<u>Unit-I</u>

Meaning of Research:

Research is a systematic process of active inquiry and discovery through collecting, analysing, and inferring from data so that we can understand a given phenomenon in which we are interested. Research is driven by a question or problem that guides the process for seeking information with a clear goal in mind. It works best when done step-by-step. The steps may need to be repeated, as the process is reiterative. In other words, research is the collection and interpretation of data in an attempt to resolve a problem at hand or to answer a question. It goes beyond facts and out-of-date ideas by taking a new look at the information and making a fresh stand.

It is simply the process of arriving at dependable solution to a problem through the planned and systematic collection, analysis and interpretation of data. Research is the most important process for advancing knowledge for promoting progress and to enable man to relate more effectively to his environment to accomplish his purpose and to resolve his conflicts. Although it is not the only way, it is one of the more effective ways of solving scientific problems.

The term 'Research' consists of two words: Research = Re + Search
'Re' means again and again and 'Search' means to find out something, the following is the process: Therefore, research means to observe the phenomena again and again from different dimensions.

For example, there are many theories of learning due to the observation from different dimensions. The research is a process of which a person observes the phenomena again and again and collects the data and on the basis of data he draws some conclusions. Research is oriented towards the discovery of relationship that exists among phenomena of the world in which we live. The fundamental assumption is that invariant relationship exists between certain antecedents and certain consequents so that under a specific set of conditions a certain consequent can be expected to follow the introduction of a given antecedent.

Data, information and research findings:

Data are the raw facts that record measures of certain phenomena which are necessary to constitute a research work, whereas information is the presentation of facts in a suitable form for researchers to make decisions. Research findings are the outcome of the research described through effective information. Findings are obtained through a rigorous process by using primary data, secondary data, statistical analysis, and so on. Primary data is the type of data which is sourced directly from the respondents/target users. It is also called raw data and can be in the form of numbers, figures, ranks, weights, and other similar response forms. The researcher needs to analyse this information in order to uncover the findings. Primary data is obtained through the researcher's involvement in the process, either through direct surveys and/or field work. Secondary data is the type of information which is already in an organized form. The data has had prior work performed on it and it can be further used for other purposes.

Commonly, secondary data sources include websites, published journals, conference papers, books, research reports, etc. In order to construct research findings, one has to utilize information in terms of data. Information should be relevant, i.e., information should be aligned with the core subject matter and not be on the periphery. The quality of information depends on the degree of data processing that has been verified and is authentic.

Characteristics of Research:

The nature and scope of any research is extensively rigorous with its conclusion in mind. But, most of the researches have the following characteristics in common –
1. It gathers new knowledge or data from primary or first-hand sources.
2. It places emphasis upon the discovery of general principles.
3. It is an exact systematic and accurate investigation.
4. It uses certain valid data gathering devices.
5. It is logical and objective.
6. The researcher resists the temptation to seek only the data that support his hypotheses. 7. The researcher eliminates personal feelings and preferences.
8. It endeavours to organise data in quantitative terms.
9. Research is patient and unhurried activity.
10. The researcher is willing to follow his procedures to the conclusions that may be unpopular and bring social disapproval.
11. Research is carefully recorded and reported.
12. Conclusions and generalisations are arrived at carefully and cautiously.

Sources of Knowledge:

If we consider how we have learned about the world around us, eventually it will point towards the sources of our knowledge that resulted in accumulation whatever is in our mind (e.g., parents, friends, books, tradition, culture, thinking, experiences). As research is primarily concerned with knowledge, we need to know the sources of it for better understanding the vivid scope of research in all spheres of our life.

> The study of knowledge—including its nature, how it is gained or generated, how it is warranted, and the standards that are used to judge its adequacy—is known as epistemology. Epistemology sometimes is called the "theory of knowledge." There are many different ways that we gain knowledge in everyday life which builds the foundation of our research –

- *Authority:* Authorities or experts are one source of knowledge. For example, we develop ideas about the world through individuals we know personally such as our parents or guardians, friends, and teachers. We also develop ideas about the world through experts we may or may not know personally, including leaders in major societal institutions such as the news media, religious authorities, the Census Bureau, politicians, health care experts, and others. It is important to bear in mind that each of these authorities has his/her own perspectives and biases. Factors such as religion, political leanings, education, and status characteristics, including race, class, gender, and sexuality, may influence authorities' ideas as well as our own.

- *Tradition or Cultural beliefs:* Cultural beliefs are another common source of knowledge. For example, our ideas about race and racism have changed over time as our culture has

changed. In order to understand how biased our cultural understandings can be, consider norms regarding race before the civil rights movement. At that time, strongly held ideas about race, which most people would find racist today, were taken for granted.

- *Personal experience:* We also develop knowledge from our personal and sensory experiences. We learn about our world based on what we see, hear, smell, taste, and touch. Sometimes these different ways of knowing coalesce to convince us of something. For example, as children, authority figures such as parents may tell us not to touch the stove because it is hot and we will burn ourselves. Then, if we do accidentally touch the stove and it hurts, our personal sensory experience confirms for us what we were told. In a more complex example, if we personally experience or witness racial profiling or stereotyping, we may be more apt to believe that others experience the same.

- *Inductive reasoning:* Another way we come to know something is through thinking, through reasoning. Reasoning refers to the process of using logical thought to reach a conclusion. We can reason inductively or deductively. inductive reasoning involves developing generalizations based on observation of a limited number of related events or experiences. Consider the example of inductive reasoning - *Observation*: An instructor examines five research textbooks. Each contains a chapter about sampling. *Generalization*: The instructor concludes that all research textbooks contain a chapter about sampling.

- *Deductive reasoning:* Deductive reasoning involves essentially the reverse process—arriving at specific conclusions based on general principles, observations, or experiences (i.e., generalizations)—as shown in the next example. *Observations*: All research textbooks contain a chapter on sampling. The book you are reading is a research text. *Generalization*: This book must contain a chapter on sampling. (Does it?)

Although people commonly use experience, authority, cultural beliefs, inductive reasoning and deductive reasoning to learn new things and draw new conclusions from that knowledge, each of these approaches to understanding has limitations when used in isolation. Some problems associated with experience and authority as sources of knowledge are graphically illustrated in a story told about Aristotle. According to the story, one day Aristotle caught a fly and carefully counted and recounted the legs. He then announced that flies have five legs. No one questioned the word of Aristotle. For years his finding was accepted uncritically. Unfortunately, the fly that Aristotle caught just happened to be missing a leg! Whether or not you believe the story, it illustrates the limitations of relying on personal experience and authority as sources of knowledge. The story also points out a potential problem with inductive reasoning: Generalizing from a small sample, especially one that is atypical, can lead to errors. Deductive reasoning, too, is limited by the evidence in the original observations. If every research text really does have a chapter on sampling, and if this book really is a research text, then it follows that this book must have a chapter on sampling. However, if one or more of the premises is false (perhaps some research texts do not have a chapter on sampling), your conclusion may also be wrong. When we rely exclusively on these common approaches to knowing, the resulting knowledge is susceptible to error and may be of limited value to understanding the world beyond our immediate experience. However, experience, authority, cultural beliefs, inductive

and deductive reasoning are very effective when used together as integral components of the scientific method of research.

Need of Research in Education:

If doctors were to lose their base of medical research knowledge, most of them would have to stop working. They would have no idea how to treat anything except common ailments. Surgeons, for example, could not perform open-heart surgery if they lacked research-based knowledge about hear functions, anaesthesia, the meaning of symptoms and the likely risks of particular surgical procedures. In contrasts, if educators suddenly were to lose the body of knowledge that has been gained from educational research, there work would be virtually unaffected. Schools would continue to operate pretty much as they do now. It is difficult to imagine teachers who would refuse to teach students because they didn't possess sufficient research-based knowledge about the learning process or the effectiveness of different instructional models.

The point of this comparison of medicine and education is that, research still has relatively little influence on the day-to-day work of educators. Then why should one do educational research? The usual answer to this question is that educational research develops new knowledge about teaching, learning and educational administration. This new knowledge is of value because it will lead eventually to the improvement of educational practice.

There are four types of knowledge that research contributes to the field of education –

- Description: Many research studies involve the description of natural or social phenomena – their form, structure, activity, change over time, relationship to other phenomena and so on. Many important scientific discoveries have resulted from researchers making such descriptions. For example, astronomers have used their telescopes to develop descriptions of different parts of the universe, new galaxies and have determined the structure of the universe. The descriptive function of research is heavily dependent upon instrumentation for measurement and observation. Researchers sometimes work for many years to perfect such instruments – for example, electron microscopes, galvanometers, standardized tests of intelligence, aptitude etc. Descriptive studies have greatly increased our knowledge about what happens in schools. Some of the most important books in education, such as *Life in Classrooms* by Philip Jackson, *The Good High School* by Sara Lawrence Lightfoot, *Amazing Grace* by Jonathan Kozol, have reported studies of this type. Some descriptive research is intended to produce statistical information about aspects of education of interest to policy makers and educators. The findings of these educational researches sometimes make its way into newspapers, thereby influencing the way community members and policy makers think about the quality of the educational system.

- Prediction: Another type of research knowledge involves prediction, which is the ability to predict a phenomenon that will occur at time Y from information available at an earlier time X. A student's achievement in school can be predicted fairly accurately by an aptitude test administered a year or two earlier. Educational researchers have done many prediction studies to acquire knowledge about factors that predict students' success in schools and in the world of work. One reason of doing such research is to guide the selection of students who will be successful in particular educational settings.

Another purpose of prediction research is to identify students who are likely to be unsuccessful as their education progresses so that prevention and remedial programmes can be planned.

- Improvement: The third type of research knowledge concerns the effectiveness of interventions. Many educational research studies are done to identify interventions, or factors that can be transformed into interventions, for improving students' academic achievement.

- Explanation: The fourth type of research knowledge – explanation – is the most important in the long term. In a sense, this type of knowledge covers the other three terms. If researchers are able to explain an educational phenomenon, it means that they can describe it, can predict its consequences, and know how to intervene to change those consequences.

Further Readings:

1. *Introduction to Educational Research: A Critical Thinking Approach* (2nd Edition), W. Newton Suter, Sage Publication: 2012
2. *Research Methods in Education* (8th Edition), Louis Cohen, Lawrence Manion and Keith Morrison, Routledge: 2018
3. *Educational Research*, James B. Schreiber & Kimberly Asner-Self, Wiley: 2011
4. *Educational Research: An Introduction* (7th Edition), Meredith D. Gall, Joyce P. Gall, Walter R. Borg, Allyn & Bacon (Pearson): 2003
5. *Educational Research: Contemporary Issues and Practical Approaches* (2nd Edition), Jerry Wellington, Bloomsbury: 2015
6. *Fundamental of Research Methodology and Statistics*, Y. K. Singh, New Age International Publishers: 2006
7. *Educational Research: Competencies for Analysis and Applications* (11th Edition), Geoffrey E. Mills & L. R. Gay, Pearson: 2016
8. *Research Methods in Education, Wang Li*, Peng Liping, Qutub Khan, Sage Publication: 2019