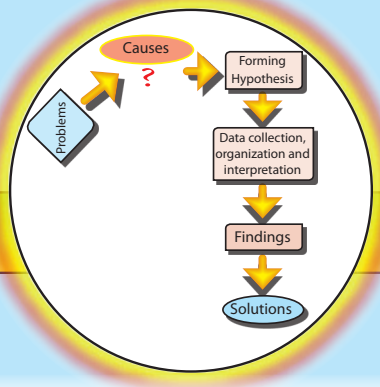
Unit 1



BASIC RESEARCH METHODOLOGIES IN GEOGRAPHY

Unit Outcomes

At the end of this unit, you will be able to:

- acquire basic research skills to enable you conduct action research;
- understand the significance of research and its nature in geography; and
- know different approaches used in geographic research.

Main Contents

INTRODUCTION

Do you remember the definitions of geography you learned in previous grades?

Geography is a discipline that attempts to understand human and physical aspects of the world. Its primary concerns are location, time and the concept that everything that happens to us is affected by our surroundings, including other people and the places within which we live, work and travel. (*Khaskar: 1*)

Geography helps us to understand how the world is changing. By studying geography, you will conceive:

- *how places and landscapes are formed*
- *how people and their environments interact*
- *what decisions we make to further our social interests*
- *what causes the diverse range of cultures and societies, and what results from these.*

Considering such issues motivates us to:

- *formulate questions*
- *develop intellectual skills for finding answers (solutions)*
- *introduce investigative tools*

Because of the wide range of geography's human and physical concerns, the questions that arise in its study ultimately lead us to perform research. The goals of this research include:

- *producing definite answers to the questions*
- *improving existing answers to the questions*
- *performing research that leads to a consensus regarding the answers*

Unlike the concerns of most social sciences, the social concerns of geography are relatively dynamic. To provide sustainable solutions for this fast-changing subject, we must use skilled *action research*.

In this unit you will learn the skills and attitudes that *this approach to research* requires. This information could lead you to become one of tomorrow's experienced researchers.

1.1 DEFINITION AND CONCEPT

At the end of this section, you will be able to:

- explain the concept of research.

Key Terms

- Research
- Research method
- Systematic inquiry
- Discovery

Have you ever attempted a small research project at your class or section level?

The term research came into English from

- *the old French root word "cerchier," which means to search or seek; and*
- *the prefix 're-' which means again.*

Research, therefore, means *to seek again with a view to becoming certain.* (*Desta Hamito; 2000*)

By the term definition, we mean a generally agreed-on opinion about the subject under clarification. When we define research it is in this sense. We define research as a scientific method of investigating answers for the problems identified. It is also a systematic inquiry into causes or the discovery of new facts through planned and organized effort that requires time, money and skill.

In short, research is the search for knowledge through objective and systematic methods of finding solutions to problems.

1.2 THE SIGNIFICANCE OF RESEARCH

At the end of this section, you will be able to:

- show appreciation to the significance of research in tackling social problems.

Key Terms

- Development
- Problem solving
- Problem identification
- Rational decisions
- Policy

Have you ever imagined or thought about the importance of research?

Development in any country depends, among other things, upon its research capability and the extent to which this capability is channeled into action. Also, to result in action, the research must be accessible to appropriate institutions, etc. Sometimes capable research work never reaches its targeted destinations.

Advances in science, technology and welfare are often considered to be the result of capable research. Governments in developed countries allocate huge sums of money for research work. Developing countries are also adopting this approach. This situation has made research work a good business for professionals.

Research as a science or professional trade for studying geography:

1. identifies the causes of problems, and the degree or extent of these problems.
   Example: The occurrences of hunger, flood, epidemics, etc.
2. adds to the body of knowledge about the problem by providing new information and knowledge.
3. enables us to visualize or understand the gap between the real world and the formulated theory.
4. provides a basis for additional investigations that validate the research findings or that advance the study of the problem by acquiring more data.
5. widens/enlarges one's own or a group's or society's reading and thinking scope.
6. strengthens our capacity for critical observation and enforces our power of prediction.
7. enables us to make rational decisions.
8. serves as an aid to formulating policy.

Activity 1.1

1. Can you distinguish the differences between these tasks?
   - ⇨ writing an essay
   - ⇨ writing a report
   - ⇨ writing up research work
2. Ask your geography teacher and others to tell you about the significance of research.
3. Use the internet to find information about the importance of research.

1.3 APPROACHES OF RESEARCH (QUALITATIVE AND QUANTITATIVE)

At the end of this section, you will be able to:

- use different geographic research approaches in action research.

Key Terms

- Quantitative
- Qualitative
- Theory
- Independent variable
- Dependent variable
- Inference
- Model
- Approach

What do you mean by an approach to treating a problem?

There are two basic approaches to research. Their differences are mainly in the attributes to be measured and the techniques to be used for collecting and analyzing data. These approaches are called

A the quantitative approach B the qualitative approach

A *Quantitative Approach*

We use the quantitative approach when trying to verify a given geographical theory. We translate the concepts of the theory into variables that can be measured with statistical techniques.

The advantage of this approach is that the quantitative technique employed by one researcher can be used by another researcher for different objectives or for further developing the same information. Very simple examples of this approach are given below:

- *the decrease in land-lease prices as one travels from the center of a city to its suburbs;*
- *the decrease in population density as one travels from the center of a city to its edges;*
- *the decrease in temperature towards the poles from the equator.*

All of the preceding examples investigate changes that occur as a function of distance from a defined point – for example, from the center of a city. In the examples, distance is the *determining variable*. A determining variable *influences* the variation of other phenomena.

Note

In the preceding examples, distance from a center is the *determining variable*. It determines the variation of these phenomena:

- land-lease prices
- population density
- temperature

In all of the examples, we assume that any variable that has not been mentioned is unchanging (is *controlled*).

The quantitative approach can be subdivided:

- ***Inferential quantitative approach:*** *the target-study uses an existing data base and infers characteristics or relationships from it.*
- ***Experimental quantitative approach:*** *the research work manipulates variables to see their effects on other variables. This approach requires considerable control over the research environment in order to manipulate the determining variables.* As described above, distance is the manipulated variable that affects lease price, population and temperature.
- ***Simulation (model) approach:*** *this approach involves constructing an artificial environment (model) to represent the actual environment we are studying. The artificial environment functions in way that parallels the actual environment and generates similar information. We use that information to study the phenomena we are investigating.*

Example:

$S = f(P_m, S_1, Cl, \ldots etc)$

This algebraic model simulates the characteristics and development of soil as a system. In the model,

S = soil, P_m = parent materials (rock),

S_1 = slope, Cl = climate.

The algebraic model explains soil as a function of its parent material, climate and slope.

The quantitative approach and hypotheses regarding an existing theory are established and tested. Also, mathematical analysis is frequently used.

B *Qualitative Approach*

What does qualitative method imply in the field of geography?

In the *qualitative approach*, data are used to explain a new theory. No previously existing theory or hypothesis is tested by way of this approach. Quantitative techniques are not employed. Therefore, the study cannot be repeated by other researchers.

Common techniques for gathering data in the qualitative approach are:

- *group interviews*
  - *telephone interviews*
  - *in-person interviews (face-to-face)*
- *questionnaires*
- *personal observations*

Some examples of subjects that could be studied with the qualitative approach to research are:

- *differences between urban and rural populations of Ethiopia.*
- *differences in academic achievement between boys and girls.*
- *effects of harsh climate on human activity.*
- *effects of poor leadership on students' national examination results.*

Exercise 1.1

I ***Complete the following sentences correctly.***

1 The approach we take to research is a function of the subject or attributes of the study and of the techniques to be used for collecting and analyzing data. The approaches we choose from are _____ and _____.

2 The technique of using interviews and questionnaires in data collection comes under the _____ approach.

3 In the quantitative approach, hypotheses are established and _____.

4 If a given theory is not to be verified and no hypothesis about it is to be established, the approach employed will be _____.

5 To examine the relationship between availability of books and student grades in college entrance exam, we would use the _____ approach to research.

II *Vocabulary Skills: See if you can match the items under column A with their definitions under column B. Ignore the unrelatable ones.*

	A		B
1	To tackle problems	A	A tested hypothesis.
2	Dynamic	B	A proposed idea or explanation that is based on observed or known facts but has not yet been proved. A predictive statement that can be tested.
3	Theory	C	Energetic and fast changing.
4	Critical observation	D	Simulation of the real world to explain a designed feature.
5	Attributes	E	To be proved.
6	To be verified	F	Careful observation.
7	Inference	G	Characters.
8	Model	H	To deal with problems.
9	Hypothesis	I	A document or case that serves as a source or reference.
10	Variables	J	Substances or factors whose effects are studied.
		K	Measures or investigates.

1.4 THE NATURE OF GEOGRAPHIC RESEARCH

At the end of this section, you will be able to:

- reflect the distinct nature of geographic research from other disciplines.

Key Terms

- Spatial distribution
- GIS
- Spatial data

Do you always focus on the same issue or center of interest?

Geography's focus has developed in scope and approach over time through the development of technology and accumulation of information.

Traditionally, geographical research is related to the locations of places and

people. In the eighteenth century, geography's focus shifted to the physical and human characteristics of places in our world. In the mid-twentieth century, geographical research focused mainly on:

- *the spatial distributions of phenomena and things*
- *the resulting patterns and interactions*
- *the forces responsible for the formation of the patterns*

Very lately, geographical research has begun to deal with environmental issues like hunger, global warming, poverty and the sustainable development of our ecosystem.

In July of 2006, in Brisbane, Australia, the International Geographical Union (IGU) commission was formed under the UN Charter that commands worldwide geographical education. The commission's position is that the academic discipline of geography is crucial to achieving sustainable worldwide development.

Human Population

Human population is an issue of concern to geography, sociology, economics, political science, etc. Each discipline has its own concerns and approaches to this issue. However, the ideas of all these fields of study about population overlap.

Economists' sphere of interest is largely aggregate demand and supply and responses to production. Sociologists' research work greatly emphasizes cultural values, the effect of the population factor on the occurrence of crimes, harmony disorders, etc.

The concerns of geography and geographers are mainly to:

- *assess the spatial distribution of the population*
- *determine the forces that governed the distribution:*
  - *is the distribution due to physical factors? or*
  - *is it due to economic factors?*
- *examine patterns of population distribution: (is it sparsely or densely populated, is there uniformity or not?)*
- *question whether there is a relationship between the distribution and the factor observed:*
  - *are areas sparsely or densely populated?*

- *is there uniformity or not?*
- *To investigate possible relationships between population distribution and other factors.*
- *look at the impact of populations on the surrounding natural resources*
- *foreward views on the sustainability of the area or locality for the future*

Thus, we see the differences and similarities between the various disciplines' approaches to the issue of population and we see geography's specific concerns and approaches to population.

In the 1950s and 1960s, the adoption of quantitative techniques in geographic research revolutionized the field. Its interest in human-environment relations became deeper and wider. At the end of the millennium, the development of the Geographical Information system (GIS) produced a powerful investigative tool for geographic research.

Do you know what information sciences is? Please study the next section carefully.

Geographic Information System (GIS)

The Geographic Information System *(GIS)* is a computer system that records, stores and analyzes information about features of the earth's surface. The break through that GIS provided is its ability to generate two-dimensional and three-dimensional images of an area. Also, it can receive geographical data from maps, satellites, photographs, and printed texts and books. GIS allows geographers to conduct research on environmental changes. GIS, as an information-acquisition and interpretation device, has enhanced geographers' ability to perform accurate high-level research. (Encarta, 2007)

1.5 BASIC RESEARCH METHODOLOGY IN GEOGRAPHY

At the end of this section, you will be able to:

- use basic elements of research in your action research.

Key Terms

- Research problem
- Hypothesis
- Interview
- Sampling
- Questionnaire
- Research report
- Bibliography
- Data analysis
- Primary data
- Secondary data

Can you distinguish a research method from a research methodology?

The following three terms are related to one another, but vary in scope.

- *research, research method, and research methodology.*

A research project is an inquiry into a problem. The researcher's motivation might be curiosity or a specific objective. Research is the foundation of research methods and methodology. Research results are important guides for solving many business, social, academic and other problems.

A research method or technique is a skill that uses different steps or elements to solve the identified problem and arrive at a possible solution. The main methods are:

- *the collection and organization of data necessary or related to the problem.*
- *the use of statistical parameters to treat and interpret the organized data.*
- *the evaluation of the accuracy of the result obtained.*

The concept of research methodology is much broader than the former two concepts. It is a science that studies how research is done scientifically. It considers:

a why the study is undertaken (its significance at various levels)
b how the research problem is identified
c what assumptions or hypotheses are formulated
d what type of data are collected
e why a particular method or technique of analyzing the data is chosen

In short, research methodology has wider dimensions than research method or technique. It is the philosophy or logic behind the research. Studying basic geographic research methodology gives you the training you need to acquire the skills below:

- *gathering materials and data and arranging them*

- *participating in field work*
- *preparing questionnaires, interviews, etc.*
- *using statistical techniques*
- *interpreting and reporting results of the study that you have designed or proposed.*

Activity 1.2

Form a group and study the following two options for your group work. Choose the one that best suits your school environment and perform the activity.

1. Ask your teacher to identify some one who is experienced in performing research. Invite that person to visit your class and conduct a discussion session on
   - a what research is
   - b the significance of research
   - c the relevance of research for geography
2. Using Encarta or Internet or other possibly accessible materials, conduct a group discussion inferring the different concepts stated between a research technique and a research methodology.

Note

Research is a time, money and other costs consuming activity but empowers you to understand, be logical and be a good observer.

Basic Elements of Research

After considering basic questions of the research methodology for their projects, geographers conduct their research by performing the following tasks:

- *identifying or formulating the research problem*
- *defining the significance of the study for solving the problem*

- *defining the study of the problem area*
- *defining the objectives of the study*
- *defining the scope and limitations of the study*
- *reviewing the literature*
- *developing a working hypothesis*
- *preparing the research design*
- *defining the sample design*
- *collecting and organizing the data*
- *analyzing the data by using statistical techniques*
- *generalizing and interpreting the data*
- *preparing the research report, based on the findings*
- *compiling the bibliography/references*

In what follows, we look at these elements:

A *Identifying or Formulating the Research Problem*

At the very beginning of a research project, the researcher must choose the problem to study. In other words, the researcher must define the area of interest. A good approach to defining a research problem is to discuss it with people who have significant experience performing research in the study area and to read the literature related to that area.

Investigating the causes of a problem is an important factor for identifying its solutions. In some cases, a problem has multiple causes that you must identify.

B *Defining the significance of the study for Solving the problem*

The significance of a research project differs from its objectives. Its significance is its importance at a local, regional, national or global level.

To be significant, a study must benefit a society or community by:

- *providing new discoveries*
- *improving existing situations*
- *demanding new decisions*
- *enriching or refuting already existing theories*

C Studying the Problem Area

When we study the problem area that a research project addresses, we create a detailed bird's eye-view for ourselves and others who will access the research. As we study the problem area, we identify problems and eliminate ambiguity. This step is particularly important when we research the spatial distribution of phenomena and things.

D Defining the Objectives of the Study

A study's objectives are the goals the researcher intends to achieve through the research project. In this step, general and specific objectives are set. The general objectives provide short statements of the goal, while the specific objectives provide detailed inter-connected statements.

E Defining the Scope and Delimitation of the Study

Research requires time, financing and skilled manpower or professionals. These factors are not always available at required levels. Shortages of these resources limits the spatial dimension that the research can cover. It also limits the quality of the research work. The greater the accessibility or spatial extent, the wider is the scope and the amount and quality of information to be obtained; which, in turn, leads to greater competency.

F Reviewing the Literature

Did you have the experience of reviewing books? After reviewing, you may have the main idea. Try to remember that idea.

Reviewing the literature means identifying, reading and analyzing documentation related to the research you plan to perform. For example,

- *books*
- *academic journals*
- *conference proceedings*
- *government reports*
- *published and unpublished documents related to the problem*

For quantitative research, the literature review can help you identify the variables and their relationships. You need to understand them in order to establish an appropriate hypothesis.

For qualitative research, the literature review helps you to expand your knowledge of the research subject.

G *Developing or Formulating a Working Hypothesis*

How do we develop a working hypothesis?

A hypothesis is a preliminary assumption or tentative explanation that accounts for a set of facts, taken to be true for the purpose of investigation and testing a theory.

Establishing a working hypothesis is crucial for research in all disciplines including geography. The information you gain from your literature review will help you to formulate an appropriate hypothesis.

The hypothesis you develop will guide you as you define the types of data to collect and decide which methods of data analysis you will use.

A working hypothesis can be formulated based on the ideas you gather from:

a conducting discussions with experts,

b inferring from the work of others on similar studies,

c personal investigations of conducting original field interviews with interested parties and individuals.

A hypothesis must have the following characteristics. It

a should be clear and precise

b should be capable of being tested or verified

c should state relationships between the variables determined

d must explain the facts that give rise to the explanation

H *Preparing the Research Design*

What is the basis for preparing a research design?

After formulating the research problem, you prepare a research design. The research design is the conceptual framework within which the research could be conducted. It helps you collect related evidence. It also helps you to limit required time, effort and expense.

The preparation of an appropriate research design for a particular problem involves the following considerations.

i the means of obtaining the information

ii the competence of the researcher

iii the time available for the research

iv the money available for the research

A research design answers such questions as these about your research project and its subject: what, where, when, how much and by what means.

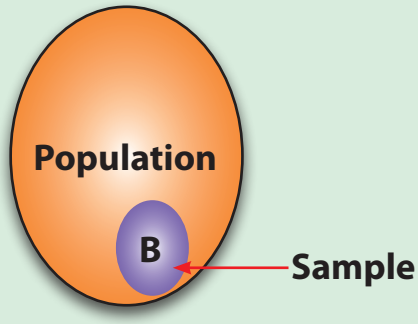
I *Defining the Sample Design*

What factors influence in determining the sample design?

We typically study *samples* of the total population in question, rather than studying the entire population. If a population is very large, and we try to address the entire population, our project might be too large to be practical. For example, the amount of information we would need to identify, gather, organize and analyze might be too large to manage.

Choosing the *population sample* is called *sampling*. The resulting study is called a "sample study". To serve a useful purpose, a sample should be free from bias and should appropriately represent the population.

Example



Where

A = **Population,** which is the total unit (for example, *the total number of students in a school*).

B = **Sample,** which is only part of the total unit but is representative of it (for example, *only the students in two or three grade levels*).

Note

The appropriate percentage or ratio of the size of a population sample to the entire population depends upon the variability of the population. If the population under study is homogeneous (similar) a small sample is sufficient. On the other hand, if the population is heterogeneous, a much larger size is necessary.

J *Designing The Main Techniques for Sampling*

What are the basic techniques adopted in sampling?

There are two main sampling techniques: ***non-probability*** and ***probability***.

i *Non-Probability Sampling*

- *This approach is sometimes known as deliberate or purposive sampling.*
- *The items for the sample are selected deliberately by the researcher.*
- *The basis of such samplings is personal decision.*
- *There is always a danger of bias in such sampling.*

ii *Probability Sampling (also known as 'random sampling')*

- *This approach is often called chance or lottery sampling.*
- *Under this approach to sampling, every item of the population has an equal chance of being included (lottery method).*
- *Only chance determines whether an item is selected or not. Once an item is selected for the sample, it cannot appear again.*

There are different types of probability sampling (Random sampling). You will learn about them when you reach the college level.

K *Collecting and Organizing the Data*

What is data? How do you collect it?

There are two types of data collection: ***primary*** and ***secondary***.

i ***Primary Data Collection:*** This type of data collection is *original* in character. The research produces the data, rather than relying on existing data.

There are several ways of collecting primary data. The important ones are based on

- *The researcher's personal observations.*
- *Interviews conducted through telephone conversations and in person.*
- *Questionnaires: A questionnaire consists of a number of questions printed or typed on a form or set of forms. The questionnaire is given to the respondents, who then fill it out by themselves. The questionnaire could be given to and collected from the respondents through the mail, by e-mail, or in person.*
- *discussion with groups of people.*
- *Primary data collection may also make use of schedules.*

This approach is similar to the use of questionnaires but differs in one aspect. An assigned enumerator fills out the questionnaire. The enumerator schedules appointments with the respondents, meets with them in person, asks them the questions from the questionnaire, and records their answers.

ii ***Secondary Data Collection:*** This type of data collection investigates data that has already been collected, organized and arranged by someone else. Secondary data may be either published or unpublished:

- *Published data include:*
  - *publications by governments*
  - *publications by NGOs*
  - *journals*
  - *magazines and newspapers*
  - *reports by universities, scholars, etc.*
  - *historical records, etc.*
- *Unpublished data include:*
  - *diaries*
  - *letters*
  - *unpublished biographies, etc.*

L *Analysis of the Data*

Data analysis is an essential aspect of the scientific study of problems and discovering their solutions. This step involves the use of statistical techniques to measure relationships of the geographic variables defined in the hypothesis. The

important issue in this step is the selection of appropriate measuring techniques.

Different statistical techniques are employed in analyzing collected data. The statistical techniques vary, depending on the nature of the geographical research, the variables investigated, the ability of the researcher etc.

At this class level, you can use:

i simple ratios and percentages

ii pie charts and compound graphs

iii measures of averages and raw-data variances

Processing research data with statistical techniques results in new *discoveries* or *findings,* followed by *interpretations*. Then, based on the findings, *recommendations* are made.

Note

Be sure that your recommendations are realistic.

M *Preparing the Research Report, Based on the Findings*

The research report is a major component of the study. Until the report is written or presented, no one can use the research results. The report must be clear and accurate.

Even if your hypothesis is brilliant, your research sampling and statistical technique accurate, and your results extremely important, they are of value only if your readers can understand and appreciate them.

To create a good report, you must prepare it carefully. A good report is the product of concentration, accuracy and the logical arrangement of your facts and ideas.

N *Compiling the Bibliography /References*

Compiling a bibliography is the final step of your research project. A bibliography is a list of written materials relevant to the research study you have performed. It includes all books, documents, etc that you referred to as you prepared for and conducted your project.

Arrange the items in your bibliography alphabetically. Use these formats:

For Books and Pamphlets

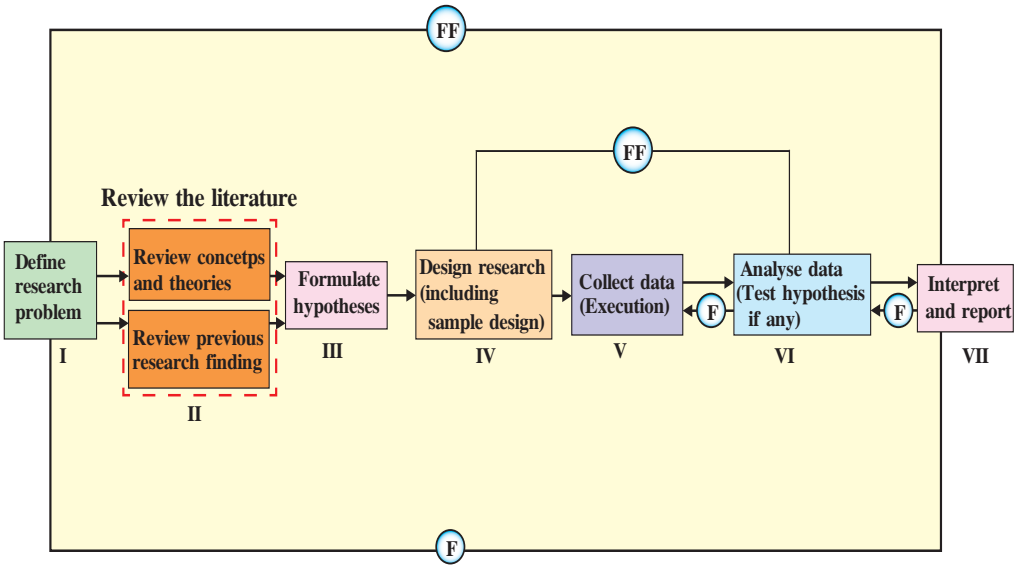
1. Name of the author, last name first.
2. Title, underlined or in italics
3. Place, publisher and date of publication
4. Volume(s) number(s)

Example: Getas A, (2007), *Introduction to Geography*, 2nd edition, Mc Graw Hill, New york.

For Magazines and Newspapers

1. Name of the author, last name first
2. Title of article, in quotation marks
3. Name of the periodical, underlined to indicate the practice of italics in printouts.
4. Volume number
5. The date of the issue
6. Page or page range

Research Process in Flow Chart



where

F = feedback (*Helps in controlling the subsystem to which it is transmitted*)

FF = feed forward (*Serves the vital function of providing criteria for evaluation*)

1.6 CONDUCTING ACTION RESEARCH

At the end of this section, you will be able to:

- conduct action research on selected problems.

Key Terms

- Action research
- Qualitative approach
- Data collection
- Sample size
- Data analysis
- Data interpreter

Please think of various problems that exist at your school. Then perform the following project.

Under subtopic 1.5, we saw the basic research methodology and elements of research work. Based on that, you will attempt to do a research project practically. It is advisable for you do this in groups.

Action research is an ongoing research process by which a particular real problem is identified, information/data are gathered, practical solutions are tested, conclusions and recommendations are reached and finally improvements are made.

The following are basic features of action research.

- *It is based on reality.*
- *It enables researchers to put ideas into action.*
- *There is rapid feedback.*
- *It aims at improving situations, not at producing new knowledge.*
- *It encourages reflections and further developments.*

When we come to action research at this grade level, you are expected to exercise elementary research work activities since they are also engaged in studying other subjects. Here, the problems identified or selected should be very easy and accessible to the students' capacity, time and availability of sources. Hence, the following steps are thought to be helpful in conducting action research at this level.

Step 1: Selecting the Problem

In identifying or selecting the problem, this gives opportunities to select problems since a problem must come out from the researcher's mind like a fountain comes out from a mountain. The following points may be thoroughly considered in selecting a research problem:

- *the problem selected should not be overdone*
- *it should not be a debatable issue*
- *it must be simple and clear so that it does not discourage the participants or the students involved in research-work*

Example:

Assume that the selected problem from the three proposed problems is "Low grade achievement of arts students in mathematics exams."

Step 2: Objectives of the Study

The objective of the action research is to discover the reasons why art students are low achievers and finally find a solution to minimize the problem. This step or process is a very pertinent part that will lead to decide on the type and nature of data to be collected.

Step 3: Making Review of Literature

This process actually gives the students more ideas, clues and attempted solutions from previous work about how to minimize achievement of low grades in a given subject. Review literatures should be related to the selected problem that should be dealt with. The availability of a good library or previously done papers is very essential for this. Teachers should guide the students from where to get the required materials. If documents are not available in the school library, the teacher should visit affiliated offices and agencies to get information.

Step 4: Establishing Working Hypothesis

A hypothesis is often considered as the principal tool in research. Its main function is to put forward an assumption that can be verified by the research. In fact, many action research projects, establish hypotheses. However, it will be difficult for grade 12 students to conduct hypothesis formulating and testing processes. Both skills demand high competence and experience. It is because of this fact that the problem identified, "why most art students often achieve low grades in mathematics than science stream students", is forwarded for conducting action research at this level.

This action research makes use of the qualitative approach. The data collectable could be based on interviews and questionnaires. Sample questionnaire formats are suggested below.

Activity 1.3

Investigating and finding a solution why most art students are less competent than science students in mathematics.

Sample Questionnaire Format

Questionnaire format A

(to be filled in by students)

1 Name of the school _____
2 Grade level _____section ____
Academic year _____
3 Average grade results in
grade 9 _____
grade 10 _____
grade 11 _____
4 Which subject do you like best? Mention only three of them.
1 _____
2 _____
3 _____
5 Are you good in mathematics (Yes or No) _____
6 If your answer is no, give your reasons _____
_____

Thank you,

Questionnaire format B

(to be filled by mathematics teachers)

1 Name of the school _____
2 Grade level _____ section _____
Academic year _____
3 What percent of your
a arts-stream students are good in mathematics? _____
b science stream students are good in mathematics? _____
4 Which-stream is active when you teach? Arts or science _____
5 Please give us your opinions about why art students are not as competent in mathematics as science students.
_____

Thank you,

Step 5: Determining the Sample Size

When research is done, taking a sample is essential. Determining your sample size can vary because all the students learning this topic at this grade level have different class size, different student combination of age, caliber, etc). Let us say that 20 % of the population under study will suffice as the sample size. If the class size is 100, twenty students are taken as the sample size. In order to avoid personal interest or making the sampling random, use a technique of lottery system.

The selected 20 students represent the 100 students. All the information they give represents the whole class or section.

Step 6: Collecting the Required Data

Under this research work, the easiest way of collecting data from the selected sample size could be:

a either through personal interview or

b through questionnaires

The students should prepare questionnaires made up of items that attempt to get answers regarding why most arts students are relatively lower grade achievers in mathematics than most of science students.

Step 7: Analysis of the Data

In order to analyze the collected data, the teacher should help the students understand how to organize the data in a tabular or graphic form. From the table, the students can create:

a simple ratios/proportions

b bar graphs/line graphs

Step 8: Generalization and Interpretation

After applying simple ratios or graphs, the students can make comparisons and generalizations. They can prove that most science students are good in mathematics than arts students. After that, possible solutions could be gathered from the questionnaire and employ the solution to reduce the number of art students scoring low marks in mathematics.

Step 9: Preparation of the Report

It may be difficult to hear the report of every student. Students could be grouped as it was done at the very beginning. The students should bear in mind that their reports must include:

a a clear statement of the objective and the explanation of the method used to analyze the data,

b a summarized generalization of the discovery or finding obtained, and

c finally forward the possible solutions that could change the attitude of most arts students towards mathematics.

It is advisable that selected students read their report to the class, or if possible even at the flag ceremony.

Unit Review

UNIT SUMMARY

- Research is a scientific method of investigating answers for the problems identified.
- Development in any country depends, among other things, upon its research capability.
- There are two basic approaches often used in geographical research works. They are quantitative and qualitative approaches. Their difference lie mainly in the attributes considered to be measured and the techniques chosen to be used.
- Geographical research works are different from the research work of other disciplines/sciences. They are very much concerned with spatial distributions and organizations of things and phenomena in time bound. They also consider the forces that results in determine the distributions.
- In the study and analysis of spatial aspects, geographical research procedures and techniques with other sciences. For example, identifying the research problem, defining the objective and significance of the research, reviewing literature related to the study, formulating a working hypothesis, etc.
- Finally, developing the skill of making action research to solve their problems.

REVIEW EXERCISE FOR UNIT 1

I ***Multiple Choices: Choose the best answer from the given alternatives for the following statements and questions.***

1 Which of the following geographical approaches is used for confirming a given theory?

A quantitative approach
B qualitative approach
C A and B
D descriptive approach

2 When distance as a varying factor determines the variation of other factors, then distance in research is a

A dependent variable
B Subordinate variable
C independent variable
D A and B

3 Traditional geographic research was largely concerned with the study of

A sustainable environments
B spatial analysis
E locations of places and people
F environmental hazards

4 The International Geographic Union Commission's priority vision is

A the promotion of geographical education all over the world at all grade levels
B the promotion of geographical education in developing countries
C the achievement of sustainable development through the spread of geographical education
D A and C

5 The 1950s and 1960s were decades of great changes in the science of geography because

A geography revolutionized its research methods, adopting quantitative techniques.
B the launching of the space shuttle took place.
C geography was assisted by computer-based data sources.
D the technology of remote sensing was adopted in teaching geography

6 Which of the following concepts are guiding and especially useful in research practices in geography?

A research technique
B research method
C research methodology
D research desire
E A, B and C

7 Which of the following steps should come first during a geographical research project?

A identifying causes
B identifying problems
C formulating hypotheses
D designing research sampling techniques

8 Reviewing literature in geographical research

A widens the researcher's knowledge of the issue to be researched

B helps the researcher to formulate working hypotheses

C helps the researcher to identify appropriate methods

D all of the above

9 One can claim that a geographical research project is complete when the

A working hypothesis is made

B sampling design is finished

C collected data is analyzed

D report is presented

II ***Questions to Think Over:***

10 What are the main problems in performing research projects in your own school? Please discuss this question in your group.

11 Have you ever thought of questioning why your grades are good or poor in mathematics? Please discuss the issue with your art-stream group and science-stream group peers.

12 National and international groups are giving serious attention to the impact of AIDS. Can you go to a nearby health center and collect data regarding the number of victims in different age groups? After performing this investigation, compare the percentage of young victims to the total number of victims.