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Education

Code:9

UNIT – 6: RESEARCH IN EDUCATION

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Section – 1: Unit at a Glance

Sub unit – 1

Educational Research:

Educational research refers to a systematic attempt to gain a better understanding of the educational process, generally with a view in improving its efficiency.

Educational Research is systematic application of scientific method for solving educational problems, purifies educative process and generates new knowledge.

Principles of Educational Research:

1. Precision in measurement
2. Replication
3. Validity
4. Reliability
5. Objectivity
6. Ethics

Scientific Method:

Scientific enquiry / Scientific method is happy blending of Inductive and deductive method. Initially it proceeds from part to whole to state meaningful hypothesis. Later on it proceeds from whole to part and hypothesis to logical conclusion.

Steps of Scientific Method:

1. Identification and definition of the problem
2. Formulation of hypothesis
3. Implication of hypothesis through deductive reasoning
4. Collection and analysis of evidence
5. Verification of the hypothesis

Characteristics of scientific method:

1. **Replicability:** It is possible when an independent group of researchers can copy the same process and arrive at the results as same as the original study.
2. **Precision:** It refers to theoretical concepts, which are often hard to measure, these must be defined with such precision that others can use those definitions to measure those concepts and test that theory.
3. **Falsifiability:** It means a theory must be stated in a way that it can be disproven. Theories that cannot be tested or falsified are not scientific theories, any such knowledge is not scientific knowledge.
4. **Parsimony:** When there are numerous explanations of a phenomena, scientist must always accept the simplest one. Phenomena should be explained in as economic a manner as possible.

The purpose of exploratory research: to gain background information, to define terms, to clarify the problems, to develop hypothesis, to establish research priorities and objectives, and to develop questions to be answered.

Explanatory Research is conducted for a problem which was not well researched before, demands priorities, generates operational definitions and provides a better-researched model.

Descriptive research may be quantitative or qualitative and use research methods accordingly. It aims to describe what is, by describing, recording, analysing, interpreting conditions that exists. It cannot be used as the basis of a causal relationship.

Fundamental research is not concerned with day to day problems. Basic research is primarily concerned with the formulation of a theory or a contribution to the existing body of knowledge. Its major aim is to obtain and use the empirical data to formulate, expand or evaluate theory. The main aim of basic research is the discovery of knowledge solely for the sake of knowledge.

Applied research is concerned with the solution of immediate, specific and practical problems. The applied research also uses the scientific method of inquiry. It has most of the characteristics of basic research. Moreover, its findings are to be evaluated in terms of local applicability and not in terms of universal validity.

Action Research: Action research designs are systematic procedures used by teachers (or other individuals in an educational setting) to gather quantitative and qualitative data to give immediate solution to the problem, to address improvements in their educational setting, their teaching, and the learning of their students.

Quantitative Research: Quantitative research emphasize objective measurements and the statistical, mathematical, or numerical analysis of data collected through polls, questionnaires, and surveys, or by manipulating pre-existing statistical data using computational techniques. Quantitative research focuses on gathering numerical data and generalizing it across groups of people or to explain a particular phenomenon. Quantitative research is a research involving the use and analyses of numerical data using statistical techniques. These researches create questions of who, what, when, where, how much, how many, and how.

Qualitative Research: Qualitative Research is mainly exploratory research. It is used to achieve an understanding of underlying reasons, opinions, and motivations. It provides insights into the problem or helps to build up ideas or premises for probable quantitative research. It provides textual data.

Research design:

The research design is an overall formulation/ strategy of a research problem. It is framework or blueprint or general plan for conducting the research. A good research design should satisfy the following four conditions namely objectivity, reliability, validity and generalization of the findings. Decisions regarding what, where, when, how much, by what means concerning an inquiry or a research study constitute a research design. Research purposes may be grouped into four categories: (i) Exploration, (ii) Description, (iii) Diagnosis and (iv) Experimentation.

Sub unit – 2

Variables:

A variable is “a thing that is changeable” or “a quantity that may have a number of different values.” IQ, sex, level of anxiety, different degree of illumination are the examples of variables that are commonly employed in psychological research.

Concepts:

Concept represents objectives of activities, ideas or living organism. Concept also represents properties, abstraction and relations between the features. ‘achievement’. ‘Intelligence’, ‘aggressiveness,’ ‘conformity’, ‘honesty’ are all concepts used to express varieties of human behaviour of interest to behavioural scientists.

Constructs:

Constructs have two common characteristics. First, the construct is a part of a theoretical framework and is related in various ways to other constructs. Second, a construct usually operationally defined so as to allow its observation and measurement. An example of a commonly employed psychological construct would be reinforcement.

Hypotheses:

The term hypothesis is made up of two words ‘hypo’ and ‘thesis’ which means less then or ‘less certain’ than a ‘thesis’. Hypothesis is a reasonable guess, an assumption, "educated guess", proposition or statement based upon the available evidence, which the researcher seeks to prove through the study.

Sources of hypothesis:

- Experience and Creativity of the Researcher
- Background Knowledge
- Versatile Intellect
- Analogies
- Scientific Theory
- Published studies, abstracts research journals, hand books, seminars on the issue, current trends on the research area.
- Instructional programs persuaded.
- Extension of the investigation.
- Offshoots of research studies in the field.

Directional hypothesis: The hypotheses which stipulate the direction of the expected differences, relationships are termed as directional hypotheses. They specify the expected direction of the relationship between variables.

Non-directional hypothesis: A research hypothesis, which does not specify the direction of expected differences or relationships, is a non-directional research hypothesis. This form of hypothesis is used in studies where there is no sufficient past research on which to base a prediction. Do not stipulate the direction of the relationship.

The relationship between research hypothesis (H_1) and the null hypothesis (H_0) is that, if null hypothesis (H_0) is rejected then research hypothesis (H_1) is accepted.

Characteristics of a good hypothesis:

- It must be testable.
- It must state relationship between the variables.
- It must be clear and precise.
- It must be consistent with known facts.
- The variables should be defined operationally, tested empirically.
- It must be based on some relevant theory or discovered truth.

SAMPLING: Sampling is a tool that enables us to draw conclusions about the characteristics of the populations. A finite subset of the population, selected from it with the objective of investigating its properties is called sample and the number of units in the sample is known as the sample size.

PROBABILITY SAMPLING: A probability sample is a sample in which every unit in the population has a chance (greater than zero) of being selected in the sample, and this probability can be accurately determined.

NON-PROBABILITY SAMPLING: Non probability sampling is any sampling method where some elements of the population have no chance of selection or where the probability of selection can't be accurately determined.

SIMPLE RANDOM SAMPLING: It is the techniques in which sample is so drawn that each and every unit in the population has an equal and independent chance of being included in the sample.

SYSTEMATIC SAMPLING: Systematic sampling is slight variation of the simple random sampling in which only the first sample unit is selected at random and the remaining units are automatically selected in a definite sequence at equal spacing from one another.

STRATIFIED SAMPLING: Population is heterogeneous in nature with respect to the variable or characteristic.

CLUSTER SAMPLING: Total population is divided into some recognizable subdivisions depending on the problem under study and a simple random sample of these clusters is drawn, are termed as clusters.

QUOTA SAMPLING: The population is first segmented into mutually exclusive sub-groups, just as in stratified sampling, and then judgment is used to select the subjects or units from each segment based on a specified proportion.

MULTISTAGE SAMPLING: Multistage sampling refers to a sampling technique which is carried out in various stages.

PURPOSIVE SAMPLING: A sample which is selected on the basis of individual judgment of the sampler is called purposive Sampling.

Snowball Sampling: Snowball sampling involves finding a small group of initial respondents and using them to recruit more respondents. It is particularly useful in cases where the population is hidden or difficult to enumerate.

VALIDITY: Validity is about the accuracy of a measure. Validity refers to how accurately a method measures what it is intended to measure.

Reliability of a Measure: Reliability is about the consistency of a measure. The extent to which the results can be reproduced when the research is repeated under the same conditions. If the same result can be consistently achieved by using the same methods under the same circumstances, the measurement is considered reliable.

Rating scale: A rating scale is a set of categories designed to draw out information about a quantitative or a qualitative attribute. In rating scale, a catalogue of some properties in which before all some digit is written.

Observation: It is the process of gathering open-ended, first-hand information by observing people and places at a research site. The observations are made without disturbing, influencing or altering the environment or the participants in any way. Researchers simply use all of their senses to observe participants in either a natural setting or a naturally occurring situation.

Advantage and Disadvantage of observation method: Advantages include the opportunity to record information as it occurs in a setting, to study actual behaviour, and to study individuals who have difficulty verbalizing their ideas (e.g., preschool children). Disadvantages of observations are that you will be limited to those sites and situations where you can gain access, and in those sites, you may have difficulty developing rapport with individuals.

Sub unit – 3: Text, PYQs, MQs, LMS, OMT, DU

Nominal scale is also called categorical variable scale. Nominal scale is the most simple of the four measurement scales. Nominal scale is a naming scale. Here variables are simply labelled or “named”, with no specific order.

Ordinal scale has all its variables in a specific order, with naming them. It simply depicts the order of variables and not the difference between the variables. These scales are generally used to depict non-mathematical ideas like happiness, a degree of pain, satisfaction, frequency etc.

Ratio scale contains all the characteristics of an interval scale. It has a value of true zero.

It is a measurement scale that not only produces the order of variables but also makes the difference between variables on the basis of true zero.

Measures of central tendency or averages: These are used to conclude the data to specify a single most representative value to describe the data set. There are several statistical measures of central tendency or “averages”. The three most commonly used averages are: Arithmetic Mean, Median, Mode.

Arithmetic mean is the most frequently used average. It is simple to calculate. It is based on all the observations. But it is affected by the presence of extreme items. **Median** is much better summary for such data. **Mode** is often used to describe the qualitative data. Median and mode can easily be computed graphically. Even in open-ended distribution they can also be easily computed.

Range: The range is the difference between the largest and smallest values of a data distribution.

ADVANTAGE OF MEDIAN:

- Easy to understand and calculate
- Not affected by extreme values
- Even if unknown extreme values median can be calculated
- Not much affected by sampling fluctuation
- Can calculate data based on ordinal scale

DISADVANTAGE OF MEDIAN:

- Not based on all values of the given data
- Arrangement of data for larger data size is a difficult process
- Not capable of further mathematical treatment

ADVANTAGE OF MODE:

- Easy to find and calculate
- Even if extreme values are not known mode can be calculated
- Uninfluenced by extreme values
- Can be used for non-numerical data

DISADVANTAGE OF MODE:

- Do not take every value into account
- Few instabilities found in the measure
- Not capable of further mathematical treatment

Estimation: (Fiduciary Limits)

- The limits of the confidence intervals of parameters are called fiduciary limits. They are calculated for mean at 0.95 levels of confidence and for standard deviation at 0.99 levels of confidence respectively.

Advantages of histogram:

- It is very easy to draw and simple to understand.
- Helps to understand the distribution easily and quickly.
- It is more accurate than the polygon.

Uses of histogram:

- Represents the data in graphic form.
- Provides the information about the distribution of the scores in the group. It provides information, If the scores are piled up at the lower or higher end of the distribution or are evenly and regularly distributed throughout the scale.

Advantage of frequency polygon:

- Easy to draw and simple to understand.
- It is possible to make it smooth.
- Comparison of two distributions can be made through frequency polygon.
- It is possible to plot two distributions at a time on the same axes.

Uses of frequency polygon:

- Frequency polygon is used when two or more distributions are to be compared.
- The data is represented in graphic form.
- It provides information about how the scores in one or more group are distributed. It provides information, if the scores are piled up at the lower or higher end of the distribution or are evenly and regularly distributed throughout the scale.

Uses of Ogive:

- It is useful to determine the number of students below and above a particular score.
- By plotting the scores of two groups on a same scale comparison can be made on both the groups.

- It is useful when the median as a measure of central tendency is wanted.
- It is useful when the quartiles, deciles and percentiles are wanted.

Type I Error: A type I error occurs when the null hypothesis (H_0) is rejected, when it is true. A type I error may be compared with a so-called false positive.

Type II Error: A type II error occurs when the null hypothesis is false, but erroneously fails to be rejected and eventually accept it. A type II error may be compared with a so-called false negative.

Parametric Techniques:

- Student's t test,
- z test,
- F ratio,
- Pearson r

Non- Parametric Techniques:

- Chi-square Test,
- Mann-Whitney U Test,
- Rank –difference Methods,
- Coefficient of Concordance (W),
- Median Test,
- Kruskal-Wallis H Test,
- Friedman Test.

Inferential statistics has two goals. They are:

- To determine what might be happening in a population, based on a sample drawn from the population.
- To determine what might happen in the future.

Correlation:

Correlation is a statistical tool that helps to measure and analyze the degree of relationship between two variables. Correlation analysis deals with the association between two or more variables. The measure of correlation called the correlation coefficient. The degree of relationship is expressed by coefficient which range from correlation ($-1 \leq r \leq +1$)

Positive correlation: the correlation is said to be positive correlation if the values of two variables changing with same direction. Example: height and weight. Water consumption and temperature.

Negative correlation: the correlation is said to be negative correlation when the values of variables change with opposite direction. Example: price and quantity demanded. Alcohol consumption and driving ability.

Simple correlation: under simple correlation problem, there are only two variables are studied.

Multiple correlation: under multiple correlation three or more than three variables are studied.

Partial correlation: analysis recognizes more than two variables but considers only two variables keeping the other constant.

Total correlation: it is based on all the relevant variables, which is normally not feasible.

Linear correlation: it happens when the amount of change in one variable tends to bear a constant ratio to the amount of change in the other.

Nonlinear correlation: it happens if the amount of change in one variable does not bear a constant ratio to the amount of change in the other variable.

Methods of studding correlation:

- Scatter diagram
- Correlation graph
- Product moment coefficient of correlation
- Rank difference correlation method

- Method of least square
- Karl Pearson's coefficient of correlation

Uses of correlation:

- To make predictions.
- In the technique of factor analysis
- In the technique of path analysis
- To evaluate the degree of reliability and validity of psychological tests and inventories.

Chi-Square Test:

- The Chi-Square test is a statistical procedure used by researchers to examine the differences between categorical variables in the same population. It is also called a "goodness of fit" statistic, because it measures how well the observed distribution of data fits with the distribution that is expected if the variables are independent.

Data reduction is the transformation of numerical or alphabetical digital information derived empirically into a more simplified, ordered and corrected form. Data reduction is the process of reducing the amount of capacity required to store data. Data reduction can increase storage efficiency and reduce costs. Principal component analysis (PCA) and factor analysis (FA) methods are popular techniques. Data reduction can be achieved in several ways. The main types are:

- Data deduplication
- Compression
- Single-instance storage.

Analytical Induction: Analytic induction is a qualitative research method which uses inductive reasoning, as opposed to deductive reasoning.

Analytic induction was first introduced in 1934 by Florian Znaniecki. After that, Donald Cressey summarized Znaniecki's complex description of Analytic Induction (AI)

Advantages of analytical induction:

- Analytic induction is inductive rather than deductive
- Analytic induction is well suited from an ethnographic viewpoint (good fit with the ethnographic narrative)
- Analytic induction is oriented observations towards developing a better hypothesis by allowing revision
- Analytic induction allows redefining what is studied to better exclude exceptions

Triangulation: Triangulation refers to the use of multiple methods or data sources in qualitative research to develop a comprehensive understanding of phenomena. Triangulation also has been viewed as a qualitative research strategy to test validity through the collection of data through multiple sources to include interviews, observations and document analysis. The purpose of triangulation in qualitative study is to increase the credibility and validity of the results.

Sub unit – 4

Grounded theory design: A grounded theory design is a systematic, qualitative procedure used to generate a theory that explains, at a broad conceptual level, a process, an action, or an interaction about a substantive topic. Two sociologists, Barney G. Glaser and the late Anselm L. Strauss, developed grounded theory in the late 1960s. Grounded theory designs are systematic, qualitative procedures that researchers use to generate a general explanation (grounded in the views of participants, called a grounded theory) that explains a process, action, or interaction among people.

A grounded theory design is a systematic, qualitative procedure used to generate a theory that explains, at a broad conceptual level, a process, an action, or an interaction about a substantive topic. However, three dominant designs are discernible:

1. The systematic design
2. The emerging design
3. The constructivist designs

Strengths of GT:

- Grounded Theory is helpful to develop an understanding of phenomena that cannot be explained with existing theories and paradigms.
- This methodology offers a systematic and rigorous process of data collection and data analysis. So, research problem can be studied in a great level of depth.
- Application of this methodology in practice fosters critical thinking and creativity.
- It is an effective approach to build new theories and understanding of new phenomenon.
- It deals with detailed and systematic procedures for data collection, analysis and theorizing.

Weakness of GT:

- Grounded theory methodology is time consuming and difficult to conduct.
- There is a great scope for researcher induced biases.
- Presentation of research findings is not straight forward.
- It is not possible to start a research study without some pre-existing theoretical ideas and assumptions.

Narrative Research Designs:

Narrative research designs are qualitative procedures in which researchers describe the lives of individuals, collect and tell stories about these individuals' lives, and write narratives about their experiences.

The term narrative comes from the verb "to narrate" or "to tell (as a story) in detail". In narrative research designs, researchers describe the lives of individuals, collect and tell stories about people's lives, and write narratives of individual experiences.

Case Study:

A case study is an in-depth exploration of a bounded system (e.g., activity, event, process, or individuals) based on extensive data collection. The case is separated out for research in terms of time, place, or some physical boundaries.

The "case" may be a single individual, several individuals separately or in a group, a program, events, or activities (e.g., a teacher, several teachers, or the implementation of a new math program).

The "case" may represent a process consisting of a series of steps (e.g., a college curriculum process) that form a sequence of activities.

Characteristics of a Good Case Study:

- It should be based on adequate and complete data.
- Its data should be valid.
- It should have continuity about it.

- Its records should be kept confidential.
- Its data should be specifically synthesized and this synthesis should be as much prognostic as diagnostic.
- Its follow up work should be undertaken.

Ethnography:

The term ethnography literally means “writing about groups of people.” Ethnographic designs are qualitative research procedures for describing, analyzing, and interpreting a culture-sharing group’s shared patterns of behaviour, beliefs, and language that develop over time. Central focus is culture. A culture is “everything having to do with human behaviour and belief”. It can include language, rituals, economic and political structures, life stages, interactions, and communication styles. To understand the patterns of a culture sharing group, the ethnographer typically spends considerable time “in the field” interviewing, observing, and gathering documents about the group to understand their culture-sharing behaviours, beliefs, and language.

Mixed Method Designs:

Mixed methods designs are procedures for collecting, analysing, and mixing both quantitative and qualitative data in a single study or in a multiphase series of studies.

Mixed methods research offers an option that actually tries to take advantage of the similarities and differences in qualitative and quantitative methods. It represents a pragmatic alternative—showing how research can proceed without resolving the potential conflicts in worldviews. As a result, contemporary supporters of mixed methods research have made an intense effort to define, document, and classify it (e.g., Creswell, 2009; Greene, 2008; Johnson, 2006; Tashakkori & Teddlie, 1998, 2003, 2009).

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Section – 2: Key Statements

Every candidate appearing for NET/SET examination should follow these key (main) points these can help them for better understanding regarding this unit very quickly.

Basic Key Statements: Research:

Concept (6.1.1) , Educational Research (6.1.2) , Characteristics Educational Research (6.1.3) , Principles of Educational Research (6.1.4) , Scope of Educational Research (6.1.5) , Meaning of Scientific Method (6.1.6) , Approaches to educational research (6.1.10) , Meaning of Research design (6.1.11) , Descriptive Design (6.1.11.1) , Experimental Design (6.1.11.2) , Historical Design (6.1.11.3) , Meaning of Variables (6.2.1) , Meaning of Concepts (6.2.2) , Meaning of Constructs (6.2.3) , Hypotheses – Concept (6.2.5) , Sources of hypothesis (6.2.6) , Characteristics of a good hypothesis (6.2.9) , Steps of writing a research proposal (6.2.10) , Concept of universe and Sample (6.2.11) , Characteristics of a good sample (6.2.12) , Types of Measurement Scale (Nominal, Ordinal, Interval and Ratio) (6.3.1) , Testing of Hypothesis (Type I and Type II Errors) (6.3.3) , Levels of Significance (6.3.40) , Parametric Techniques (6.3.60) , Non-Parametric Techniques (6.3.7) , Conditions to be satisfied for using parametric techniques (6.3.8)

Standard Key Statements:

Steps of Scientific Method (6.1.6.1) , Characteristics of scientific method (6.1.6.2) , Types of research (6.1.9) , Types of Variables (6.2.4) , Types of hypothesis (6.2.7) , Techniques of Sampling (6.2.13) , Tools of research (6.2.14) , Types of Tools (6.2.16) , Techniques of research (6.2.17) , Quantitative Data Analysis - Descriptive data analysis (Measures of central tendency, variability, fiduciary limits and graphical presentation of data) (6.3.2) , Inferential data analysis (6.3.9) , Qualitative Research Designs (6.4.1)

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Advanced Key Statements:

Types of scientific method (6.1.7) , Aims of research as a scientific activity (6.1.8) , Formulating Hypothesis (6.2.8) , Standardization of a Tool (6.2.15) , Power of a statistical test and effect size (6.3.5) , Use and Interpretation of statistical techniques (6.3.10) , Qualitative Data Analysis - Data Reduction and Classification, Analytical Induction and Constant Comparison, Concept of Triangulation (6.3.11)

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Section – 3: Key Facts and Figures

Sub Unit – 1:

6.1.1 Research: Concept

The word ‘research’ means the systematic and scientific investigation into the phenomenon and study of materials and sources in order to establish facts and reach new conclusion.

The term ‘Research’ consists of two words –

Research = Re + Search

‘Re’ means again and again and ‘Search’ means to find out/search for something new. Research is a process in which a person observes the phenomena again and again and collects the data and on the basis of collected data he/she draws some conclusions.

Definitions of Research

According to **J. W. Best**, Research is considered to be the more formal, systematic, intensive process of carrying on the scientific methods of analysis. It involves a more systematic structure of investigation, usually resulting in some sort of formal record of procedures and report of results or conclusions.

6.1.2 Educational Research

Meaning:

Educational research refers to a systematic attempt to gain a better understanding of the educational process, generally with a view in improving its efficiency.

It is a systematic application of scientific method for solving educational problems, which attempts towards purification of educative process and generates new knowledge.

Definitions of Educational Research

According to **Good**, Educational research is the study and investigation in the field of education.

According to **Mulay**, any systematic study designed to promote the development of education as a science can be considered educational research.

According to **W. M. Traverse**, Educational research is that activity which is directed towards the development of science of behaviour in educational situations.

According to **Crawford**, Educational research is a systematic and refined technique of thinking, using special tools in order to obtain a mere adequate solution of a problem.

Thus, we can conclude that Educational Research is a systematic and scientific approach to solve educational problem in a logical, progressive way and also to understand, explain, predict and control human behaviour.

6.1.3 Educational Research Characterizes as follows :

- Educational Research is highly purposeful.
- It is purely objective, systematic, scientific and critical process of investigation into a phenomenon which aims at interpreting and explaining the phenomenon.
- Educational Research is based on empirical evidences and observable experience.
- It attempts to organize quantitative and qualitative data to arrive at statistical inferences.
- It discovers new facts in new perspective.
- It is based on some philosophic principle.
- It generates new knowledge.

- It depends on the researcher's ability, ingenuity, expertise and experience for its interpretation and conclusions.
- It follows interdisciplinary approach for solving educational problem.
- It results towards generalized principles or theories.
- It involves subjective interpretation and deductive reasoning in some cases.

6.1.4 Principles of Educational Research:

Modern research is expected to comply with certain standards, in order to make more generalized and acceptable findings.

- Precision: Effort should be made to measure phenomenon accurately.
- Replication: Other independent researchers should be able to reflect similar findings.
- Validity: measurement is supposed to be valid and authentic.
- Reliability: Measuring instruments and procedure should produce consistent/stable results.
- Objectivity: Research should be conducted without bias, prejudice. Data should be presented as it is.
- Ethics: Ethical considerations should be adhered to in the research process.

6.1.5 Scope of Educational Research:

- Education has strong roots in the fields like philosophy, psychology, sociology, history, economics etc.
- Because of the changing concept of education, there is a need for educational research in this field. In the report of The International Commission on the Development of Education, named "Learning To Be" (UNESCO 1972, p. 143) emphasized the following:

'Education from now-on can no longer be defined in relation to a fixed content ... through his various experiences and increasingly – all the time – to fulfil himself. It has strong roots, not only in economics and sociology but also in the findings from psychological research ... If this is so, then education takes place at all ages of life, in all situations and circumstances of existence. It returns to its true nature, ... and transcends the limits of institutions, programmes and methods imposed on it down the centuries.'

In the context of above nature of education, the limits of educational research have to be extended from the conventional modes of education to the innovative systems based on ecological and cybernetic models.

Again, in 1975 the following problems on scope of education were highlighted in an N.C.E.R.T book named "Educational research and innovation".

- To solve the problem of imparting education to the poor students.
- Interdisciplinary research.
- Hunt of talent and problem related to their development.
- Compulsory and free education up to 14 year-children whose provision in Indian constitution section 45, study related to that problem.
- Education related problem's study of schedule caste and schedule tribes' children.

The fields of educational research contain a vast area. As it is a scientific and systematic study of educational process, it involves individuals (Student, teachers, educational experts, parents, mentors.) and institutions (Schools, colleges, universities, research – institutes). It discovers facts and relationship in order to make educational process more effective, more fruitful. It relates social sciences like education, history, philosophy etc. It includes process like

investigation, planning (design), data collecting, processing of data, their analysis, interpretation and drawing inferences or conclusions. It covers areas from formal and non-formal education as well. Some fields are classified in terms of following content areas:

- Comparative Education
- Curriculum construction and Textbooks
- Economics of Education
- Educational Psychology
- Educational Technology
- Guidance and counselling
- Philosophy of Education
- Sociology of Education
- Educational Administration
- Educational Measurement and Test development
- Teacher education and teaching behaviour
- Education and politics
- Moral education
- Leadership in education
- Education and social change
- Education and law
- Philosophy of Education
- Sociology of Education
- Educational Measurement and Evaluation

As the education is self-motivated and changing in nature, its related problems are also dynamic in nature. We can conduct study in every field that are related to education.

Areas of educational research according to fifth survey of Educational research are as follows:

1. Philosophy of Education.
2. Sociology of Education.
3. History of Education.
4. Economics of Education.
5. Psychology of Education.
6. Mental Health.
7. Cognitive Processes.
8. Social Processes.
9. Motivation.
10. Creativity and Innovations.
11. Guidance and Counselling.
12. Curriculum Development.
13. Pre-Primary Education.
14. Primary Education.
15. Secondary Education.
16. Higher Education.
17. Social Science Education.
18. Science Education.
19. Mathematics Education.
20. Physical and Health Education.
21. Moral, Art and Aesthetic Education.
22. Educational Technology.
23. Teaching Strategies.

24. Teacher Education – Pre-service and In-service.
25. Vocational and Technical Education.
26. Special Education.
27. Open and Distance Education.
28. Adult, Continuing and Non-Formal Education.
29. Education of Tribes and Minorities.
30. Education of Girls and Women.
31. Demographic studies in Education and population Education.
32. Ecological and Environmental studies in Education.
33. Comparative Education.
34. Educational Assessment and Evaluation.
35. Educational Planning and Policy Research.
36. Organization, Administration and Management of Education.
37. Correlates of Achievement.

6.1.6 Meaning of Scientific Method:

Bacon's inductive method or Aristotle's deductive method contributes to human knowledge. It is difficult to solve many problems through inductive or deductive method. So, Charles Darwin, in his scientific method, seeks happy blending of inductive and deductive method. In this method, knowledge gained from previous knowledge, experience, reflective thinking and observation is unorganized. Later on, it proceeds inductively through part to whole and particular to general and ultimately to meaningful hypothesis. Thereafter, it proceeds deductively through the process of whole to part, general to particular and hypothesis to logical conclusion.

Scientific enquiry/Scientific method is happy blending of Inductive and deductive methods. At first, it proceeds from part to whole to state meaningful hypothesis. After that, it proceeds from whole to part and hypothesis to logical conclusion.

6.1.6.1 Steps of Scientific Method:

Scientific method follows five steps as under:

6. Problem Identification and definition of the problem: The researcher states the identified problem in such a manner that it can be solved through experimentation or observation.
7. Formulation of hypothesis: It allows to have an intelligent guess for the solution of the problem.
8. Implication of hypothesis through deductive reasoning: Here, the researcher deduces the implications of suggested hypothesis, which may be true.
9. Collection and analysis of evidence: The researcher is expected here to test the deduced implications of the hypothesis by collecting concerned evidence related to them through experimentation and observation.
10. Verification of the hypothesis: Later on, the researcher verifies whether the evidence support hypothesis. If the result is yes, then the hypothesis is accepted, if it doesn't the hypothesis is not accepted and later on it is modified if it is necessary.

A peculiar feature of this method is not to prove the hypothesis as an absolute truth but to conclude that the evidence does or doesn't support the hypothesis.

6.1.6.2 Characteristics of scientific method:

Replicability: It means research must be replicable or repeated. It is possible when an independent group of researchers can copy the same process and arrive at the results as same as the original study. When replicability is not found in a study, it suggests that there is a lack of knowledge and understanding in the study or our methods of testing are insufficient.

Precision: It refers to theoretical concepts, which are often hard to measure. These must be defined with such precision that others can use those definitions to measure those concepts and test that theory.

Falsifiability: It means a theory must be stated in a way that it can be disproven. Theories that can't be tested or falsified are not scientific theories. And any such knowledge is not scientific knowledge. For a hypothesis to be proved false, it must be logically possible to make an observation or do a physical experiment that would show that there is no support for the hypothesis. When a hypothesis can't be shown to be false, that does not necessarily mean it is not valid. Further testing may disprove the hypothesis. To determine whether a hypothesis is supported or not, psychological researchers must conduct hypothesis testing by using statistical measures.

Parsimony: When there are numerous explanations of a particular phenomenon, scientist must always accept the simplest one. Phenomena should be explained in as economic and easy way as possible. Needless complexity must be avoided. Scientists must aim to achieve the most elegant and simple theories. It prevents one from pursuing excessively complex theories with endless number of concepts. It also prevents one from relationships that may explain a little bit of everything but nothing in particular.

6.1.7 Types of scientific method:

Exploratory Research:

- It is generally done in the beginning of a research. It is undertaken to explore an area where little is known or to investigate the possibilities of undertaking a particular research study and is akin to feasibility study or pilot study.
- It attempts to clarify 'why' and 'how' there a relationship is between two or more aspects of a same situation or phenomenon.
- The purpose of exploratory research is to gain background information, to define terms, to clarify the problems, to develop hypothesis, to establish research priorities and objectives, and to develop questions to be answered.

Explanatory Research:

- Explanatory Research is conducted for a problem which was not well researched before in a particular field. It demands priorities, generates operational definitions and provides a better-researched model.
- It is basically a type of research design which focuses on explaining the aspects of your study in a detailed manner.
- Here the researcher begins with a general idea and uses research as a tool which could lead to the subjects that would be dealt with in the coming future.
- It is meant for providing details where a small amount of information exists for a certain product in mind of that researcher.
- It is conducted in order to help us find the problem that was not studied before in-depth.
- It is not used to give us some conclusive evidence but helps us in understanding the problem more efficiently. When conducting the research, the researcher should be able to adapt himself/herself to the new data and the new insight that he discovers as he/she studies the subject.

Descriptive Research:

- Descriptive research may be quantitative or qualitative and use research methods accordingly. It aims to describe what is, by describing, recording, analysing, interpreting conditions that exists.
- It is generally used to describe characteristics of a population or phenomenon being studied.
- Descriptive research does not answer questions about 'how', 'when', 'why' the characteristics occurred. Rather it addresses the 'what' type questions (what are the characteristics of the population or situation being studied?). The characteristics which are used to describe or explain the situation or population are usually some kind of descriptive categories.
- Descriptive research cannot be used as the basis of a causal relationship (situation where one variable affects another). This kind of research can be said to have a low requirement for internal validity.
- The description is used for averages, frequencies and other statistical calculations. Often the best approach is to conduct a survey investigation, prior to writing descriptive research. Qualitative research often aims at description or explanation of a phenomena and researchers may follow-up with examinations of why the observations exist and what are the implications of the findings.

6.1.8 Aims of research as a scientific activity:

Problem-solving: Research is often called as a problem-solving activity. It helps the learner in developing decision-making skills, critical thinking, personal autonomy, enhance communication, negotiations, team building etc. Problem-solving can be used for improving research skills, increasing the knowledge base, presentation skills. It is elaborately described in other sections of this unit.

Theory Building: We arrive at a scientific laws or theories through a process of logic and evidence. Logic (theory) and evidence (observation) are the two main pillars upon which scientific knowledge is based on. Theories provide meaning and significance to what we observe and observations help to validate or refine existing theory or construct a new theory. A theory describes the relationship among key variables for explaining present state or to predict future. It is elaborately described in other sections of this unit.

Prediction: The researchers make predictions about various phenomena. Predictions are sometimes made in the form of hypothesis, which are tentative, testable. Researchers also make predictions concerning the relationship between or among variables. It is elaborately described in other sections of this unit.

6.1.9 Types of research:

Basic or Fundamental Research:

Fundamental research is not concerned with day to day problems or real-life problems. Basic research is designed to add some new to an organized body of scientific knowledge and does not necessarily produce results of immediate practical value. It is primarily concerned with the formulation of a theory or a contribution to the existing body of knowledge. Its major aim is to obtain and use the empirical data to formulate, expand or evaluate a theory. It is also called as pure or fundamental research. It draws its pattern and spirit from the physical sciences. It represents a rigorous and structured type of analysis. It engages careful sampling procedures in order to extend the findings beyond the group or situation. And for that develops theories by discovering proved generalizations or principles. The main aim of this research is the

discovery of knowledge solely for the sake of knowledge. Fundamental research has little concern for the application of the findings or social usefulness of the findings.

Applied Research:

Applied research is concerned with application of theory in common practices.

Applied research aims at the solution of immediate, specific and practical problems. It is performed in relation to actual problems, under the conditions in which they are found in practice. The goal of this research in terms of adding to scientific knowledge acquires only a secondary position. It gives importance on a problem here and now. This research also uses the scientific method of inquiry. It has most of the characteristics as same as basic research. But its methodology, however, is not as rigorous as that of basic research. Its findings are to be evaluated in terms of local applicability and not on universal validity. It is mainly intended to improve school practices and to improve teacher effectiveness in a practical manner. Most of the problems faced by teachers, policymakers, and administrators are solved through applied researchers.

Action Research:

The action research focuses on practical issue of immediate concern to particular groups. According to Goof, Action research is research made by teachers, supervisors and administrators to improve the quality of their decisions and actions.

Action research designs are systematic procedures, used by teachers (or other individuals in an educational setting) to gather quantitative and qualitative data, to give immediate solution to the problem. It also aims at to address improvements in their educational setting, their teaching, and the learning of their students.

Action research mainly focuses on immediate application, not on the development of theory or on general application. Its findings are to be evaluated in terms of local applicability, not universal validity. Its purpose is to improve school practices and to improve those who try to improve the practices. It attempts to combine the research processes, habits of thinking, ability to work harmoniously with others and professional spirit.

Steps of Action Research:

- Identify a problem to be studied
- Collect data on the problem
- Organize, analyse, and interpret the data
- Develop a plan to address the problem
- Implement the plan
- Evaluate the results of the actions taken
- Identify a new problem
- Repeat the process

Thus, in doing action research the usual sequence of steps are:

- i) Plan
- ii) Act
- iii) Observe
- iv) Reflect

6.1.10 Approaches to educational research:

Quantitative Research: Quantitative research emphasize the statistical, mathematical, or numerical analysis of data collected through polls, questionnaires, and surveys, or by manipulating pre-existing statistical data using statistical techniques. This research focuses on gathering numerical data rather than textual data. And generalizing it across groups of people or to explain a particular phenomenon.

Quantitative research is a research involving the use and analyses of numerical data using statistical techniques. These researches create questions of who, what, when, where, how much, how many, and how.

Quantitative research methods are developed to construct statistically consistent data that shows how many people do or think something. Quantitative data characteristically is in numerical form such as averages, ratios or ranges. Quantitative research is precisely helpful when carrying out a large-scale needs estimation or baseline survey. It is independent of the researcher and one should get alike results no matter who carries out the research. It can also be used to calculate trends.

Quantitative research should be used under following circumstances:

- When trying to measure a trend, such as, ‘do youth talk to their teachers about issues important to them?’
- When data can be obtained in numerical forms such as ‘number of children under 15 who participate in co-curricular activities.’
- When simple objective responses can be received such as ‘yes’ and ‘no’ type questions.
- You are trying to collect data in ratios, percentages and averages.

Characteristics:

- The data is usually gathered using structured research instruments/standardised tools.
- The sample is larger in size and is representative of the population.
- The research study can usually be replicated or repeated and its reliability is high.
- Researcher has a clearly defined hypothesis to which objective answers are sought.
- Before data collection, research design planning is must for all
- Data are collected in the form of numbers and statistics, often arranged in tables, charts, figures, or other non-textual forms.
- Project may be used to generalize concepts, predict future results, or investigate causal relationships.
- Researcher uses tools, such as questionnaires, rating scales, inventories or computer software, to collect numerical data.

Advantages of Quantitative Research:

- It can be used when large quantities of data need to be collected.
- The result is usually numerical (quantifiable).
- It is more objective.
- The data should be quantifiable and usually generalizable.

Disadvantages of Quantitative Research:

- Results need to be calculated manually or by using ready to use software like Excel, Access, or data analysis software (such as SPSS), which may not always be accessible to a country program.
- The analysis process is time consuming, as the researcher needs to enter, clean and then analyse the data.
- The larger the sample, the more time it takes to analyse and interpret it.
- The larger the sample, the more time it should take to collect data.
- The quantitative data ignores human elements.

Qualitative Research:

Qualitative Research is mainly exploratory research. Qualitative Research is used to achieve an understanding of underlying reasons, opinions, and motivations of a phenomena. It provides insights into the problem or helps to build up ideas or premises for probable quantitative research.

- Qualitative Research is primarily exploratory research.

- It is used to gain an understanding of underlying reasons, opinions, and motivations of a phenomena.
- It paves insights into the problem or helps to develop ideas or hypotheses for potential quantitative research.
- It is also used to uncover trends in thought, opinions, and dive deeper into the problem to collect ground level real data.
- Some common methods include focus groups (group discussions), individual interviews, participant observations etc.
- The sample size is typically small in comparison to quantitative research, and respondents are selected to fulfil a given quota.

Qualitative research is appropriate when:

- The intended/proposed research area is not well studied or understood.
- A subject need to be studied in depth.
- A holistic perspective is needed.
- Behavioural aspects of people need to be studied.
- Management techniques like questionnaires are not considered suitable.
- A researcher is more interested in the process (how it works) and not the product (the outcome).

Advantage of Qualitative research:

- Problems and subjects covered can be evaluated in depth and in detail.
- Interviews are not limited to particular questions. It can be redirected or guided by researchers in real time.
- The framework of research can be revised quickly as soon as new information and results appear.
- The data in qualitative research depends on human experience and feelings. This is more forceful and influential than data gathered through quantitative research.
- Complexities and subtleties about the subjects of the research or the topic enclosed are usually missed by many positivistic inquiries.
- As sample size is small, so data is usually gathered from few individuals or cases, therefore findings and outcomes cannot be spread to larger populations. However, findings can be transferred to another setting.
- In this type of research, the researcher has an obvious vision on what to anticipate. They collect data in an authentic attempt of plugging data to bigger picture.

Disadvantages of Qualitative Research:

- The quality of research depends on the skills of the researcher and can be easily predisposed by personal idiosyncrasies and biases of researchers.
- Inflexibility is more difficult to measure, show and uphold.
- The amount of data makes understanding and analysis time overwhelming.
- Qualitative investigation is dynamic in nature. It changes it's from time to time and understood especially within scientific communities.
- The presence of researcher in the course of data gathering is inevitable. And therefore can influence or affect the responses of subjects.
- Issues like confidentiality and ambiguity can cause problems during presentation of findings.
- Findings may be time consuming and hard to present in optical ways.

6.1.11 Meaning of Research design:

The research design is an overall formulation/ strategy of a research problem. It is framework or blueprint or general plan for conducting the research. A good research design should fulfil the following four conditions namely objectivity, reliability, validity and generalization of the findings. Generally, the good research design minimises bias and maximises the reliability of the data collected and analysed. But how all these can be achieved depends mainly on the research purpose. Research purposes may be grouped into four categories:

- Exploration,
- Description,
- Diagnosis and
- Experimentation.

Research design should answer the following questions-

- What is the study about?
- Why is the study being made?
- Where will the study be carried out?
- What type of data is required?
- Where can the required data be found?
- When the study will be incorporated?
- What will be the sample design?
- What techniques of data collection will be used to collect data?
- How will the data be analysed?
- How will the report be prepared?

Consideration of Research Design:

- Objectives
- Methodology
- Sample design
- Tools for collecting the data
- Analysis of data

Purpose of Research Design:

- Efficiency
- Optimum utilization of resources
- Flexibility
- Unbiased (or minimization of bias)
- Reliability
- Objectivity

Definition of Research design:

Smith (1976): A design is a carefully arranged scheme regarding how to conduct a experiment. The design of an experiment refers to the selection and arrangement of conditions.

Kerlinger: Research design is the plan, structure and strategy of investigation conceived so as to obtain answers to research questions and to control variance.

6.1.11.1 Descriptive Design:

Definition and Purpose:

Descriptive research aims to describe what is, by describing, recording, analysing, interpreting conditions that exists. It may be quantitative or qualitative and use research methods accordingly.

Descriptive research designs generally provide answers to the questions of 'who', 'what', 'when', 'where', and 'how' associated with a particular research problem; a descriptive study cannot conclusively ascertain answers to 'why'. Descriptive research designs are often used to obtain information concerning the current status of the phenomena and to describe "what exists" with respect to variables or conditions in a situation.

What does these inform:

- The observation is made in a completely natural and unchanged natural environment. True experiments often adversely influence the normal behaviour of the subject.
- Descriptive research is often used as a pre-cursor to more quantitatively research designs, the general overview giving some valuable pointers as to what variables are worth testing quantitatively.
- If the limitations are understood, they can be a useful tool in developing a more focused study.
- Descriptive studies can capitulate rich data that lead to important recommendations.
- Descriptive studies collect a large amount of data for detailed analysis.

What these don't inform:

- The results can't be used to discover a definitive answer or to disprove a hypothesis.
- Because this research designs often utilize observational methods [as opposed to quantitative methods], the results cannot be replicated.

The descriptive function of research is highly dependent on instrumentation for measurement and observation.

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6.1.11.2 Experimental Design:

Definition and Purpose:

Experimental research describes what will be when certain variables are carefully controlled or deliberately manipulated. Characteristics of experimental research are: Control, manipulation, observation, replication. Here, the researcher has to plan first for the experimental design. Experimental design is a blueprint of the procedure that enables the researcher to maintain control over all factors that may affect the result of an experiment. The researcher aims at determine or predict what may occur. Experimental research is often used where there is time priority in a causal relationship (cause precedes effect), there is consistency in a causal relationship (a cause that will always lead to the same effect), the magnitude of the correlation is high. Experimental research often deals with an experimental group and a control group. The independent variable is administered only to the experimental group and not to the control group, and both groups are measured on the same dependent variable. Experimental designs have used more groups and more measurements over a longer period. True experiments must have control, randomization, and manipulation. Experimental design is most appropriate in controlled settings such as laboratories. It assumes random assignment of subjects and random assignment to groups. It attempts to explore cause-effect relationships where causes can be manipulated to produce different kinds of effects. Due to the requirement of random assignment, this design can be difficult to execute in the real world (non laboratory) setting. True Experimental Design; Double-Blind Experiment are frequently used in scientific research.

What does it inform:

- This research allows the researcher to control the situation. In doing so, it allows researchers to answer the question, “what causes something to occur?”
- Experimental research Permits the researcher to identify cause-effect relationships between variables and to distinguish placebo effects from treatment effects.
- This research designs support the ability to limit alternative explanations and to infer direct causal relationships in the study.
- Experimental design provides the highest level of evidence for single studies.

What it does not inform:

- Experimental design is artificial, and results may not generalize well to the real world.
- Artificial settings of experiments may alter subject behaviours or responses.
- This type of designs may be costly if special equipment or facilities are needed.
- Because of ethical or technical reasons, some research problems cannot be studied using an experiment.
- It is difficult to apply ethnographic and other qualitative methods to experimental designed research studies.

6.1.11.3 Historical Design:**Definition and Purpose:**

Historical research describes what was by investigating, recording, analysis, interpreting past events to understand the past, present and to some extent in anticipating the future.

The purpose of this design is to collect, verify, and synthesize evidence from the past, to establish facts that defend or refute the hypothesis. Historical research design uses secondary sources and a variety of primary documentary evidence, such as, logs, official records, reports, diaries, archives, and non-textual information [maps, pictures, audio and visual recordings]. It is to be remembered that the sources must be both authentic and valid. The main purpose is to collect, verify, synthesize evidence to establish facts that defend or refute the hypothesis. Historical research design uses primary sources, secondary sources, and lots of qualitative data sources such as logs, diaries, official records, reports, etc. The sources must be both authentic and valid.

What does it inform:

- The historical research design is unobtrusive. So, the act of research does not affect the results of the study.
- This approach is well suited for trend analysis.
- Historical records can add important contextual background which is required to more fully understand and interpret a research problem.
- There is no possibility of researcher-subject interaction. So, there is less possibility that it could affect the findings.
- Historical sources can be used over and over to study different research problems or to replicate a previously done research study.

What it does not inform:

- The ability to fulfil the aims of the research are directly related to the amount and quality of documentation available to understand the research problem.
- Since historical research depends on data from the past, there is no way to manipulate it to control for contemporary contexts.
- Interpreting historical sources can be time consuming.
- The sources of historical materials must be archived consistently/deliberately to ensure access.

- Original authors bring about their own perspectives and biases to the interpretation of past events. These types of biases are more difficult to ascertain in historical resources.
- Due to the lack of control over external variables, historical research is very weak with regard to internal validity.
- It is rare that the entirety of historical documentation needed to fully address a research problem available for interpretation, so, gaps need to be acknowledged.



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Previous Year Questions Analysis with Explanation

JUNE - 2014

1. Which one of the following may be considered as the best source for the formulation of a research problem?

- (A) Consulting the research supervisor
- (B) Holding a discussion with liberation
- (C) Reflecting on research articles, reported in a journal
- (D) Reflecting on the problems of education

Answer with References

| Sl. No. | Answer |
|---------|--------|
| 1 | C |

December 2014

1. Some usual steps in conducting research are given below, identify the code which gives acceptable rational sequence.

- (1) Formulating hypothesis
- (2) Collecting data and its analysis
- (3) Identifying the research problem
- (4) Testing the hypothesis

Codes:

- (A) 1 3 2 and 4
- (B) 1 2 4 and 3
- (C) 3 1 2 and 4
- (D) 2 1 4 and 3

Answer with References

| Sl. No. | Answer |
|---------|--------|
| 1 | C |

June 2015

1. A teacher is studying the impact of his personal association with students on students' discipline in his/her class. This type of research may be called

- (A) Fundamental and action research
- (B) Action and applied research
- (C) Descriptive and Fundamental research
- (D) Analytical and action research

2. In a study, the effect of peer's learning is being studied in relation to students' achievement and motivation. What type of research label will be acceptable for this study?

- (A) Fundamental research
- (B) Evaluative research
- (C) Applied research
- (D) Descriptive research

3. A systematic, objective and deliberate effort at answering meaningful questions, pertaining to a field of enquiry or about phenomena is called
 (A) Problem solving
 (B) Research
 (C) Theorising
 (D) Invention
4. Which one is not a valid argument for conducting research in education?
 (A) For advancement of Educational Theory
 (B) For improvement of educational practices
 (C) For improving social awareness of teaching
 (D) For developing sound educational policies
5. Which type of research aims at explanation of the status and conditions exist at present?
 (A) Applied research
 (B) Analytical research
 (C) Descriptive research
 (D) Fundamental research

Answer with References

| Sl. No. | Answer |
|---------|--------|
| 1. | B |
| 2. | C |
| 3. | B |
| 4. | C |
| 5. | C |

December 2015

1. Importance of the subject, feasibility and time needed for the study, have essentially be kept in mind at the time of

- (A) Collection of data
 (B) Selection of the problem
 (C) Analysis of data
 (D) Writing the report

2. Questions like what data is to be collected? What characteristics of data are relevant and needed to be studied? And what techniques are to be used for the purpose? Can be answered, it

- (A) Related literature is studied adequately
 (B) Problem is defined properly
 (C) Tools are constructed properly
 (D) Data are organised properly

3. A researcher is studying the effect of reinforcement on student's achievement with appropriate controls imposed in practical situation. What is the type of research in this situation?

- (A) Fundamental research
- (B) Applied research
- (C) Action research
- (D) Both b) and c)

Answer with References

| Sl. No. | Answer |
|---------|--------|
| 1. | B |
| 2. | B |
| 3. | B |

July 2016

1. In the formation of research problem for educational studies using quantitative paradigms, a sequence of logical steps has to be followed usually in a particular order. From the list given below, select an appropriate sequence from the code.

- 1. Deciding the specific problem
- 2. Determining the field of study
- 3. Identifying the variable involved
- 4. Evaluating on the basis of personal and academic suitability of the problem

Codes:

- (A) 1 2 4 3
- (B) 3 4 2 1
- (C) 2 4 3 1
- (D) 2 1 3 4

2. For conducting action research, reviewing of related literature is done to

- (A) Classify the design of the study
- (B) Ascertain the quantitative or qualitative nature of the situation
- (C) Ensure the contribution of the study to existing literature
- (D) Identify the effective ideas and practices

Answer with References

| Sl. No. | Answer |
|---------|--------|
| 1. | D |
| 2. | D |

January 2017

1. In educational research, case study method given importance

- (A) Prediction
- (B) Causal connections
- (C) Generalisation
- (D) Unique characteristics

Answer with References

| Sl. No. | Answer |
|---------|--------|
| 1. | D |

July 2018

1. Match the following

List 1 (Attribute Based Scientific Criteria's)

List 2 (Descriptions)

- a. Parsimony 1. Knowledge should remain open to revision
 b. Empiricism 2. Interpretation of research should not reflect personal basis
 c. Precision 3. Knowledge should be as simple as possible
 d. Objectivity 4. Explanations should be as simple as possible
 5. Research statement should be based on accurate measurements

Codes:

A B C

(A) 1 2 4

(B) 2 1 4

(C) 3 2 1

(D) 4 1 2

Answer with References

| Sl. No. | Answer |
|---------|--------|
| 1. | B |

November 2017

1. An investigator uses two matched groups to compare effectiveness of two methods of

teaching science. This study would come in the ambit of

- (A) Experimental study
 (B) Causal comparative study
 (C) Descriptive survey study
 (D) Phenomenological study

2. Which of the following type is most useful for the government in planning policies?

- (A) Correlation studies
 (B) Descriptive studies
 (C) Experimental studies
 (D) Historical studies

3. Match the following:

List 1 (Types of Researches) List 2 (Intended Uses of Researches)

a. Fundamental research 1. Exploring applicability of research-based knowledge in a given field

b. Applied research Advances scientific knowledge with addition of basic laws and principles

c. Evaluation research Attempts to establish universal generation
Explores research-based knowledge about a specific practice

Codes:

a b c

(A) 1 2 4

(B) 2 1 4

(C) 3 2 1

(D) 4 1 2

Answer with References

| Sl. No. | Answer |
|---------|--------|
| 1. | A |
| 2. | B |
| 3. | B |



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Model Questions

1. Which one of the following may be considered as the best source for the formulation of a research problem?
 - a) Consulting the research supervisor
 - b) Holding a discussion with liberation
 - c) Reflecting on research articles, reported in a journal
 - d) Reflecting on the problems of education

2. Some usual steps in conducting research are given below, identify the code which gives acceptable rational sequence.
 1. Formulating hypothesis
 2. Collecting data and its analysis
 3. Identifying the research problem
 4. Testing the hypothesis
 Codes:
 - a) 1 3 2 and 4
 - b) 1 2 4 and 3
 - c) 3 1 2 and 4
 - d) 2 1 4 and 3

3. A teacher is studying the impact of his personal association with students on students' discipline in his/her class. This type of research may be called
 - a) Fundamental and action research
 - b) Action and applied research
 - c) Descriptive and Fundamental research
 - d) Analytical and action research

4. In a study, the effect of peer's learning is being studied in relation to students' achievement and motivation. What type of research label will be acceptable for this study?
 - a) Fundamental research
 - b) Evaluative research
 - c) Applied research
 - d) Descriptive research

5. A systematic, objective and deliberate effort at answering meaningful questions, pertaining to a field of enquiry or about phenomena is called
 - a) Problem solving
 - b) Research
 - c) Theorising
 - d) Invention

6. Which one is not a valid argument for conducting research in education?
 - a) For advancement of Educational Theory
 - b) For improvement of educational practices
 - c) For improving social awareness of teaching
 - d) For developing sound educational policies

7. Which type of research aims at explanation of the status and conditions exist at present?
 - a) Applied research
 - b) Analytical research
 - c) Descriptive research
 - d) Fundamental research

8. Importance of the subject, feasibility and time needed for the study, have essentially be kept in mind at the time of
 - a) Collection of data
 - b) Selection of the problem
 - c) Analysis of data
 - d) Writing the report

9. Questions like what data is to be collected? What characteristics of data are relevant and needed to be studied? And what techniques are to be used for the purpose? Can be answered, it
 - a) Related literature is studied adequately
 - b) Problem is defined properly
 - c) Tools are constructed properly
 - d) Data are organised properly

10. A researcher is studying the effect of reinforcement on student's achievement with appropriate controls imposed in practical situation. What is the type of research in this situation?
 - a) Fundamental research
 - b) Applied research
 - c) Action research
 - d) Both b) and c)

11. In the formation of research problem for educational studies using quantitative paradigms, a sequence of logical steps has to be followed usually in a particular order. From the list given below, select an appropriate sequence from the code.
 1. Deciding the specific problem
 2. Determining the field of study
 3. Identifying the variable involved
 4. Evaluating on the basis of personal and academic suitability of the problem
 Codes:
 - a) 1 2 4 3
 - b) 3 4 2 1
 - c) 2 4 3 1
 - d) 2 1 3 4

12. For conducting action research, reviewing of related literature is done to
- Classify the design of the study
 - Ascertain the quantitative or qualitative nature of the situation
 - Ensure the contribution of the study to existing literature
 - Identify the effective ideas and practices

13. In educational research, case study method given importance
- Prediction
 - Causal connections
 - Generalisation
 - Unique characteristics

14. Match the following

| List 1 (Attribute Based Scientific Criterias) | List 2 (Descriptions) |
|---|---|
| A. Parsimony | 1. Knowledge should remain open to revision |
| B. Empiricism | 2. Interpretation of research should not reflect personal basis |
| C. Precision | 3. Knowledge should be as simple as possible |
| D. Objectivity | 4. Explanations should be as simple as possible |
| | 5. Research statement should be based on accurate measurements |

Codes:

A B C

a) 1 2 4

b) 2 1 4

c) 3 2 1

d) 4 1 2

15. An investigator uses two matched groups to compare effectiveness of two methods of teaching science. This study would come in the ambit of

- Experimental study
- Causal comparative study
- Descriptive survey study
- Phenomenological study

16. Which of the following type is most useful for the government in planning policies?

- Correlation studies
- Descriptive studies
- Experimental studies
- Historical studies

17. Match the following:

| List 1 (Types of Researches) | List 2 (Intended Uses of Researches) |
|------------------------------|---|
| A. Fundamental research | 1. Exploring applicability of research-based knowledge in a given field |
| B. Applied research | 2. Advances scientific knowledge with addition of basic laws and principles |
| C. Evaluation research | 3. Attempts to establish universal generation |
| | 4. Explores research-based knowledge about a specific practice |

Codes:

A B C

- a) 1 2 4
- b) 2 1 4
- c) 3 2 1
- d) 4 1 2

18. What is the purpose of a research?

- a. Acquisition of new knowledge
- b. Filling the missing things in the existing knowledge
- c. Verification of existing knowledge
- d. All of the above

19. Which one of the following is not required in experimental research.

- a. Reference collection
- b. Manipulation
- c. Controlling
- d. Observation?

20. Which one of the following is true for Action research -

- a. is initiated to solve immediate problems
- b. is an applied research
- c. is a longitude research
- d. All of the above

Answer Table with Reference

| QUESTION NO | ANSWER | REFERENCE |
|-------------|--------|----------------|
| 1 | c | 6.1.1, 6.1.2 |
| 2 | c | 6.1.2 |
| 3 | b | 6.1.9 |
| 4 | c | 6.1.9 |
| 5 | b | 6.1.1 |
| 6 | c | 6.1.3 |
| 7 | c | 6.1.11.1 |
| 8 | b | 6.1.2 |
| 9 | b | 6.1.6.1 |
| 10 | b | 6.1.9 |
| 11 | d | 6.1.2 |
| 12 | d | 6.1.9 |
| 13 | d | 6.1.2, 6.4.1.3 |
| 14 | b | 6.1.6.2 |
| 15 | a | 6.1.11.2 |
| 16 | b | 6.1.11.1 |
| 17 | b | 6.1.9, 6.1.7 |
| 18 | d | 6.1.1, 6.1.3 |
| 19 | d | 6.1.11.2 |
| 20 | a | 6.1.9 |

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Abbreviation:

1. **Text: Unit wise separate pdf**
2. **PYQs: Previous Years Questions**
3. **MQs: Model Questions**
4. **LMS: Last Minute Suggestion**
5. **OMT: Online MOCK Test**
6. **DU: Daily Updates**



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