

**G. Causal (Experimental) Hypothesis**

Predicts that manipulating an IV will **cause** a change in the DV.

**Examples**

- *Providing explicit feedback will improve grammar accuracy.*
- *Using task-based instruction will increase learners' speaking confidence.*

Common in true experiments and quasi-experiments.

**H. Complex Hypothesis**

Predicts relationships involving **two or more IVs, DVs, or both**.

**Examples**

- *Motivation and self-efficacy together will significantly predict speaking performance.*
- *Instructional method and gender will interact to influence writing achievement.*

Used in multifactor or advanced statistical designs.

**4. How to Write High-Quality Hypotheses**

To write strong hypotheses, Creswell recommends:

 **1. Keep them aligned with theory:** Hypotheses must be grounded in what scholars already know.

**2. Use measurable variables:** Avoid abstract, unmeasurable concepts unless they can be operationalized.

**3. Write in clear and simple language**

**4. Use the correct form depending on the purpose:** For example, use a correlational hypothesis in a correlational study.

**5. Avoid mixing questions and hypotheses:** Choose one approach unless your study design requires both.

## 5. Examples of Hypotheses Organized by Design

### A. Descriptive Study

- H: *The average writing anxiety level of Algerian secondary-school EFL learners will be moderate.*

### B. Correlational Study

- $H_1$: *There is a significant positive relationship between motivation and vocabulary size.*

### C. Predictive Study

- $H_1$: *Motivation will significantly predict vocabulary size.*

### D. Comparative Study

- $H_1$: *Female students will perform better than male students in reading comprehension.*

### E. Experimental Study

- $H_1$: *Students who receive peer feedback will have higher speaking fluency than those who do not.*

## 6. Placement of Hypotheses in the Research Report

In a thesis or article, hypotheses usually appear after:

1. **The introduction**
2. **The literature review**
3. **The theoretical framework**

They often follow this order:

1. **Descriptive questions/hypotheses** (if any)
2. **Correlational hypotheses**
3. **Comparative hypotheses**
4. **Predictive or causal hypotheses**

This creates a logical progression from describing → relating → comparing → predicting.

## 7. Testing Hypotheses

Hypotheses determine:

- Which statistical tests to use
    - t-tests / ANOVA for comparative hypotheses
    - Correlation/regression for correlational and predictive hypotheses
    - Experimental tests for causal hypotheses
- How results are interpreted

Researchers either:

- Reject the null hypothesis ($H_0$)
- Fail to reject the null hypothesis

They do **not** say a hypothesis is "proven," only supported by evidence

**8. Common Mistakes to Avoid**

- Vague hypotheses with unclear variables: Always define variables precisely

- Predicting something you cannot measure:  Use operational definitions

- Using directional hypotheses without strong justification: Only predict direction if literature supports it

- Mixing research questions and hypotheses: Choose the appropriate form based on your study design

**Conclusion**

Hypotheses are essential in quantitative and mixed methods research. They transform abstract theories into concrete, testable statements. By understanding and using different types of hypotheses—descriptive, correlational, comparative, predictive, directional, nondirectional, null, complex, and causal—researchers can design rigorous studies and conduct appropriate analyses.

A good hypothesis is:

- Clear
- Theoretically grounded
- Matched to the research design
- Testable
- Structured around measurable variables

Mastering hypotheses leads to stronger research, clearer results, and meaningful contributions to scientific knowledge.

- Clearly identifying the **independent variable first**, then the **dependent**, and finally any **mediating or moderating** variables.
- Using **demographic factors** (like prior grades) as moderating rather than central variables.
- Ensuring all questions flow logically from an underlying **theoretical framework**.

In sum, this descriptive–inferential model helps organize research questions systematically—first describing variables, then analyzing how they relate or differ—to provide a coherent structure for quantitative studies.

**Conclusion**

In a nutshell, these characteristics ensure the psychometric validity and reliability of the questionnaire, enhance its practicality, and take into account the perspectives of the respondents.

**Sampling**

**Sample**, **population**, and **representativeness**

**The sample** is the group of participants whom the researcher actually examines in an empirical investigation. In other words, it is a **subset** of a population.

**The population** is the group of people whom the study is about. It is the entire group that shares a set of characteristics.

For example, the population in-a study might be EFL learners in Algerian secondary schools and the actual sample might involve three Taiwanese secondary classes. That is, the target population of a study consists of **all the people** to whom the survey's findings are to be **applied or generalized.**

**Representativeness:** It refers to how closer the sample mirrors the characteristics of a group (for example, age, gender, ethnicity, educational background, academic capability, social class, or socioeconomic status).

- Why shouldn't we include the whole population? impossible, unnecessary and a waste of time and resources.
- Only in census, we have a complete population to guide policy.

**Two types of samplings**: Probability and non-probability sampling

**Probability sampling**

Random sampling The key component of probability sampling is 'random sampling' . This involves selecting members of the population to be included in the sample on a completely random basis, a bit like drawing numbers from a hat (for example, by numbering each member and then asking the computer to generate random numbers).

**Stratified sampling**:  It is  a method of sampling in which the population is divided into smaller groups, called strata, based on shared characteristics (e.g., income, education level, and age). The, random sampling is done with any  stratum.

**Systematic sampling** II1. anonymous surveys it can be difficult to make a random selection because we may, have no means of identifying the participants in advance and thus their names cannot be 'put in the hat' (Cohen et al. 2000). A useful technical shortcut is in such cases to apply 'systematic sampling', which involves selecting every nth member of the target group.

**Cluster sampling One** way- of making random sampling more practical, especially when the target population is widely dispersed, is to randomly select some larger groupings or units of the populations (for example,- schools) and then examine all the students in those selected units.

- **Quota sampling:** is a non-probability sampling technique where researchers divide population into sub-groups (quotas) based on specific characteristics (e.g., age, gender, income) and then selects participants from sub-groups to meet quotas. For example, if a researcher has to survey people opinions about a given product, he/she has to divide the population into quotas of age like people aged between 13 and 25, 26 and 50, and more than 50. The selection is done non-randomly.
- **Snowball sampling** This involves a 'chain reaction' whereby the researcher identifies a few people who meet the criteria of the particular study and then asks these participants to identify further appropriate members of the population. This technique is useful when studying groups whose membership is not readily identifiable (for example, teenage gang members) or when access to suitable group members is difficult for some reason.
- **Convenience or opportunity sampling:** The most common sample type in L2 research is the 'convenience' or 'opportunity sample', where an important criterion of sample selection is the convenience of the researcher: members of the target population are selected for the purpose of the study if they meet certain practical criteria, such as geographical proximity, availability at a certain time, easy accessibility, or the willingness to volunteer. Captive audiences such as students in the researcher's own institution are prime examples of convenience samples.
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