Knowledge Analysis:

Objective:

- ✓ understand and work with Concepts and Types related to Research

Prerequisites:	Essential Questions:
A student has Knowledge of : 1. General terms used in the Science, Mathematics and Social Sciences at School level. 2. General idea of Scientific and Technological Development	1. What is the relation between Knowledge and development? 2. What are the general problems discussed in the area own knowledge discipline/ subjects?

Instruction (Referencing):

Content & Mode of Transaction:

Content	Mode of Transaction
1. Scientific inquiry and its nature 2. Meaning, purpose and characteristics of research 3. Types of research and their characteristics 4. Steps of Research	Lecture with Presentation (1 hour)

INTRODUCTION:

Knowledge is required for development and enhancement of quality of human life. Search for knowledge and creation of new knowledge is continuous process which is popularly called as Research. Research is systematic, scientific enquiry for any kind of knowledge. It explores the plural ways to solve problems of all fields of work and knowledge belonging to our being. It is a meaningful journey from known to unknown.

The knowledge and research are playing vital roles in the development since we have been existing on this planet. The evolution of different forms of knowledge and research is unending but the last two centuries are very crucial in the history of development of mankind. These centuries have brought an unbelievable change in the human life and all sectors of development. The cause behind the change is knowledge and research revolution in the western world. This process of change has many socio-cultural-political-economic-religious aspects. However, this is true that the focus of research was towards the Science and Technology. Now days the quest for knowledge and research is neither bound to science and technology nor specific field of knowledge nor selected countries.

Research is a complex and a non-stop process. Thus, it is not possible to direct a clear, singular path beginning from a specific point to reach a specific end. However, it is necessary to design and develop some worth map of some kind that may help in dealing with problem in limited context. The knowledge of methodology is required to designing of worth plan that one can think appropriate, rational and can go ahead with it.

The present module introduces the concepts and ideas related to Research and methodology of research. It will help the beginners to shape their ideas, understanding the terminology of scientific inquiry-research process and begin the research smoothly.

SCIENTIFIC METHOD AND SOURCES OF KNOWLEDGE:

We need different knowledge forms in our life. The personal as well as societal development depends on the quality and volume of knowledge and the ability to apply it .and for knowledge we depend on various sources of knowledge. Few of the popular sources of acquiring knowledge are as follows:

- Tradition and Beliefs
- Authority/ Scholars/ Academicians/Experts
- Personal Experience
- Books and Literature
- Scientific works and Institutes

Scientific work is recognized as most valid way of knowledge which is based on systematic method known as Scientific method.

Science belongs to precision and exactness. It is treated to be universally applicable. However, the Social Sciences or the human behavior related studies, discipline cannot show such exactness or universal applicability.

An enquiry is a natural technique for a search. But when it's used systematically and scientifically, it takes the form of a method. Thus, it is termed as Scientific method and it is recognized that it is applicable to the Science as well as Social Sciences / humanities also.

Scientific method is based on Inductive and Deductive logic. It is observed that many of the time neither Inductive nor Deductive logic is competent to solve the problems. Science explains cause and effect relationships and the facts behind the phenomenon. It is intended towards two principle functions:

1. Development of theories
2. To formulate hypotheses based on the theories to solve the problems

Aristotle's Deductive method and Bacon's inductive method are integrated to develop Scientific method. This method is exclusive in many aspects from other sources of knowledge those we have mentioned before. John Dewey's reflective thinking system has explained Scientific method consisting of few basic steps. Those are as:

1. Identification and definition of the problem:

In this step the researcher identifies the problem derived from own observations, review of literature or discussion with experts etc. and defines the terms or variables involved in the problem the problem

2. Formulation of hypothesis:

Hypothesis is probable solution of the problem based on the previous knowledge, theories or observation, assumptions. It is a kind of hunch or an intelligent guess which may be proposed as tentative solution of the problem. Hypothesis is derived through deductive reasoning. It is statement of solution which may be true or false after its testing.

3. Collection and analysis of evidence:

The evidences or data is collected through observation; experimentation etc. to verify the hypothesis. The data may qualitative or quantitative. It is desired that the data/ evidences must be true, derived through valid sources and tools.

4. Verification of the hypothesis:

This step is proposed to verify the hypothesis whether the data/evidence support hypothesis or not. In case of finding the evidences/data in support of hypothesis, it is accepted to be true. If it doesn‘t the hypothesis, it is not rejected or modified if found necessary.

5. Inference and Generalization

The inference is derived from the analysis of data and testing of hypothesis. Theses inferences are generalized in the context of research problem and its background. Higher ability of generalization is an indicator of higher authenticity and validity of research work.

MEANING, DEFINITIONS AND CHARACTERISTICS OF RESEARCH:

Etymologically the term research comes from French word "recherche", which means "to go about seeking", the term is derived from the a compound word "Re-" + "Search", meaning 'search again and again'. The emphasis on ‘again and again search’ shows that it is purposed to find true, valid knowledge about something.

There are plural definitions of research according to plural perspectives. Few of them are mentioned here.

- Research is act of careful or meticulous search

- Research is systematic way of knowledge creation and its application for problem solving.
- According to John W. Creswell, Research is a process of steps used to collect and analyses information to increase our understanding of a topic or issue.
- Research is process of finding answers to questions in an organized and logical and systematic fashion.

These definitions highlight the purpose, function and nature of the process of research. Some common characteristics based on these definitions may be noted as following:

- Purposeful, Planned and Focused
- Rational, Relevant and Replicable
- Empirical, Evidential and Ethical
- Coherent, Comprehensive, Consistent and Continuous
- Testable and Time bound
- Logical and Attainable

PURPOSE OF THE RESEARCH

The act of research is an exclusive feature of human being. It is developed and evolved after very long efforts in the different faculties of knowledge. Irrespective of Faculties, discipline and perspectives of research the purpose of research may be noted as following:

1. Search for Truth of existence or reality
2. Creation and enhancement of knowledge in different disciplines
3. Formation/ revision/ application of different theories
4. Development in different sectors of human life.
5. Welfare of man, society and nature

TYPES OF RESEARCH:

Research may be classified in several ways according to Approach, functions, methods, nature of data or disciplines of knowledge. (Examples : Research in natural and Social Science, Qualitative and Quantitative research etc.). Here, three types of research are described which are applicable for all approaches, methods or knowledge disciplines.

Fundamental Research:

The approach of this research is to create knowledge and develop new theories. Fundamental research is longitudinal and has no immediate and simplified application to the practical problems.

According to Travers, Fundamental research is dedicated to enhance existing body of scientific knowledge and does not necessarily produce results of immediate practical value. Some it is intended to challenge existing knowledge, theories or revise them.

This type of research draws its pattern and spirit from the physical sciences. It represents a rigorous and structured type of analysis. It employs careful sampling procedures in order to extend the findings beyond the group or situations and thus develops theories by discovering proved generalizations or principles. The main aim of basic research is the discovery of knowledge solely for the sake of knowledge.

Applied Research:

This type of research belongs to practical problems and they have immediate, clear implication value. Applied research uses the existing body of knowledge and theories to solve the identified problem. Thus, the nomenclature of this type is 'Applied Research'. Some applied researches have the ability to contribute the knowledge and theories but it is not the primary objective of the research.

Applied research is planned in the response of actual problems and their actual context. Fundamental research and applied research are not contradicting to each other. They are complimentary to each other.

Action Research:

This is kind applied research belonging to actual world of work of an individual. This is treated as most effective way of dealing with problems in the real world that cannot be covered by broad, general applied research.

Action research is not confined to a particular approach, theory, methodology or paradigm. It is aimed to solve actual, micro problems through the application of scientific methods. It is concerned with a local problem and is conducted in a local

setting. The ability to generalize very low in this research and primary goal is to solve the problem.

STEPS OF RESEARCH:

The research process involves following general steps derived from the scientific method.

- Step 1 : Identifying the Gap in Knowledge
- Step 2 : Identifying of the Researchable Problem and variables
- Step 3: Defining the objectives,
- Step 4 : Formulating Hypotheses
- Step 5 : Data Collection (Selection data sources/sampling, Data collection tools and methods)
- Step 6 : Testing the Hypotheses :
- Step 7 : Analysis and Interpretation of the Findings:
- Step 8 : Conclusions , Comparing the Findings with Previous literature, generalization and recommendations

These steps give general idea of research procedure. The steps vary according to nature of problem, approach and method adopted by researcher, skill of investigator etc.

SUMMARY:

Knowledge plays key role in the process of development and change. There are various sources of knowledge but the scientific inquiry is most authentic and valid source because it is comprised of both inductive and deductive logic in a systematic way. It begins with identification of problem. Then a hypothesis which means a tentative solution of problem is proposed on the basis of observations, assumptions and previously proven things. Adequate evidences are collected and the hypothesis is tested by employing different statistical analysis techniques to draw a valid conclusion.

The concept of research is closely associated with scientific inquiry. It adopts the scientific inquiry but it is different in many aspects. Research is process of problem solving in systematic way and creation of knowledge. There are many types of the research according to purpose, nature of problem, approach and methods, subject disciplines etc.