METHODOLOGY OF EDUCATIONAL RESEARCH

Fundamental – Applied and Action Research

In general, research is classified into three types: Basic, Applied, and Action Research.

Basic Research:

- According to Menon (1982): "Basic research by definition is at the frontiers of our knowledge, and the quality of work and achievements have to be judged by the international scientific community. Quite clearly those who would accomplish such research have to process capabilities necessary for works at frontiers of science a competitive international basis".
- Basic research is designed to add an organized body of scientific knowledge and does not necessarily produce results of immediate practical value (Travers, 1948).
- It is concerned with the formulation of a new theory or existing body of knowledge.
- The other name of this research is known as pure or fundamental research.
- Its main aim is to discover of knowledge, and obtain and use to formulate, evaluate theory.

Applied Research:

- Applied research is undertaken to solve an immediate practical problem and the goal of adding to scientific knowledge is secondary (Travers, 1948). It is a performed in relation to actual problems and under the conditions in which they are found in practice.

Basic Research	Applied Research
The basic aim to known something.	The basic aim is to do something.
Carried out to contribute to the existing body of knowledge.	Adding knowledge is the incidental outcome.
The researcher adopts rigorous laboratory techniques in order to gain control over the situation but the precision. So gained may or may not guarantee relevance to the findings.	Research inquiries are conducted in complicated psycho-sociological climate; hence suffers from lack of control and precision but the findings can have relevance for application.

The motivation for the researcher is the intrinsic value of the research.	The motivation is extrinsic because the researcher attempts immediate solution to the practical problem.

Action Research:

Action research is a small-scale intervention in the functioning of the real world and a close examination of the effects of such intervention. It is a relatively new dimension in the field of research. Educational research once was the province of the well trained research experts only. The approach of action research emphasizes the actual practitioners, teachers and administrators to do research for testing theories, discussing the problems, organizational issues and so on, so that simple classroom problems, organizational problems of teachers and heads could be scientifically approached by evolving suitable techniques out of the research data. Action research can be desirable and feasible in education to meet such a necessity. Action research is focused an immediate application.

Definitions:

- Good Carter, V. (1959): "Action research is researched by teachers, supervisors, and administrators to improve the quality of their decisions and actions".
- Corry, S.M. (1962): "Action research is the research a person conducts in order to enable him to achieve his purpose more effectively. A teacher conducts action research to improve his own teaching. The school administrator conducts action research to improve his administrative behaviour".
- Mouly, C.J. (1964): "On the spot research aimed at the solution of an immediate problem is generally known in education as action research".
- Best, J.W. (1963): "Action research is focused on the immediate application, not on the development of theory. It has placed its emphasis on a real problem, here and now in a local setting".

Features of Action Research:

- It is situational - concerned with diagnosing a problem in a specific context and attempting to solve it in the context.
- Collaborative –teams of teacher researches or any such team of practitioners work together on a project.
- Participatory
- Self-evaluative
- Focused on a specific problem in a specific setting but does not emphasize on generalization.
- Means of remedying problems.

Procedure of Action Research:

Teaching is concerned with action and teacher translates generalizations into specific acts. It is mainly carried out in two stages.

a) Diagnostic Stage: in which problems are analyzed and hypotheses are developed.
b) Therapeutic Stage: -where hypothesis are tested by a consciously directed change experiment.

The process of Action Research includes the following stage:

1. Feel of the problem.
2. Identification of the problem.
3. Defining the problem.
4. Analysis of the problem.
5. Action hypothesis.
6. Action programme.
7. Choice tools.
8. Implementation of the project.
9. Analysis and classification of data and their interpretation and the inference drawn.
10. Overall evaluation of the project.

Formulation of Research Problem:

- It was Albert Einstein who noted that "the formulation of a problem is often more essential than its solution". This is good advice. Too often researchers focus on finding the right answer than asking right question. Many do not realize that defining a problem may be more difficult than solving it. In educational research, if the data is collected before the nature of the problem is carefully thought out, the data probably will not help solve the problem.
- The Adage "a problem well defined is a problem half solved" is worth remembering. This adage emphasizes that an orderly definition of the research problem gives a sense of direction to the investigation. Careful attention to problem – definition allows the researcher to set the proper research objective. If the purpose of the research is clear, the chances of collecting the necessary and relevant information – without collecting surplus information – will be much greater.
- Defining a research problem involves several interrelated steps. They are:
    1. Ascertain the objective.
    2. Understand the background of the problem.
    3. Isolate and identify the problem rather than its symptoms.
    4. Determine the unit of analysis.
    5. Determine the relevant variables.
    6. State the research questions (hypotheses) and research objectives.
- While formulation of research problem, every researcher will be kept in mind following way:
    1. The researcher understanding the problem thoroughly.
    2. Analytical point of view of a problem.
    3. The researcher must refer review of literature.
    4. In next step, the researcher must carefully operationalization of terms from the selected problem.

Criteria for Identifying a Research Problem:

Possible topics for research are assessed in terms of certain considerations and cautions, some of which are given here.

- You should have a personal interest in the topic you select if the experience is to be adequately rewarding. Such interest may exist because the topic intrigues you, or is one in which you have had many pleasant experiences, or is one that has caused you unpleasant concern. Any topic that repeatedly suggests itself to you should be strongly considered.
- The topic you select should be important – not just because you are interested in it but because you believe it makes a true difference in education.
- You might have a keen personal interest in handwriting but unless you can convince yourself that handwriting makes a significant difference in education (and perhaps it does!), you should not select it as a topic for research.
- Basic research is done without regard for whether or not its findings have any practical use. However, your efforts will bring you much more satisfaction if you believe that the findings from your investigations have a good chance of being useful in education.
- While you might be personally intrigued with conditioning students to response to beliefs, lights, and sounds, findings from such studies would probably not have practical use, and would be considered in consequential.
- The newness of a research topic may stimulate your enthusiasm and satisfaction.
- Old does not mean bad – there is value in repeating previous research in order to validate its methods and findings and to see if they hold true over time. However, you may find it much more exciting to explore new topics, where you can bring information to light for the first time.
- In selecting research topics, you must always give attention to time.
- Reflect also on the difficulty of researching the topic in which you might be interested. Many extremely interesting topics are difficult or impossible to research for a number of reasons.
- Select research topics that are interesting but feasible.
- Consider the expenses or costs associated with investigating your topic.
- The research problem should be feasible, interesting, novel, ethical and relevant.

Sources of Problems:

The various sources of problems are:

1. Reviewing of related literature.
2. Suggestions for further research.
3. Consultation with administrators, researchers, and experts in that particular field.
4. Daily life experiences (Day to day events).
5. Reading of books, research trends, articles, newspapers etc.

The choice of a suitable problem is always difficult. The beginning researcher would do well to consider research topics in which he/she has a personal interest with refinement, topics can be formed up to research problems. Education abounds with topics calling for research.

Some Good Sources of Research Topics:

1. Topics for Teachers:

- Classroom environment.
- Instructional materials.
- Classroom management.
- Instruction.
- The relation of human growth patterns to education.
- Evaluation etc.

2. Topics for Administrators:

- Effective Communication.
- Effective Supervision.
- Effective Public Relations.
- Effective Leadership Style.

The most likely sources to which one may go for a suitable problem are:

- Review of the Literature – dissertations, journals reports, reading assignment provide a rich source for beginning researches, by indicating the lacunae prevalent in current topics of research.
- Technological Innovations, e-learning, new techniques and procedures, flexi-timing, team teaching and so forth, provide rich sources of new problems.
- The classroom, the school and the community with which the research is familiar.

Delineating and Operationalizing Variables:

- A constant is a characteristic or condition that is the same for all individuals in a study.
- A variable is a characteristic that takes on different values or condition for different individuals.
- Example: If a study is undertaken where the relative effectiveness of two new teaching techniques on the mathematics achievement of ninth standard students is undertaken, the standard level (ninth) is a constant, as the sample comprise ninth standard students. However, each student would receive different scores on a test to measure the mathematics achievement. So, the mathematics achievement is a variable, because different student score differently on the same test. Mathematics achievement in this care is variable.
- There is another variable in the example above – the teaching technique. In this case, the teaching technique is a categorical variable consisting of only two categories – the two teaching techniques.

Independent and Dependent Variables:

- Where an experiment is conducted, some variable are manipulated by the experimenter, and others are measured from the subjects. The former variables are called independent variables; the latter are called dependent variables.
- In educational research, an independent variable may be a particular teaching method say like programmed learning or CAI, a reward or a period of exposure to a new curriculum. The dependent variable may be a test score, the number of errors, or measured speed in performing a task.

Examples:

- A study of the effect of school location upon attitudes of sixth standard student toward school.
  Independent Variable: Location of school: urban, semi-urban and rural.
  Dependent Variable: Score on the investigator developed inventory to measure attitude.
- A study of job stress of men and women teachers.
  Independent Variable: Gender of the teacher – male and female.
  Dependent Variable: Score on the tool to measure job stress.

Different Types of Variables:

- **Organismic Variable** is a preexisting characteristic of the individuals under study. Gender and intelligence are examples.
- **Intervening Variable** is a hypothetical internal state that is used to explain relationship between observed variables, such as independent and dependent variables, in empirical research. An intervening variable facilitates in a better understanding of the relationship between the independent and dependent variables when the variables appear to not have a definite connection. They are studied by means of operational definitions and have no existence apart, examples of intervening variables include: motivation, intelligence, intention and expectation.

Example: An independent variable in a study on latent learning in rats is the number of practice trails received. Each rat receives an increasing number of trails, as one trail is given per day. The dependent variable is the number of wrong turns (errors) the rats make on a trial. As time, and number of practice trails, increases, the number of errors decreases. Theoretically, an internal state of "learning" intervened between the independent and dependent variables. It was this state that caused the errors to decrease, not the practice trails.

- **Control Variable** is a variable other than the independent variable of primary interest whose effects are determined by the investigator. It is a variable held constant in order to assess or clarify the relationship between two other variables. Commonly used control variables for research on people include sex, age, caste, education and income. Commonly used control variables for research on organizations like schools include school size (number of students or teachers), mission, budget, and location of the school.
- **Moderator Variable** is, in general terms, a qualitative (e.g. sex. Class) or quantitative (e.g. level of reward) variable that affects the direction and/or strength of the relation between dependent and independent variables.

Example: Considered is the case in which a variable **M** is presumed to change to **X** or **Y** causal relationship. So for instance, a certain form of psychotherapy may reduce depression more for men than for women, and so we would say that gender (M) moderates the causal effect of psychotherapy (X) on depression (Y).

- Descriptions of variables are not mutually exclusive. For example, Organismic variables may also be control variables.
- A variable is a concept or construct that can vary or has more than one value. Variables can be classified as categorical (or qualitative) and numerical (or quantitative). **Categorical** variables take on values that are names or labels. The colour of a ball (e.g. red, green) or the result in an examination (e.g. pass or fail) would be examples of categorical variables. **Quantitative** variables are numerical. They represent a measurable quantity. Example, age of a person or population of a country.
- Quantitative variables can be further classified as **Discrete or Continuous.** If a variable can take on any value between its minimum values its maximum value, it is called a continuous variable; otherwise it is called discrete variable. The number of head in tossing of two coins is a discrete variable, which takes 0 or 1 or 2. The weight of a person is a continuous one as it takes all the values with some interval.
- There is another variable we come across in research which is known as **Confounding** variable. A confounding variable is one that provides an alternative explanation for the thing we are trying to explain with our independent variable. A simple example is a study in which we want to find a better method of teaching among two proposed methods. We get two groups of students and teach each with different method. If we get better results in case of one group, then we say that method is superior. If one group has all males and the other group has all females, the better result for one group might be due to the gender variation. So, here the gender is the confounding variable.