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Mohamed Kheider University of Biskra

Faculty of Letters and Languages

Department of Foreign Languages

Section of English

Lectures of Methodology

for Master Two Students

By Dr. Saliha Chelli

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Part one

Basics of Research

Lecture 1

Lecture Objectives: Introduction to research

In this lecture, the student will

- Be introduced to research.
- Identify the characteristics of good researchers.
- Understand the research process.

1. What is meant by research?

The word research is composed of two syllables: re and search

Re is a prefix meaning again, anew or over again

Search is a verb meaning to examine closely and carefully, to test or to probe. Together, they form a noun describing a careful, **systematic**, patient study and investigation in some field of knowledge, undertaken to establish facts or principles.

Research is:

- **Hunting for facts or truth about a subject.**
- **An organized scientific investigation to solve problems, test hypotheses, develop or invent new products.**

2. What characteristics do we need to be good researchers?

According to Dörnyei (2007: 17-18), the characteristics of good researchers are:

- The primary characteristic of good researchers is that they have a genuine and strong **curiosity** about their topic. They are always after something intriguing or puzzling or about which they have a hunch (in research terms, a hypothesis). Serious research will inevitably require some hard work and the only way to maintain our momentum and creativity throughout the laborious parts is to be driven by our passion for the topic. It is why it is advisable for novice researchers to choose topics that they are genuinely interested in rather than one that seems sensible from a career point of view.
- The second reason is **common sense**.
- The third aspect of successful research is **having good ideas**. Many of the best known studies in applied linguistics are not at all complicated in terms of their research methodology but they are based on fairly simple but original insights.
- Finally, a good researcher needs to be **disciplined and responsible**. This is related to the systematic nature of research. During the course of investigation, there are recurring temptations to cut corners, to leave out some necessary steps and to draw conclusions that are not fully supported by the data. It is the researcher's discipline that keeps him/her on the right track. The lack of discipline or consistency is one of the frequent sources of inadequate research.

- An important related characteristic is that a good researcher should have a sense of social responsibility; that is, accountability to the field and more broadly to the world. This means that a good researcher needs to learn to communicate his/her findings with others.
- Other characteristics can be: commitment, having good written and verbal communication skills, having an analytical mind...

Research is systematic because it follows certain steps that are logical in order. These steps are:

- Understanding the nature of the problem to be studied and understanding and identifying the related areas of knowledge,
- reviewing literature to understand how others have approached or dealt with the problem,
- collecting data in an organized and controlled manner so as to reach a valid decision,
- analyzing data appropriate to the problem,
- drawing conclusions and making generalizations.

The research process can be translated in this diagram (adapted from Kothari, 2005, p.11)

Research Problem formulation	Literature review	Hypothesis	Research design		Interpreting	Reporting
			Collection of data	Analysis of data (testing the hypothesis if any)		

Prior to collecting any data, researchers must typically identify a topic area of interest, conduct a literature review, formulate a research question, articulate hypotheses, determine who or what will be studied, identify the independent and dependent variables that will be examined, and choose the appropriate methodology (Marczik,G, Dematteo,G & Festinger, 2005, pp.26/27)

3. Test yourself and train in writing

- Write a paragraph in which you show how research is a systematic process.
- Write an essay of no more than 35 lines on the following subject:

Based on class discussion, your reading as well as your opinion, what are the essential characteristics of good researchers?

- What is meant by common sense?

Lecture 2

Lecture objectives

In this lecture, the student will

- understand the characteristics of a research problem.
- understand the characteristics of good research questions.
- understand the purpose of a literature review.
- understand the process of a literature review.
- formulate research questions and hypotheses.

1. Identifying a research problem

1.1. What is a research problem?

A research problem is the topic you would like to address, investigate or study, whether descriptive or experimental. It is a challenge you are interested in.

1.2. Where can you find a problem?

As you are going to commit yourself to a significant investment of time and energy, you must choose a topic you are interested in. This can be based on:

- **Everyday life** is one common source of research ideas.
- **Your own experience** as a learner, a teacher, a parent...
- **Practical issues** can be an excellent source of research ideas (current problems facing students, teachers...). What research topics do you think can address some of these current problems?
- **Past research** can be an important source of research ideas because a great deal of research has been conducted on various topics. Besides, while examining thoroughly past research, you can find a gap in literature to be filled. Moreover, most of the dissertations and thesis are ended with questions for future research.

According to Walliman (2001, p.24) 'the most features that can lead you to a suitable research problem are:

1. It should be of great interest to you.
2. The problem should be significant
3. It should be delineated.
4. You should be able to obtain the information required
5. You should be able to draw conclusions.
6. You should be able to state the problem clearly.

Aids to locating and analysing problems

Booth et al. (1995, p.36, cited in Walliman, 2001) suggest that the process for focusing on the formulation of a research problem looks like this:

1. Find an interest in a broad subject area (problem area).
2. Narrow the interest to a plausible topic.
3. Question the topic from several points of view.
4. Define a rationale for your project.
- 5.

1.3 Statement of the problem in your research proposal

The **statement of the problem** is the **foundation for the construction of any research proposal**. It serves as the basis for determining research objectives, formulating hypotheses and planning research design. It allows the researcher to **describe the problem systematically, to reflect on its priority and to point out why the research on the problem should be undertaken**.

A problem might be defined as the issue which exists **in literature, theory or practice that leads to a need for the study** (Creswell, 1994; p. 50). Effective statement of the problem answers the question: why does the research need to be conducted. This is where you present the hole or holes (gaps) in the existing literature.

2. Literature review

After the identification of your research idea and a general problem that sounds interesting to you as well as to the field of investigation, you need to know about what has been published on your topic. This will help you to check if your topic has been researched and whether it requires revision. Moreover, the literature review can help you in designing the study. The most important thing is that after a thorough literature review, both your specific research questions and the design of the study will be clearer.

Literature review in your research proposal is to:

- Situate your research in the context of what is already known about a topic.
- It needs to show how your work will benefit from the whole.
- It should provide a theoretical basis for your work, show what has been done by others and set the stage for your work.

Very simply, literature review needs to address the following main issues:

- What is known about the research problem?
- What are the gaps?
- Where and how does the proposed research fit into this picture?
- What contribution will the proposed research make to the existing academic knowledge and how will it enrich current practises?

Sources of information include:

- Books
- Journals
- Computer databases such as ERIC
- Dissertations and thesis abstracts

Remark: Before carrying the research, you need to assert if it is feasible or not in terms of time, resources, population/ sample... In other words, you need to design a study that can be carried out methodologically and ethically.

3. Research purpose, research questions and research hypotheses

The research purpose, research questions and research hypotheses are closely related. Therefore, this requires from the researcher careful and deep thinking in order to formulate these statements.

3.1. Research purpose

It is a relatively short statement (no more than a paragraph) that describes the objective of the study, explaining why the investigation is undertaken and what its potential significance is (Dörnyei, 2007, p.73). The purpose statement identifies the variables, population and setting for a study. It should explain the final conclusions that the research intends to reach.

You can start the purpose section by:

- The general purpose of the study:
Example: The overall purpose of this study is to examine the effect of listening texts on developing second year students stress placement at the Department of Foreign Languages, Section of English at Biskra University..

Once the overall purpose has been presented, write a specific purpose about each key variable.

The study might include:

- Identify how often students are exposed to listening texts.
- Determine the effects of listening texts on two syllable simple words: verbs, adjectives, adverbs and nouns.
- Then, on three syllable simple words: verbs, adjectives, adverbs and nouns.
- Complex words: words + affix, compound words.

3.2. Research questions and hypotheses

After the completion and digestion of the literature review, the next step is to ask research questions.

Their role is to translate the research purpose into specific research questions that the planned study aims to answer (ibid.). That will not only help you ensure that you know what you are going to research, but also enable you to communicate your ideas to others and guide you in the research process.

3.2.2. What is a research question?

A research question is a way of expressing your interest in a problem or phenomenon. You may have one or more than one question, depending on the complexity and breadth of the proposed work.

Good research questions provide orientation to the research methodology that can achieve the research purpose (Dörnyei, 2007, p.73).

Identifying research questions

The first and perhaps the most difficult aspect of any research undertaking is the identification of research questions (Mack & Gass, 2005, p. 16). Most research texts suggest that the proper way to do research involves first generating one or more questions and then choosing the design, the method and the instrument that allow the researcher to find answers to these questions (op.cit.). The research questions are of great importance because they drive the design.

* We need to keep in mind that the **feasibility of a study** may depend on a number of factors:

- **Breadth** of the study in relation to its research questions' scope and answerability.
- Whether it will be possible to obtain the data necessary to **answer the questions**.

Therefore, one of the most difficult aspects of any research understanding is the identification of appropriate research questions.

- Research questions need to be **interesting** in the sense that they address current issues,
- They need to be **sufficiently narrow** (specific) and constrained so that they can be answered.
- Broad questions can be difficult if not impossible to be addressed without breaking them down into smaller answerable questions.

Good research questions

- Are specific.
- Are clear.
- Refer to the problem or phenomenon.
- Reflect the intervention in experimental research.
- Note the target group of participants

For example: What is the effect of the native language on the learning of a second or a foreign language?

This cannot be answered because it is a research area, but not a specific question

How can you narrow or make it specific?

The researcher might investigate the effect of the native language on specific aspects of a target language (e.g., phonology, syntax...).

Examples of good research questions

- Will the use of the Self-Regulated Strategy Development Model for written expression improve the composition skill of students with ADHD (Reid&Lienemann, 2006)?
- Would students in classroom of teachers receiving professional development in early little skill show greater gains in cognitivedevelopment when compared to those in control classrooms (Landry, Swank, Smith, Assel & Gunnewig, 2006)?
- Would a combined repeated reading question generation intervention improve the reading of fourth-through eighth grade students with learning disabilities or who are at risk for reading failure (Therrien, Wickstorm & Jones, 2006)?
- What are the beliefs and self-perceived knowledge of middle school general education mathematics teachers regarding teaching students with learning disabilities (DESimone & Parmar, 2006)?
- Does the use of metacognitive strategies predict reading performance on standardized tests for Chinese immigrant children?

Remember that

- The research ideas need to be **current**, we should check whether the research questions have not been answered in the literature, or have only partially been answered and require further additional research.
- Most questions come **from a reading of the literature** and an understanding of the history of current issues. Extensive reading and analysis of existing research can lead to the identification of gaps that may strike a reader as important.
- We can develop research questions through **suggestions made by other researchers**
- But the researcher must make sure that others have not conducted such studies. A first step in the process is to consult the university library. Another way of locating relevant information is through web-based search.
- On other occasions, ideas for research might stem from observing learners either in or out of a classroom context or through some **general feeling or curiosity**.

3.2.3 Hypotheses

Research problems are generally expressed in terms of research questions and/or hypotheses. Research questions are questions for which answers are sought, whereas hypotheses can be used to express what the researcher expects the results of investigation to be.

- They are based on observation or on what the literature suggests the answers might be.
- There are times when, because of lack of literature, hypotheses cannot be generated because the research is dealing with something new and/or unexplored (Mackey & Gass, 2005, p.19).

A research hypothesis is essentially a declarative statement of how you expect the research to turn out. In a way, it is a possible answer to your research question. It is a statement that can be an alternative or a null hypothesis.

A hypothesis is a specific testable prediction about what would happen in a study. It provides a tentative explanation for a phenomenon under investigation (Leedy & Ormrod, 2001).

It is a formal statement that presents the expected relationship between an independent and dependent variable (Creswell, 2001.)

An alternative hypothesis, H₁, is a statement of what a statistical test is set up to establish.

A null hypothesis, H₀ is a type of hypothesis in statistics that proposes that no statistical significance exists in a set of given observations.

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They can take different forms depending on the questions being asked and the type of study being conducted. Some may simply describe how two things are related. Others may hypothesize that one variable causes change in another one/ or effect on another one.

Examples

Alternative hypothesis: Students make errors in the use of prepositions because of the native language interference.

Null hypothesis: Students do not make errors in the use of prepositions because of the native language interference.

Once the test has been carried out, we either reject H₀ in favour of H₁ or accept it.

The alternative can be **directional or non-directional**.

The directional, also called **one tailed**, predicts that there will be a difference between groups and specifies how the groups will differ.

Example: Boys will perform better than boys in speaking if they are exposed to authentic listening texts. (shows the direction)

The non- directional hypothesis, also called **two tailed**) predicts that there will be a difference between groups without specifying the direction of this difference.

Example: There will be a difference in the performance of girls and boys in speaking if they are exposed to authentic listening texts. (not defining what kind of difference)

Paradigmatic differences in formulating hypotheses

According to Dörnyei(2007, p.74),

Qualitative and quantitative studies differ considerably in terms of how the purpose of the investigation is specified and how it is broken into specific research questions. In quantitative studies, it is generally true that the more specific the research purpose/ question, the better. Thus, good quantitative purpose statements often identify the target variables and causal or descriptive relationship between them to be examined. The research questions, then, specify concrete methodological procedures, and research hypotheses are also drawn up containing the researcher's predictions.

He adds that:

QUAL research purposes and questions are often vaguer than their QUAN counterparts... They tend to be broader than quantitative ones, often focusing on the big picture or the main processes that are shaped to shape the target phenomenon- usually it is not possible to be more specific at this stage without limiting the inquiry and, therefore, investigators emphasize the exploratory nature of the study instead.

In a **quantitative research** study, specific hypotheses are developed from the literature review. A hypothesis is the researcher's prediction of the relationship that exists between variables being investigated.

However, in qualitative research, the hypotheses may be generated as the researchers gain insights into what is being studied.

4. Characteristics of a Good Title

Research is a comprehensive task that requires great effort on the part of the researcher. The first thing that determines your research is your topic. A good research topic should have the following qualities:

- **Clarity** is the most important quality of any research topic. It should be clear so that others can easily the nature of your research. It should have a single interpretation so that people cannot be distracted. It should be clear in your mind and free of ambiguity.
- **Well defined:** it should have a single meaning.
- **The language** used should be simple.

- **Length:** it should be neither too short nor too long. A general recommendation is from 5 to 10.
- **It should follow rules of titling**
- **It should be of current importance.** It should provide benefit to the field in which you are conducting the study.

5. Test yourself

A. Study these topics and give your opinion about them.

- The Effects of the Process Approach on Learners' Written Productions
- Attitudes on the Use of Collaborative Learning in Writing
- An Investigation on the Impact of ICT's on learning English
- The Role of Motivation in English Foreign Language Learning in the Algerian School
- An Investigation on the Impact of Formulaic Language on Developing Learners' Conversational Competence

B. Try to formulate research questions and a hypothesis based on these research topics

A. The Effects of Integrative Grammar in Teaching Academic Writing

B. An Investigation of the Effects of Vocabulary Learning Strategies on Developing Learners' Lexical Competence

3. Think of other qualities that can make your title a good one.

Lecture 3

Important Concepts Related to Research Design

Lecture objectives

In this lecture, the students will

- Identify the two main variables: the independent and dependent variables.
- Know other types of variables that can interfere in research and make the difference between them.
- Know the difference between categorical and continuous variables.
- Know the difference between qualitative and quantitative variables

1. Definition of research design

A research design is the arrangement of conditions for the collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure (Kothari, 2005, p.31).

After the selection of the topic, the literature review, the formulation a research problem and hypothesis, it would be helpful to identify what variables will be the focus of the study.

2. Variable types

In order to carry out any sort of measurement, we need to think about variables; that is, characteristics that vary from one person to person, text to text, or object to object. Simply put, variables are features or qualities that change (Mack & Gass, 2005).

There are many categories of variables that can appear in research studies, however, the focus will be on the most common ones.

There are two main variables types: independent and dependent:

2.1. Independent variables

The independent variable is the one we believe may cause the results. It is manipulated to determine its effects on the dependent variable.

2.2. Dependent variables

The dependent variable is the one we measure to see the effect of the independent variable on it.

The researcher can also take into consideration other types of variables, some of them are presented below:

2.3. Moderator variables

Moderator variables are characteristics of individuals or of treatment variables that may result in an interaction between an independent variable and other variables. For example, when dealing with any

research question, gender may affect them. In other words, a moderator variable is a type of an independent variable that may not be the main focus of the study, but may modify the relationship between the independent variable and the dependent variable.

2.4. Intervening variables

Intervening variables are similar to moderator variables, but they are not included in original study either because the researcher has not considered the possibility of their effort or because they cannot be identified in a precise way. For example, consider a study that measures the effect of a pedagogical treatment (independent variable) on learners overall language proficiency (dependent variable). The abilities may be due to test-taking abilities rather than the treatment.

2.5. Control variables

When conducting research, one ideally wants to study the effects of the independent variable on a dependent variable. For example, consider the impact of feedback type on a performance measure. Variables that might interfere with the findings include the possibility that learners with different levels of proficiency respond differently to different types of feedback. Another possibility is the difference of their prior language experiences. Whenever possible researchers need to identify these possible factors and control them in some way, although it should be recognized that identifying them in L2 and foreign language learning may be difficult.

Exercise: identify the independent and the dependent variables in each of the following research questions.

Research question	Independent variable	Dependent variable
Does feedback type affect subsequent performance?		
Is there a relationship between Learners' noticing of recasts and L2 development?		
Does the process approach develop learners' writing strategies		
Does the use of authentic activities help learners acquire listening competencies		

You also need to be familiar with another category of variables called: categorical variables/ continuous variables.

2. Categorical versus continuous variables

Categorical variables are variables that can take on specific values within a degree range of values. They can be measured with a greater degree of precision. For example, gender, can be male or female. In contrast with categorical variables, continuous variables are variables that can take on values along the continuum. For example, age, income, weight and height. Therefore, the type of data produced differs from one category to another.

3. Qualitative versus quantitative variables

Qualitative variables are those that vary in kind. Rating something as 'attractive' or not, 'helpful' or not or 'consistent' or not are examples of qualitative variables that vary in kind.

Whereas, reporting the number of times something happened or the number of times someone engages in a particular behaviour are examples of quantitative variables because they provide information regarding the amount of something (Marczik, DeMatteo, Festinger, 2005).

Test yourself

1. What is the difference between an independent variable and a moderator variable?
2. Give other examples of qualitative and quantitative variables.
3. How can you identify variables in your study?

Part TWO

Types of Research

Lecture 4

Types of research

Lecture objectives

In this lecture, the student will:

- Make the difference between types of research

Types of research can be classified from three different perspectives:

1. Application of the findings of the research study
2. Objectives of the study
3. Mode of enquiry used in conducting the study

The classification of a study on the basis of these three perspectives is not mutually exclusive; that is, a research study classified from the viewpoint of application can be classified from the perspectives of objectives and enquiry mode.

1. Types of research: Application perspective

If you examine a research from the perspective of its application, you can have two broad categories:

- a. Pure research:** This kind of research is academic in nature and is undertaken in order to gain knowledge about phenomena that may or may not have applications in the near future, and to develop new techniques and procedures that form the body of research methodology.
- b. Applied research:** Most of the research in social sciences is applied. In other words, the research techniques, procedures and methods that form the body of research methodology are applied.

2. Types of research: Objectives perspective

If you examine a research study from the perspective of its objectives, it can be classified as:

- a. Descriptive:** A research study classified as a descriptive study attempts to describe systematically a situation, problem, phenomenon, service or programme, or provide information about the living conditions of a community, or describe attitudes towards an issue.

The methods that can be used in the descriptive research are:

- The case-study method: case study research involves an in-depth study of an individual or group of individuals;
- The survey method: in survey method research, participants answer questions administered through questionnaire or interviews. In order for the survey to be both valid and reliable, it is important that the questions are constructed properly;
- The observational method: it can be naturalistic observation or laboratory observation.

b. Correlational research: The main emphasis in a correlational study is to discover or establish the existence of a relationship/ association/ interdependence between two or more variables or more aspects of a situation. In other words, it determines whether and to what degree a relationship exists between two or more variables (quantifiable but nothing is manipulated). The degree of the relationship is expressed as a coefficient of correlation. For examples, what is the impact of an advertising campaign on the sale of a product? What is the relationship between technology and unemployment?

The methods that can be used in the correlational research are:

- The observational method
- The survey method
- The archival method

c. Explanatory research: this kind of research attempts to clarify why and how there is a relationship between two aspects of a situation or phenomenon. It tries, for example, to explain why stressful living **results in heart attacks; or how home environment affects children's level of academic achievement.**

This type of research can be conducted using:

- The Case study method
- The survey method
- The observational method

d. Exploratory research: it is study which is undertaken to explore an area where little is known or to investigate the possibilities of undertaking a particular research study. It is flexible and can answer what, who and why questions. When a study is carried out to determine its feasibility, it is

also called a feasibility study or a pilot study. It is usually carried out when a researcher wants to explore an area about which s/he has little or no knowledge. A small scale study is undertaken to decide if it is worth carrying out a detailed study.

This type of research can be conducted using:

- The observational method
- The survey method
- The case study method

3. Types of research: Mode of enquiry perspective

From the point of view of the mode of enquiry perspective, there are two types of research:

- a. **Quantitative research (structured research):** The main objectives of this research is to quantify the variation and diversity in a phenomenon, situation or attitude.
- b. **Qualitative research (unstructured):** A qualitative study describes the variation and diversity in a phenomenon, situation or attitude with a flexible approach so as to identify as much variation and diversity as possible.

Many scientist and researchers advocate a combined approach to social sciences

Lecture 5

Quantitative Research

Lecture objectives

In this lecture, students will

- Identify types of quantitative research.
- Know about its history.
- Know about its characteristics, strength and weaknesses.

1. Types of quantitative research

Quantitative research can be divided into: **associational and experimental**. What is common between them is that researchers attempt to determine a relationship between variables.

The goal of **associational research** is to determine whether a relationship exists between variables and if so, the strength of that relationship. This is often tested statistically through correlations, which allow the researcher to determine how closely two variables (e.g., motivation and language ability) are related in a given population. Associational research is not concerned with causation or co-occurrence.

In **Experimental research studies**, researchers manipulate one or more variables (independent variables) to determine the effect on another variable (dependent variable). This manipulation is described as a treatment and the researchers' goal is to determine whether there is a causal relationship. Many experimental researches involve a comparison of pre-treatment and post-treatment performance.

2. Brief historical overview of quantitative research

Quantitative social research was originally inspired by the spectacular progress of natural sciences in the 19th century, and therefore early social researchers set out what was called 'the scientific method' in their investigations. This method that had been evolving in western thinking since

Broadly speaking, the scientific method postulated three key stages in the research process:

- a. Observing a phenomenon or identifying a problem
- b. Generating an initial hypothesis
- c. Testing the hypothesis by collecting and analysing empirical data using standardized procedures.

Once the hypothesis has been successfully tested and further validated through replication, it becomes accepted as a scientific theory or law.

The scientific method is closely associated with numerical values and statistics. As a result of this progress, the social sciences achieved maturity and earned the reputation of being able to study scientifically both at the individual and the societal levels.

3. Characteristics of quantitative research

Although quantitative methods in the social sciences by and large align with the general principles of the scientific method, they also show certain distinctive features.

- **Using numbers:** numbers are powerful as attested by the discipline of mathematics. Yet, they are also rather powerless in themselves because in research context they do not mean anything without 'backing'. They are faceless and meaningless unless we specify exactly the category we use specific number for, and also the different values within the variable.
- **A priori categorization.** Because the use of numbers already dominates the data collection phase, the work requires to specify the categories and values need to be done prior the actual study.
- **Variables rather than cases.** Quantitative research is less interested in the common features of groups of people. It is centred around the study of variables that capture these common features and which are quantified by counting, scaling or assigning values to categorical data. All the various quantitative methods are aimed at identifying the relationships between variables by measuring them and also manipulating them (as in experimental studies).
- **Statistics and the language of statistics.** Because of the close link of quantitative research and statistics, much terminology has become part of the quantitative vocabulary.
- **Standardized procedure to assess.** Bachman (2004a) points out that this stance is based on the assumption that there exists an objective reality so that

- **Quest for generalizability and universal laws.** Numbers, variables, standardized procedures, statistics and scientific reasoning are all part of the ultimate quantitative quest for facts that are generalizable beyond the particular and add up wide-ranging, ideally universal laws.

4. Strengths and Weaknesses of Quantitative Research

- Quantitative opponents usually emphasize that at its best the quantitative inquiry is systematic, rigorous, focused and tightly controlled, involving precise measurement and producing reliable and replicable data that is generalizable to other contexts.
- The statistical, analytical apparatus offers some in-built quality checks and indices that help readers to decide on the validity of quantitative findings.
- As it works with concepts of averages, it is impossible to do justice to the subjective variety of an individual life.
- The general exploratory capacity of quantitative research is rather limited in term of its generalizations.

5. Quantitative research design types

Design types can range from correlational research to truly experimental (with random assignment) to what is known as quasi-experimental (without random assignment).

5.1. Correlational research can be used in different way, for example, to test a relationship between or among variables and to make predictions. Predictions are dependent on the outcome of a strong relationship between or among variables. That is, we can often predict the likelihood of the presence of one form the presence of the other(s). The following are examples of two types of survey-based correlational research (one relational and one predictive, both from a large survey-based study of motivation by "Dorneiy and Clement (2001):

- **Research question:** Are students motivational characteristics related to language choice?

Context: motivational characteristics (e.g., direct contact with L2 speakers, cultural interest, integrativeness and linguistic self-confidence were collected from more than 4700 Hungarian students

Information was gathered on their language choice in school (e.g., American versus British English, German, French, Italian and Russian).

Analysis: The study was set up so that the relationship between these variables can be examined.

- **Research question:** Was integrativeness a predictor of language choice? (integrativeness was represented by questions such as 'how important do you think learning these languages is in order to learn more about its culture and art of its speakers? How much do you like these languages? How much do you like to become similar to the people who speak these languages).

Analysis: the follow-up analysis showed that integrativeness was the best predictor of language choice.

5.2. Experiment research and quasi-experimental Design

In educational research, experimental and quasi-experimental designs are used when one wants to systematically observe the effects of a particular treatment on a particular population through the use of a representative sample. For example:

- How does student choice of reading material effect primary-age pupils reading motivation?
- What are the effects of inquiry-based teaching on high school students' reading comprehension scores in scientific texts?
- Which programme or writing workshop is more effective at increasing high school student' narrative genre knowledge and writing ability?

Researchers test whether differences are related to the treatment by using statistics to ensure that the results obtained from the sample are statistically significant in order to generalize the findings to a larger population.

These two research designs differ in the use of participants. According to the experimental design, participants are randomly assigned to either the treatment group or the control group, whereas they are not assigned randomly in the quasi-experimental design. In general, intact groups or already existing ones are used.

One of the most used quasi-experimental design is the non-equivalent group design which includes an existing group of participants who receive a treatment and another one to serve as a control group or comparison group.

6. Test yourself

- What is the difference between experimental and correlational research?
- What is the difference between experimental and quasi-experimental research?

- Give one topic to illustrate each of those types of research.
- What is a research design?

Lecture 7

Qualitative Research

Lecture Objectives

In this lecture, students will

- Know what qualitative research is.
- Identify types of qualitative research.
- Know how to formulate a research question.

1. Definition: Qualitative research is a process of inquiry with the goal of understanding a social or human problem from multiple perspectives; conducted in a natural setting with the goal of building a complex and holistic picture of the phenomenon of interest. It is exploratory or diagnostic in nature usually involving a small number of people. According to Denzin and Lincoln (2005, p.3), qualitative research is an interpretive naturalistic approach to the world. This means that qualitative researchers study things in their natural setting, attempting to make sense of or interpret phenomena in terms of the meaning people bring to them.

After the identification of the problem under study and the literature review, we need to formulate question(s). Qualitative research questions are the **why** and **wherefores** rather than asking how often something occurs and how spread it is.

In qualitative research, questions like: who is doing or involved in something, how is it done, for what kind of reasons. What is done, what kind of order, what kind of strategies are used, what are the consequences of doing or not doing something, why is it like this, wherefore is it done and why?

Example: What are the special challenges faced by immigrant students in the UK?

How do elderly people living in retirement home perceive their situation and how

they are dealing with it?

In summary, a qualitative question mainly focuses on 'W' questions.

2. Types of qualitative research

There are many different types of qualitative research, some of which are presented below:

- **Ethnographic Studies:** the researcher studies an intact cultural group in a natural setting over a specific period; a cultural group can be a group of individuals who share a common social experience, location, or other social characteristic of interest. It is a methodology for descriptive studies of culture and people which include:
 - Geographical- a particular region or country
 - Religious
 - Social / familial
 - Shared experience

Ethnographic studies can include undertaking 'a case study', which could include studying a single person.

Case Studies: the researcher explores a single entity or phenomenon bounded by time and activity (e.g., a programme, event, process, institution, or social group) and collects information through a variety of data collection procedures over a sustained period of time.

- **Grounded Theory**

The main feature is to develop a new theory through the collection and analysis of data

About a phenomenon.

- **Interpretive Phenomenological Analysis/ Phenomenological Studies:** human experiences are examined through the detailed description of the people being described- the goal is to understand the 'lived experience' of the individuals being studied; this approach involves studying a small group of people intensively over a long period of time.

- **Discourse Analysis**

It focuses on text and talk as social practices. Discourse analysis is interested in the study of language in use, and any language in use transcripts of speech or texts are considered. In this type of qualitative, researcher are interested in both the content and functions of discourse.

- **Conversation Analysis**

It explores how social interactions are structurally organized. For this purpose, transcripts of tape recordings are analysed.

- **Content Analysis:** it is used mainly in analysing documents, such as newspaper texts or responses to open questions.
- **Narrative Analysis:** This focuses on people's narrative stories.

And others...

3. Test yourself

- Explain grounded theory in your own words.
- Try to give examples of qualitative topics related to your area of study.

Lecture 8

Sampling

Lecture objective

In this lecture, students will

- Know the types of sampling
- Differentiate between the types that can be used in quantitative and qualitative research.

Before introducing sampling, let us see the difference between population and sample.

- **The population** is the group of people whom the study is about. The target population consists of all the people to whom the survey's findings are to be applied.
- **The sample** is the group of participants whom the researcher actually examines in an empirical investigation.

A good example is very similar to the target population in its most general characteristics (age, gender, educational background, social class, socio-economic status, academic capability). That is the sample is a subset of the population that is representative of the whole population.

1. Sampling procedures

There are two main sampling procedures: probability sampling and non probability sampling as follow:

1.1 Probability sampling

- **Simple random sampling:** The method involves selecting at random from a list of the population the required number. In simple random sampling, each member of the population has an equal chance of being selected.
- **Stratified random sampling:** the population is divided into groups or 'strata' and a random sample of a proportioned size is selected from each group. This is done on a number of parameters of the wide population. An obvious example would be the division of males and females.

- **Systematic sampling:** It is a modified form of simple random sampling. It involves selecting subjects from a population list in a systematic rather than a random fashion. For example, in a population of 2,000, a sample of 100 is required, then every twentieth person can be selected. One can decide how frequently to make systematic sampling by a simple statistic- the total number of the wider population divided by the sample size required.
- **Cluster sampling:** When the population is large and widely dispersed, a simple random sampling poses administrative sampling. For example, the researcher can select a specific number of schools and test all the students in those schools. The researcher should be careful to ensure that cluster sampling does not build bias. A city of an area of heavy industry or great poverty may not represent all kinds of cities or socio-economic groups.
- **Stage sampling:** It is an extension of cluster sampling. It involves selecting the sample in stages, that is taking samples from samples. For example, selecting a number of schools at random, and from within each of these schools, select a number of classes at random, and from within those classes select a number of students.

2.2 Non-probability sampling

- **Convenience or opportunity sampling:** the most common sample type in L2 research is a convenience or opportunity sampling, where an important criterion of sample selection is convenience for the researcher. Members are selected if they meet certain criteria, such as geographical proximity, availability at a certain time, or easy access. They are also selected because they possess certain characteristics that are related to the purpose of the investigation.
- **Snowball sampling:** Researchers identify a small number of individuals who have the same characteristics in which they are interested. These people are used then used as informants to identify or put the researcher in touch with others. This kind of sampling is used for sampling a population where access is difficult.
- **Quota sampling:** this method has been described as the non-probability equivalent of stratified sampling. Like a stratified sample, a quota sample strives to represent significant characteristics of the wider population; unlike stratified sampling, it sets out to represent these in the proportions in which they can be found in the wider population. For example, suppose the population contains 70% females and 30% males, then the sample would have to contain 70% females and 30% males.
- **Purposive sampling:** In this method, the researcher chooses specific people with particular characteristics within the population to use for a particular study. It is called judgment sampling as it is based on the researcher's judgment to select the member of the sample that help him answer the research questions.

- **Dimensional sampling:** one of reducing the problem of sample size in quota sampling is to opt for dimensional sampling. It involves identifying various factors of interest in a population and obtaining at least one respondents of every combination of those factors.
- **Volunteer sampling:** It can be used in cases where access is difficult. One has to be very cautious in making generalizability or representativeness.

Test yourself

1. What is the difference between stratified and cluster sampling?
2. What are the types of sampling that can be used in quantitative and qualitative studies?
3. What is the difference between quota sampling and purposive sampling?

Part Three

Data Gathering Tools

Lecture 8

Questionnaires

Lecture Objectives

In this lecture, students will

- identify types of questionnaires,
- the data yielded by questionnaires,
- types of questionnaire items,
- the format of a questionnaire,
- and the different phases of using a questionnaire

The field of questionnaire design is very vast. This course provides an introduction to its key elements.

1. Types of questionnaires

The researcher can select several types of questionnaires, from highly structures to unstructured. They are often referred to as:

- **Closed-ended questionnaires (structured).** This type of questionnaire is used to generate statistics in quantitative research and can be scanned straight forward into computer for ease of analysis.
- **-Open-ended questionnaires (unstructured).** This type is used in qualitative research. The questionnaire does not contain boxes to tick but instead leaves a blank section to write in an answer. . As there are no standard answers to these questions, data analysis is more complex.
- **Combination of closed-ended and open-ended questionnaires (semi-structured).** Many questionnaires begin with closed questions, with boxes to tick or scales to rank, and end with open questions for more detail response.

2. Data yielded by questionnaires

1. Questionnaires can yield three types of data about the respondents:

- **Factual questions** which are used to find out certain facts about the respondents, such as demographic characteristics (age, gender and race), residential location, material and socio-economic status, level of education, occupation, experience...
- **-Behavioural question** which are used to find out what the respondents are doing or have done in the past focusing on actions, life styles, habits and personal history.
- **-Attitudinal questions** which are used to find out what people think, covering attitudes, opinions, beliefs, interests and values.

3. Types of questionnaire items

Different types of items can be used depending on how structured the questionnaire is, the type of study, the sample to be used and many other reasons.

3.1. Closed question items:

- **Likert scales:** the most famous type of closed ended items is the 'Likert scale which consists of a characteristics and the respondents are asked to indicate the extent to which they agree or disagree with it by ticking or circling. For example:

Strongly agree agree neither agree or disagree disagree strongly disagree

- **Semantic differential scales:** in this technique, respondents are asked to by marking with a tick or an 'X' between two bipolate adjectives at the extreme. For example:

Research methology texts are :

difficult ; ; ; ; ; ; easy

useless ; ; ; ; ; ; useful

- **True/ false:** while generally it is true that the more response options an item contains, the more accurate evaluation it can yield, there might be cases when only a polarized yes-no decision can be reliable.
- **Multiple choice:** it is familiar because of its popularity.
- **Rank order items:** The rank order question is akin to the multiple choice question, but it asks respondents to identify priorities. For example: please indicate your priorities by placing numbers in the boxes to indicate your views, 1= the highest priority; 2= the second highest priority and so on (see the examples in Cohen et.al., 2007:325)
- **Rating scales:** they provide a range of responses to a given question or statement. Numerical scales give so many marks out of so many, that is assigning one of several numbers (which corresponds to a series of ordered categories).

For example:

All students should have access to higher education.

1= strongly disagree

2= disagree

3= neither agree nor disagree

4= agree

5= strongly agree

3.2 Open-ended questions: open-ended questions include items where the actual question is not followed by response options. This kind of questions works well if they are not completely open but contain certain guidance.

4. The format of the questionnaire

The questionnaire includes some parts as any kind of writing as follows:

- **Title:** like any other piece of writing, a questionnaire should have a title to identify the domain of the investigation.
- **General introduction:** 'the opening greeting' usually describes the purpose of the study. The important functions of this section involve emphasizing that there are no right or wrong answers and saying 'thank you.'
- **Specific instructions:** these explain and demonstrate how respondents should go about answering the questions.
- **Questionnaire items:** These constitute the main body of the questionnaire. They need to be very clearly separated from the instructions. This is where different typefaces and font styles are useful.
- **Additional information:** at the end of the questionnaire, we may add information such as contact name.

Final 'thank you.'

5. Length of the questionnaire: Most researchers agree that anything that is more than 4-6 pages long and requires over half an hour to complete may be considered too much.

5. The layout of the questionnaire: It is an important aspect. Three points in particular are worth bearing in mind:

- **Booklet format**
- **Appropriate density:** it refers to how much we put on a page

Items sequence: we need to decide on the order of items. The opening questions need to be interesting, relatively simple and at the same time focusing on important aspects. Using closed-ended at beginning and open-ended at the end. In addition, mixing up the scales creates a sense of variety and prevents respondents from repeating previous answers.

6. Important steps after the construction of a questionnaire

- **Validating the questionnaire**
- **Piloting the questionnaire**
- **Administering the questionnaire**
- **Analyzing the questionnaire**

7. Test yourself

- what is the selection of questions based on?
- what are you required to do after the selections of the needed questions?
- How can you validate a questionnaire?
- What is piloting? Why is it important?
- List some ways of administering a questionnaire.
- what are the different phases involves in questionnaire analysis?
- Refer to some master dissertations questionnaires in the library and try to sort out the positive and negative points in them.

Lecture 9

Lecture Objectives

In this lecture, students will

- be introduced to qualitative tools
- know the process followed in this type of research

3. Qualitative data collection methods

The main methods are: interview, focus group, observation, collection of documents such as diaries, photographs, collection of narrative, journals, the think aloud method and open questionnaires.

3.1 Qualitative data process

The analysis of qualitative data usually goes through some or all of the following stages:

- Familiarisation with the data through review, reading, listening...
- Transcription of tape recorded material: it is the full script of an interview or a conversation, or the procedure of producing a written version of these methods
- Organisation of data: after the transcription, it is necessary to organise the data into easily retrievable sections.
- Coding (called indexing): for example, sections of text transcripts may be marked by the researcher in various ways,: underlining in a coloured pen, highlighting, giving a numerical reference, or bracketed with a textual code in the margin.
- Identification of themes
- Development of provisional categories
- Exploration of relationships between categories, finding possible and plausible explanations for findings
- Report writing

3.2 Interviews

There are three main kinds of interviews:

- **The structured interview** is one in which the content and the procedures are organized in advance. This means that the sequence and wording of the questions are determined by means of a schedule and the interviewer is left little freedom to make modifications. It is characterized by being closed. This kind of interview is used in situations where a written questionnaire would in theory be adequate except that for some reason the written format is not feasible (for example, because of the low level of literacy amongst the participants or the need to tighten control as in some market surveys or opinion poll) (Dörnyei, 2007: 135).
- **The semi-structured interview** is the most **common qualitative** data gathering tool during which the person being interviewed is the expert and the interviewer the student. This kind of interview involves a number of open-ended questions based on the topic areas that the researcher wants to cover. The open-ended nature of questions posed defines the topic under investigation but provides opportunities for both interviewer and interviewee to discuss some topics in detail. If the interviewee has difficulty answering a question or provides only a brief response, the interviewer can use cues or prompts to encourage the interviewee to consider the question further. A good interviewer needs to be able to put the interviewee at ease, needs good listening skills and needs to be able to manage an interview situation so as to collect data which truly reflect the opinions and feelings of the interviewee concerning the chosen topic.
- **The unstructured interview** is an open situation having greater flexibility and freedom. It is similar to a free-flowing conversation. No detailed interview guide is prepared in advance, although the researcher usually thinks of a few (1-6) opening questions. During the interview, the researcher may ask an occasional question for clarification and may give reinforcement feedback, but interruptions are kept to the minimum (Dörnyei, 2007: 136). For an unstructured interview to be successful, the interviewer needs to establish good rapport with the interviewee.

3.2 Preparing for the Interview and designing the interview guide

The complete interview process involves a series of carefully designed steps after having chosen the sample. The preparation of an interview guide containing a few relevant questions is necessary. A good interview guide requires careful planning followed by piloting (*ibid.*).

3.3. Question Types

- The first few questions can be **factual questions** (family, job) to set the tone and create initial rapport.
- **Content questions:** experiences and behaviours, opinions and values, feelings, knowledge, sensory information (what has someone seen, heard...), background or demographic information. These categories concern different aspects of the participants' overall view/experience of the phenomenon and then we can get a rounded picture by including in our interview guiding questions that tap into each dimension (*ibid.*).

- **Probes** may include detailed oriented and clarification questions to increase the richness and depth of the responses.
- The final **closing questions**. This permits the researcher to have a final say. Simple questions such as 'Is there anything you like to add' or 'What should I have asked you that I didn't ask you?'

3.4 Recording the interview

Some key issues of interview conduct are helpful such as:

- Recording the interview
- Starting the interview (the first few minutes are important to set the tone/ climate of the interview. We must show that we are really interested in what the interviewee has got to say and that we are a nice and reasonable and non-threatening person. Before starting the recording, we need to explain again the purpose for the interview.

3.5 Conducting the interview

A good qualitative interview has two features: a) it flows with the various parts connecting seamlessly. We must remember that we are there to listen (not to speak). B) it is rich in detail; it is an area where the skilful use of various probes can make a real difference.

*** Then, the process mentioned above is to be followed.**

4. Focus Groups

Focus groups - as the name suggests- involve a group format whereby the researcher records the responses of a small group (usually 6-12 members). The focus group is based on the collective experience of brainstorming, that is, participants thinking together, inspiring and challenging each other, and reacting to the emerging issues (Dorneiy, 2007: 144).

5. Observation

The distinctive feature of observation as a research process is that it offers an investigator the opportunity to gather 'live' data from naturally occurring social situations. Observation, too, can be structured, semi-structured or unstructured. The structured observation is useful for testing hypotheses while the semi-structured and unstructured provide a rich description of a situation which, in turn, can lead to subsequent generation of data.

5.1 Classroom Observation

To organize the many different ways in which we can observe classrooms, two dichotomies are usually offered 'participant versus non participant' and 'structured versus unstructured'. These are

very similar to quantitative and qualitative distinction in observation terms. The first one is highly structured and involves going to the class with a specific focus and with concrete observation categories, whereas the unstructured is less clear; the researcher needs to observe first what is taking place before deciding on its significance for research. The former involves completing an observation scheme, while the latter involves completing narrative field notes, often supplemented by maps or diagrams (*ibid*: 179).

Schemes – similar to questionnaires- have a range of systematic categories which allow the observer to record events quickly by using tally marks (*ibid*: 180). Schemes also need to be piloted.

In planning observations, one has to consider the following:

- When, where, how and what to observe
- How much degree of structure is necessary in the observation
- The duration of the observation, which must be suitable for the behaviour to occur and observed
- Timing of the observation period
- The context of the observation
- The nature of the observation (structures, semi-structures, unstructured)
- The need to choose the appropriate kind of recording (Cohen *et.al.*, 2007).

5.2 Techniques for collecting data through observation

- **Written descriptors:** the researcher can record observations of people, a situation or an environment by making notes of what has been observed.
- **Video recording:** this frees the observer from the task of making notes
- **Artefacts:** artefacts are objects which inform us about a phenomenon under study because of their significance to the phenomenon. Examples would be doctor's equipment in a particular clinic or art work hung in residential care homes

6. Test yourself

- What is the difference between an interview and a focus group?
- Can these qualitative tools be used in quantitative research?
- Explain the term 'probe'.
- How can you code the data?
- How can you identify themes in an interview?
-

Part Four

Data Analysis

Lecture 9

Quantitative Data Analysis

Lecture Objectives

In this lecture, the student will

- Know the different scales of data
- Know the basics of descriptive statistics
- Know inferential statistics and practise computing necessary measures in addition formulas required for testing hypotheses.

Quantitative data analysis is a powerful research often associated with large scale research, but can also serve smaller scale investigations, with case studies, action research, correlation research and experiments. Numerical data analysis can be performed using software, for example, the Statistical Package for Social Sciences (SPSS). Statistical packages apply statistical formulae and carry out computations.

1. Scales of data

1.1 The nominal scale (frequently termed categorical data) simply denotes a category (e.g., gender, age groups, subject taught, type of school, socio-economic status...). We may accord 1 to females and 2 to males. Number 1 and 2 are simply short labels.

1.2 The ordinal scale not only classifies but also introduces an order into the data. It is possible to place items in order, weakest to strongest, smallest to biggest, lowest to highest, least to most and so on. But there is still absence of metric- a measure using equal intervals. Therefore, one cannot assume that the distance between 'very little' and 'a little' may not be the same as the distance between 'a lot' and 'a very great deal'. They include likert scales and rating scales and are frequently used in asking for opinions and attitudes.

1.3 The interval scale introduces a metric- a regular and equal interval between each data point- as well as keeping the two previous scales, classification and order (e.g., the distance between 5

degrees celsius and 6 degrees Celsius is the same as 8 degrees celsius and 9 degrees Celsius. However, there is no true zero. In practice, the interval scale is rarely used.

1.4 The ratio scale embraces the main features of the previous three scales- classification, order and equal interval metric- but adds a fourth, powerful feature: a true zero. Measures of distance, money in the bank, population, marks on a test and so on are ratio measures as they are capable of having a true zero quantity. The ratio scale can be considered as the most powerful level of data because of the use of the four arithmetical processes mentioned before.

2. Preparing the data for analysis

Having collected the data is half the battle, the second step includes the processing of completed questionnaires or tests or multiple pages of notes of various quantitative scores.

2.1 Coding quantitative data

Mathematical aspects of quantitative data analysis can be calculated manually (as in the early days) or through the use of software packages as SPSS. The first step of data processing involves converting the respondents' answers to numbers by means of coding procedures. Because numbers are meaningless in themselves and are too easy to mix up, a major element of the coding phase is to define each category and then to compile coding specifications for every possible value the particular variable can take. For example gender is usually labelled 'sex' and it can take two numerical values: 'male' is usually coded '1' and female '2'.

With numerical variables such as test scores, the coding is simple because the value range can be the same as the possible scores for the test. For the close-ended questionnaire items, such as likert scales, the coding frame is similarly straightforward: each pre-determined response option is assigned a number (for example, 'strongly disagree'= 1, disagree=2, neutral=3, 'agree=4, strongly agree=5).

For simple open-ended questionnaire items (for example, a background information question such as which foreign language have you learnt in the past?) the coding frame is more complex because it can have many categories (for example, French= 1, German=2, Italian= 3...), in fact as many as the number of the different answers in all the questionnaire. Thus, with such items, the coding frame is continuously extended during the processing of the data, with every new language mentioned by the respondents being assigned a number.

If the coding of other open-ended questionnaire items elicits more diverse or longer responses, these may require a kind of summary on the part of the coder. For example, with a question such as 'what is your favourite leisure activity?', the task is to condense the diverse information contained in the responses into a limited number of categories.

2.2 Inputting the data

Entering the data into a computer file requires three stages:

- Creating and naming a data file
- Defining the coding frames (decision should be made about the 'coding frames' for all the variables)
- Keying the data

2.3 Data manipulation

Data manipulation involves making changes in the dataset prior to the analyses to make it more appropriate for certain statistical procedures. At this stage there are three particular issues to attend to: a) handling missing data, b) recoding certain values and c) considering standardizing the data.

3. Descriptive versus inferential statistics

Statistics can be divided into two principal areas, 'descriptive statistics' and 'inferential statistics'. Descriptive statistics are used to summarize sets of numerical data in order to conserve time and space or they describe and present data, for example, in terms of summary frequencies. They also form the basis of inferential statistics. The two main categories of descriptive statistics are the measures of central tendency and the measures of variability.

Measures of central tendency describe the data set with a single numerical value. The three most commonly measures used are the following:

- The **mean** is the average of the scores : It is calculated using the sum of scores divided by the number of scores (sample) as represented in the formula below:

$$\bar{x} = \frac{\sum X}{N}$$

Example:

G1 scores: 45, 99, 57, 17, 63, 100

G2 scores: 66, 62, 65, 64, 63, 60

$$\sum x: 45+99+57+17+63+100= 381:6= 63.5$$

$$\sum x: 66+62+65+64+63+60=63.3$$

- The **median** is the middle point in a set of scores that have been arranged in a ranked order

Example:

14 19 **26 26** 31 34

The mean is 26

78 92 92 74 80 89

Let's order them

74 78 80 89 92 92

The median is: $84+ 89= 84.5$

- **The mode** is the most occurring score.

79 84 99 99 132 148 198

Measures of variability provide indices of how dispersed or varied the scores are in a dataset. They include:

- **The range** is the difference between the highest and the lowest score

$$79 \ 84 \ \underline{99 \ 99} \ 132 \ 148 \ 198 \qquad 198 - 79 = \mathbf{119}$$

- The **variance** and its square root, **the standard deviation** are indicators of the average distance of the scores from the mean.

Calculation of the variance

Score	Mean	Difference	Difference squared
49	63.5	- 14.5	210.25
99	63.5	35.5	1260.25
57	63.5	- 6.5	42.25
17	63.5	- 46.5	2162.25
63	63.5	- 0.5	0.25
100	63.5	36.5	1332.25
		Variance= sum of difference squared: number of scores	Σ= 5007.5 Variance: 5007.5: 6= 834.58

Mackey& Gass (2005, p.260)

Standard deviation: $\sqrt{\text{variance}} = \sqrt{834} = \mathbf{28.89}$

Another formulae: Variance:
$$S^2 = \frac{\sum X^2}{N} - \bar{X}^2$$

Standard deviation: is the square root of the variance

Such statistics make no inferences or predictions, they simply report what has been found.

Inferential statistics, by contrast, make inferences and prediction based on the data gathered. This includes, for example, hypothesis testing, correlations, difference testing...Inferential statistics are often more valuable for researchers and typically they are more powerful.

4. Statistical significance

The main concern of inferential statistics has traditionally been the testing of 'statistical significance'. Statistical significance denotes whether a particular result in a sample is true for the whole population. If the result is non-significant, this means that we cannot be certain that it did not occur by chance

Significance is measured by probability coefficient (p), which can range from 0 to + 1. A p figure of 0.25 means that the obtained result might be due to pure chance in 25 percent of the cases. In social sciences we typically consider a result being significant if $p < 0.05$, that is, if the probability of the result not being real but only due to chance.

5. Comparing two groups: t-tests

Comparing various groups of people is the most common statistical procedure in applied linguistics research. In statistics there are different methods available for such comparisons depending on the number of groups. If we take two sets of scores, we are bound to find some difference in the raw scores, but we cannot assume that the observed difference reflects any real difference, thus, we need a t-test statistics to check whether we have a more generalizable result or whether the score is likely to be merely an artefact of random variation. There are two types of t-test:

- **Unpaired t-tests** (independent-samples t-tests) are for research design where we are comparing the results of groups that are independent of each other (for example, class 1 and class 2, or control and experimental groups)
- **Paired-samples t-tests** (dependent t-tests) are for the research design where we want to compare two sets of scores obtained from the same group (before and after the treatment).

6. Computation of the t-test for independent sample

The following stages will be followed to calculate the independent test for this experiment (Miller, 1984, p. 80):

I. Calculate the two samples means \bar{X}_1, \bar{X}_2 using the formula

$$\bar{x} = \frac{\sum X}{N}$$

II. Calculate the two samples variances S_1^2 and S_2^2 using the formula;

$$S^2 = \frac{\sum X^2}{N} - \bar{X}^2$$

III. Substitute the values of: $\bar{X}_1, \bar{X}_2, S_1^2, S_2^2, N_1, N_2$ in the computational formula for t:

$$t_{N_1 + N_2 - 2} = \frac{(\bar{X}_1 - \bar{X}_2)\sqrt{(N_1 + N_2 - 2)N_1 N_2}}{\sqrt{[(N_1 - 1)S_1^2 + (N_2 - 1)S_2^2](N_1 + N_2)}}$$

Methods Manual: t-test - hand calculation - for paired samples*

1. List the raw scores by group
2. Subtract each Y score from each X score (d).
3. Square each d and sum.

Anxiety score			
regular day	exam day	d	d ²
16	32	-16	256
3	22	-19	361
17	23	-6	36
3	13	-10	100
19	20	-1	1
15	29	-14	196
24	11	13	169
23	25	-2	4
3	13	-10	100
12	20	-8	64
32	30	2	4
		<u>-86</u>	
		<u>+15</u>	
		$\Sigma d = -71$	
			$\Sigma d^2 = 1291$

Nof pairs = 11

4. Use the following formula to calculate the *t*-ratio.

$$t = \frac{\frac{\Sigma d}{N}}{\sqrt{\frac{\Sigma d^2 - \frac{(\Sigma d)^2}{N}}{N(N-1)}}$$

d = difference between matched scores
 N = number of *pairs* of scores

5. Find the probability value (*p*) associated with the obtained *t*-ratio.

$$\begin{aligned}
 t &= \frac{-71}{11} \\
 &= \frac{-6.455}{\sqrt{\frac{1291 - \frac{(-71)^2}{11}}{11(11-1)}}} \\
 &= \frac{-6.455}{\sqrt{\frac{1291 - \frac{5041}{11}}{11(10)}}} \\
 &= \frac{-6.455}{\sqrt{\frac{1291 - 458.27}{110}}} \\
 &= \frac{-6.455}{\sqrt{\frac{832.73}{110}}} \\
 &= \frac{-6.455}{\sqrt{7.57}} = \frac{-6.455}{2.75} = -2.35
 \end{aligned}$$

6. Calculate degrees of freedom (df)

$$\begin{aligned}
 df &= N \text{ (number of pairs)} - 1 \\
 df &= 11 - 1 = 10
 \end{aligned}$$

7. Use the abbreviated table of [Critical Values](#) for t -test to find the p value.

For this example, $t = -2.35$, $df = 10$. The obtained value of 2.35 exceeds the cutoff of 2.11 ($df = 17$, nearest df shown on the table) at the .05 level. Therefore, $p < .05$. In a report the result is shown as $t(17) = -2.35$, $p < .05$.

A plus or minus sign at the end, associated with the t -ratio, indicates the direction of the difference between the means (anxiety was higher on exam day). The p value remains the same in either direction.

* If you have independent samples (i.e., two different groups of subjects), you must use a different formula. See [t-test for independent samples](#).

7. Test yourself: answer briefly using your own words.

- What is the difference between the paired and unpaired t tests?
- Is the same formula used in both of them?
- What is the difference between descriptive and inferential statistics?
- What is the importance of the critical value?
- What is meant by one tailed/ two tailed?
- which software package can be used to compute the data in quantitative research?

Lecture 10

Qualitative Data Analysis

Lecture objectives

In this lecture, students will

- Be introduced to the process of data analysis

In lecture 7, we identified some common features of qualitative research and its types. In this one, we will focus on qualitative analysis.

1. **What is meant by analysis:** after the mass of words are generated by interviews or observational data, they need to be described and summarised. It may require the researcher to seek relationships between various themes that have been identified. Finally, the results are presented, generally as a descriptive and interpretive account of the data.

2. Stages in qualitative data analysis

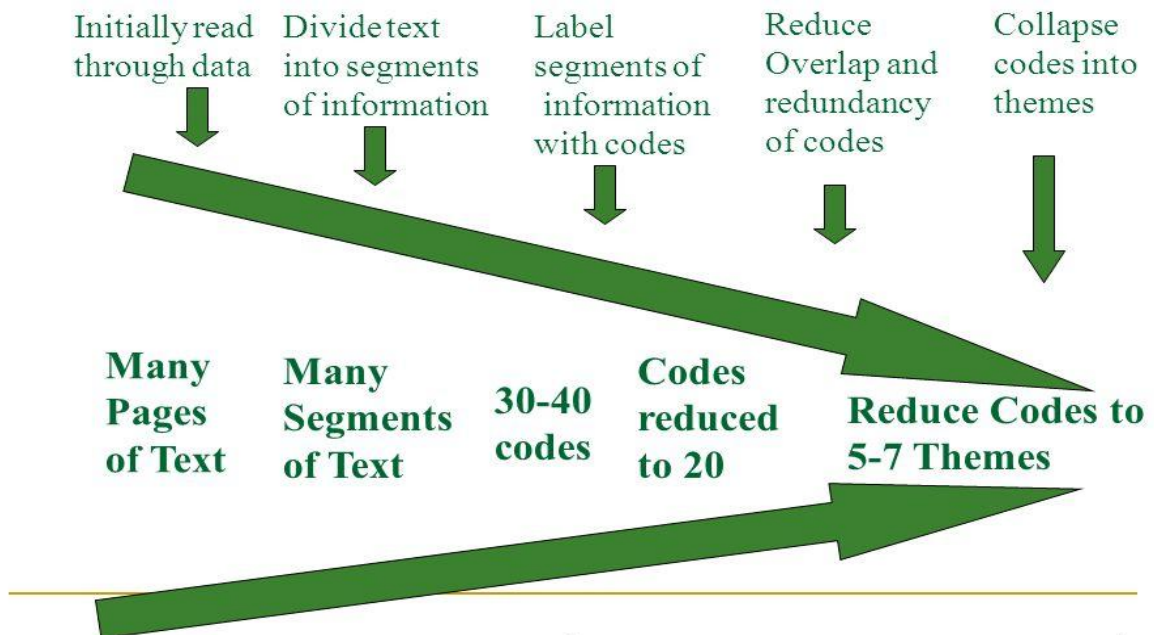
In order to analyse this kind of data the researcher goes through several steps.

The analysis of qualitative data usually goes through some or all of the following stages:

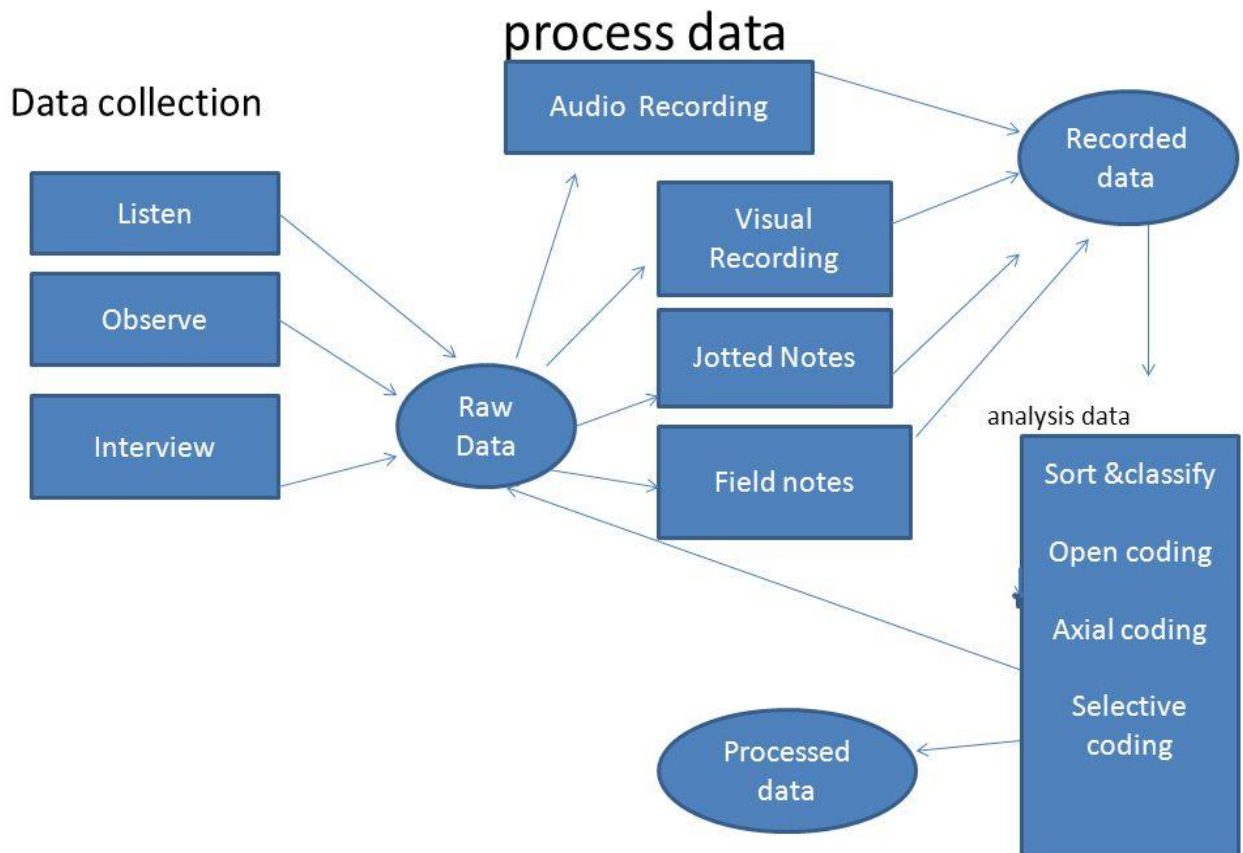
- Familiarisation with the data through review, reading, listening...
- Transcription of tape recorded material: it is the full script of an interview or a conversation, or the procedure of producing a written version of these methods
- Organisation of data: after the transcription, it is necessary to organise the data into easily retrievable sections.
- Coding (called indexing): for example, sections of text transcripts may be marked by the researcher in various ways,: underlining in a coloured pen, highlighting, giving a numerical reference, or bracketed with a textual code in the margin.
- Identification of themes
- Development of provisional categories
- Exploration of relationships between categories, finding possible and plausible explanations for findings
- Report writing

Coding is illustrated in the above figures

A Visual Model of the Coding Process in Qualitative Research



Qualitative data process



- Coding can be done in different ways, e.g. assigning a word, phrase, number, or colour to each coding category.
- It can be done by colour coding the different categories on the transcript and field notes or cut text segments and place them in note cards.
- Labels can be used to classify and assign meaning to pieces of information.

am home
alone / lonely
 When you move into your own home, you're alone. There is no bustle of people around the house. *miss company* I miss having someone to chat to when I get home. I put the TV or some music so *background noise* there's some background noise. *lonely* the silence makes me feel so alone. Sometimes I will be sat watching trash TV and thinking I should be out doing something rather than watching this rubbish. *doing* I read a lot but sometimes I am too tired and just want to veg out. But it's been good to move out of mum and dad's as *unhealthy to be dependent* it's not healthy to rely on them as they won't last forever. I become independent and made my own decisions. *support* It's good they still there when I need them. *distance* It's good to have some distance as when I was at home I was arguing a lot with my dad and *conflict* that was made me decide it was time to go. *moving out*

3. Computer software packages for qualitative analysis

Various packages have been developed to allow the researcher to organise, code and search data such as ATLAS.ti, used for large bodies of textual, graphical and audio and video data.

Qualitative Analysis Software

- Atlas.ti (<http://www.atlasti.com>)
- NVIVO (<http://www.qsrinternational.com>)
- QDA Miner (<http://provalisresearch.com>)
- Content Analysis
 - LightSide (<http://www.cs.cmu.edu/~emayfiel/side.html>)

LightSIDE: Machine Learning for Text

UNM

The software helps in:

- Data storage and management
- Data searching and retrieval

- Coding
- Developing and testing theory
- Writing reports

However, they cannot replace the human as they lack the capacity to think, reflect and Analyse.

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Further reading

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These references or parts of them can be given as assignments in addition to others later on.

