B.Ed. NONFORMAL PROGRAMME
DE-508 RESEARCH TECHNIQUES (RT)

Assignment 1

Q1:- What is Educational Research? Describe the Educational Research as Scientific and Discipline Inquiry.

Ans:-

A cyclical process of steps that typically begins with identifying a research problem or issue of study. It then involves reviewing the literature, specifying a purpose for the study, collecting and analyzing data, and forming an interpretation of information. This process culminates in a report, disseminated to audiences, which is evaluated and used in the educational community. (Creswell, 2002)

In less comprehensive terms, educational research is an organized approach to asking, answering, and effectively reporting a question.

Scientific Inquiry

His research found that student curiosity and involvement real science investigations moves students from passive learners to active learners. This is evidenced when students:

- ask questions during an investigation
- design their own investigations
- conduct investigations using their design
- formulate explanations of findings
- present their findings
- reflect upon their findings

Scientific inquiry causes a fundamental change in science education, moving it away from traditional teaching practices of lecture and demonstration to a collaborative relationship between teacher and student. In these collaborative environments, students take risks without fear of ridicule and begin to think about science. Teachers become facilitators of their student's inquiry by: modeling and immersing their students in scientific inquiry ask guiding questions which provoke thought and reflection allow student creativity in experimental design allow students to discover experiments can be successful, yet fail to answer the original question being investigated

Initial confusion by students analyzing experimental findings is not necessary bad, because they are using critical thinking processes. Confusion is good in this setting, because it demonstrates students are trying to determine why they did not find the typical canned answer. Also, a hypothesis can actually result in a non-support statement as a result of the experiment.

Too often students investigate canned labs which result in a guided hypothesis which can only result in supported finding. This leads them to feel when their experiment does not support their hypothesis they failed. They have not failed, however they do not know this in traditional science teaching.

Disciplined Inquiry

Although knowledge that is constructed may be more interesting to students than knowledge that is merely reproduced, this is not to say that all constructions represent significant intellectual accomplishment.

For knowledge construction to be powerful, it must be grounded on a foundation of disciplined inquiry.
For a constitutional lawyer, this means understanding the essential assumptions underlying common law, recognizing the intricacies of U.S. judicial proceedings, and being able to do the detective work of a good historian.
Disciplined inquiry includes a command of the facts, vocabulary, concepts, and theories used in a domain. More importantly, the inquirer must have an in-depth understanding of particular problems in the field of study, and the ability to express that understanding in ways acceptable to experts.
For example, a geographer may consider the relationships between physical phenomena, adaptive or maladaptive cultural traditions, and evolving technologies in order to predict future demographic patterns. Or, an economist may produce symbolic charts and graphs to show how a particular monetary policy is likely to influence key economic indicators in the future.
Conventional schoolwork seldom engages students in the kinds of inquiry and communication practiced by members of a discipline. More often, students memorize isolated facts about a topic, and then use those facts to complete short-answer worksheets or items on a test. Geography students may be asked to locate place names on a map. An economics teacher may be satisfied if students can draw a graph to demonstrate the principle that "prices increase when demand exceeds supply." These activities may reflect considerable accumulation of prior knowledge; but not until students explore the issues, relationships, and complexities that form the context of a focused problem will they be demonstrating disciplined inquiry. Authentic intellectual performance includes the use of written, visual, or symbolic language that captures the essence, nuances, and analogs of a particular topic.

Q2:- Explain the Identification and Importance of Research Problem. Discuss the Problematic Situation and Source of Research Problem.

Ans:-

RESEARCH PROBLEM?

A research problem is the situation that causes the researcher to feel apprehensive, confused and ill at ease. It is the demarcation of a problem area within a certain context involving the WHO or WHAT, the WHERE, the WHEN and the WHY of the problem situation.
There are many problem situations that may give rise to research. Three sources usually contribute to problem identification. Own experience or the experience of others may be a source of problem supply. A second source could be scientific literature. You may read about certain findings and notice that a certain field was not covered. This could lead to a research problem. Theories could be a third source. Shortcomings in theories could be researched.
Research can thus be aimed at clarifying or substantiating an existing theory, at clarifying contradictory findings, at correcting a faulty methodology, at correcting the inadequate or unsuitable use of statistical techniques, at reconciling conflicting opinions, or at solving existing practical problems.

IDENTIFICATION OF THE PROBLEM

The prospective researcher should think on what caused the need to do the research (problem identification). The question that he/she should ask is: Are there questions about this problem to which answers have not been found up to the present?

Research originates from a need that arises. A clear distinction between the PROBLEM and the PURPOSE should be made. The problem is the aspect the researcher worries about think about, wants to find a solution for. The purpose is to solve the problem, ie find answers to the question(s). If there is no clear problem formulation, the purpose and methods are meaningless.

Keep the following in mind:

- Outline the general context of the problem area.
- Highlight key theories, concepts and ideas current in this area.
- What appear to be some of the underlying assumptions of this area?
- Why are these issues identified important?
- What needs to be solved?
- Read round the area (subject) to get to know the background and to identify unanswered questions or controversies, and/or to identify the the most significant issues for further exploration.

The research problem should be stated in such a way that it would lead to analytical thinking on the part of the researcher with the aim of possible concluding solutions to the stated problem. Research problems can be stated in the form of either questions or statements.

- The research problem should always be formulated grammatically correct and as completely as possible. You should bear in mind the wording (expressions) you use. Avoid meaningless words. There should be no doubt in the mind of the reader what your intentions are.
- Demarcating the research field into manageable parts by dividing the main problem into sub-problems is of the utmost importance.

Problematic Situation

The Problematic Situation is a general learning strategy that can be modified for reading instruction. In this strategy, the teacher confronts students with an important problem. Solving this problem promotes engaged learning in the forms of research, information organization, and lively classroom discussion. The problems that are best suited for prompting student exchange are those that are close to students' personal experiences or those that draw clear opposing ("pro" and "con") responses.

This strategy is applied to reading by using a selected text as a starting point for stating the problem and/or outlining its possible solutions.

1. Select a text document that states an important problem or that offers a one-sided (dare we say "controversial") solution to an important problem.
2. Divide students into groups and distribute copies of the selected document.
3. Ask the groups to produce a list of potential solutions to the problem. Suggest role-playing—assuming the role of a public official or key decision-maker—as a device for framing possible solutions. Stress that all solutions must be based on evidence within the text document or outside research.
4. Provide time for students to conduct research on the topic.

5. Encourage debate within the groups about the merits of each solution. Have each group commit to a "best solution" for the problem.
6. Ask the groups to share their findings with the class. Note any trends (e.g., agreement on specific solutions, any radically divergent solutions, etc.).
7. Allow the student groups to discuss/debate the range of solutions, defending their positions with evidence and seeking to persuade other students to agree with their conclusions.

Sources of Research Problem

Problems can be conceptualized at a number of levels. At one level we are all searching for the answer to the question "why do organisms behave the way they do?" Questions with more specificity could proceed from; why do humans behave the way they do, to how do reinforcement affect behavior, to how does reinforcement affect studying, to how do reinforcement affect studying for tests in university males.

Beginners tend to start with relatively specific research problems focused on the face value of the question, but eventually develop a broad research question with great generality. For example, what started as "how can I help my roommate study more?" evolves into "what controls studying in people?" At the beginning, the roommate's behavior is at issue for itself. Later the person and the behavior are seen as arbitrary instances of a much more important and challenging question. Career long research problems tend to emerge following several years of specific research topics, and require many specific research studies to solve. This section details some of the sources for an initial, relatively specific, research problem. It is intended to help you come up with research which is manageable, enjoyable, and productive.

A very serious impediment facing new researchers is well illustrated by trying to use a foreign language dictionary to learn what foreign words mean. Until you know "enough" of a language, you cannot find out what the words mean. Until you know "enough" of a paradigm, you do not know what unresolved questions remain, or when the paradigm is wrong. "A" below is generally a person's first exposure to a research project for that reason.

In addition to not knowing what unresolved problems remain, is missing the more fundamental broader issue underlying any specific behavior change. When looking at the world, try to see each functional relationship as only an instance of a more general class of relationships.

Q3:- Q3:- Give the Definition and Importance of Research Hypothesis in detail and explain the kinds of Hypothesis with examples.

Ans:-

Research Hypotheses

Research hypotheses are the specific testable predictions made about the independent and dependent variables in the study. Usually the literature review has given background material that justifies the particular hypotheses that are to be tested. Hypotheses are couched in terms of the particular independent and dependent variables that are going to be used in the study.

An example would be

"Children who are exposed to regular singing of the alphabet will show greater recognition of letters than children who are exposed to regular pronouncing of the alphabet"

Notice the IV is specified (singing compared to pronouncing) and the DV is specified (recognition of letters is what will be measured). Notice also that this research hypothesis specifies a direction in that it predicts that the singing group will recognise more letters than the pronouncing group. This is not always the case. Research hypotheses can also specify a difference without saying which group will be better than the other. In general, it is considered a better hypothesis if you can specify a direction.

Finally, note the deductive reasoning principle of the scientific method when we test hypotheses. If our theories and ideas are the truth we can devise controlled experiments and find evidence to support them. This gives considerable credence to our theories. If we work the other way, and gather data first and then try to work out what happened (inductive reasoning) we could be faced with a large number of competing theories all of which could be true or not true. This is sometimes called posthoc theorising and is a common way in which people explain events in their world. But we have no way of knowing which one is correct, we have no way of ruling out the competing reasons and we usually end up with choosing the one that fits best with our existing biases.

Inductive reasoning does have a role in exploratory research in order to develop initial ideas and hypotheses, but in the end the hypotheses have to be tested before they can have scientific credence.

A hypothesis is not just an "educated guess" as many may define it. It's more of what you think the outcome of the experiment you are about to do is going to be.

Kinds and Examples of Hypotheses

Independent variable: The burning of the clothes.
Dependent variable: Which t-shirt takes longer to burn?

If you were burning t-shirts to see which brand takes longer to burn, and you thought that shirt "A" would last longer than shirt "B" you would write:

I believe that shirt A will last longer than shirt B because (your reason for believing this).

Imagine you were interested in investigating the influence of humor in ads on sales.
Your hypothesis could be the following:
A funny ad will result in more sales than an ad that is not funny.

Now imagine that you were interested in investigating whether the number of pages in a book influences book sales. Your hypothesis could be the following:

Q4:- What is research design? Discuss its major types in detail.
Ans:-
When constructing a building there is no point ordering materials or setting critical dates for completion of project stages until we know what sort of building is being constructed. The First decision is whether we need a high rise office building, a factory for manufacturing machinery, a school, a residential home or an apartment block. Until this is done we cannot sketch a plan, obtain permits, work out a work schedule or order materials.
Similarly, social research needs a design or a structure before data collection or analysis can commence. A research design is not just a work plan. A work plan details what has to be done to complete the project but the work plan will flow from the project's research design. The function of a research design is to ensure that the evidence obtained enables us to answer the initial question as unambiguously as possible. Obtaining relevant evidence entails specifying the type of evidence needed to answer the research question, to test a theory, to evaluate a programme or to accurately describe some phenomenon. In other words, when designing research we need to ask: given this research question (or theory), what type of evidence is needed to answer the question (or test the theory) in a convincing way?
Research design deals with a logical problem and not a logistical problem (Yin, 1989: 29). Before a builder or architect can develop a work plan or order materials they must first establish the type of building required, its uses and the needs of the occupants. The work plan flows from this. Similarly, in social research the issues of sampling, method of data collection (e.g. questionnaire, observation, and document analysis), and design of questions are all subsidiary to the matter of `What evidence do
I need to collect?'
Too often researchers design questionnaires or begin interviewing far too early ± before thinking through what information they require to answer their research questions. Without attending to these research design matters at the beginning, the conclusions drawn will normally be weak and unconvincing and fail to answer the research question.

Types of Research Design

1 Philosophical/discursive
This may cover a variety of approaches, but will draw primarily on existing literature, rather than new empirical data. A discursive study could examine a particular issue, perhaps from an alternative perspective (e.g. feminist). Alternatively, it might put forward a particular argument or examine a methodological issue.

2 Literature review
This may be an attempt to summarize or comment on what is already known about a particular topic. By collecting different sources together, synthesizing and analyzing critically, it essentially creates new knowledge or perspectives. There are a number of different forms a literature review might take.

A ‘systematic’ review will generally go to great lengths to ensure that all relevant sources (whether published or not) have been included. Details of the search strategies used and the criteria for inclusion must be made clear. A systematic review will often make a quantitative synthesis of the results of all the studies, for example by meta-analysis.

Where a literature field is not sufficiently well conceptualized to allow this kind of synthesis, or where findings are largely qualitative (or inadequately quantified), it may not be appropriate to attempt a systematic review. In this case a literature review may help to clarify the key concepts without attempting to be systematic. It may also offer critical or alternative perspectives to those previously put forward.

3 Case study

This will involve collecting empirical data, generally from only one or a small number of cases. It usually provides rich detail about those cases, of a predominantly qualitative nature. There are a number of different approaches to case study work (eg ethnographic, hermeneutic, ethogenic, etc) and the principles and methods followed should be made clear.

A case study generally aims to provide insight into a particular situation and often stresses the experiences and interpretations of those involved. It may generate new understandings, explanations or hypotheses. However, it does not usually claim representativeness and should be careful not to over-generalize

.

4 Survey

Where an empirical study involves collecting information from a larger number of cases, perhaps using questionnaires, it is usually described as a survey. Alternatively, a survey might make use of already available data, collected for another purpose. A survey may be cross-sectional (data collected at one time) or longitudinal (collected over a period). Because of the larger number of cases, a survey will generally involve some quantitative analysis.

Issues of generalisablity are usually important in presenting survey results, so it is vital to report how samples were chosen, what response rates were achieved and to comment on the validity and reliability of any instruments used.

5 Evaluation

This might be an evaluation of a curriculum innovation or organizational change. An evaluation can be formative (designed to inform the process of development) or summative (to judge the effects). Often an evaluation will have elements of both. If an evaluation relates to a situation in which the researcher is also a participant it may be described as 'action research'. Evaluations will often make use of case study and survey methods and a summative evaluation will ideally also use experimental methods.

6 Experiment

This involves the deliberate manipulation of an intervention in order to determine its effects. The intervention might involve individual pupils, teachers, schools or some other unit. Again, if the researcher is also a participant (eg a teacher) this could be described as 'action research'. An experiment may compare a number of interventions with each other, or may compare one (or more) to a control group. If allocation to these different 'treatment groups' is decided at random it may be called a true experiment; if allocation is on any other basis (e.g. using naturally arising or self-selected groups) it is usually called a 'quasi-experiment'.

Issues of generalisablity (often called 'external validity') are usually important in an experiment, so the same attention must be given to sampling, response rates and instrumentation as in a survey (see above). It is also important to establish causality

('internal validity') by demonstrating the initial equivalence of the groups (or attempting to make suitable allowances), presenting evidence about how the different interventions were actually implemented and attempting to rule out any other factors that might have influenced the result.

Q5:- Write notes on the following:

1:- Hypothesis v/s Objectives

The objectives and hypotheses of a research study should flow logically from the earlier sections identifying the problem situation, defining the parameters of the problem, and justifying its importance. In this section, we explain how to narrow and focus the research. Specific objectives are written that describe the expected results arising from the study and the outcome variables that will be measured. Once objectives have been set, researchers can formulate specific, testable hypotheses that specify the relationship between program interventions and outcomes.

Hypothesis

A hypothesis is a statement about an expected relationship between two or more variables that permits empirical testing. While ultimate objectives identify the anticipated contributions arising from a study, and immediate objectives (stated in behavioral terms) specify what will be done or measured in the study, hypotheses specify the **expected** relationship among the variables. Hypothesis statements are most appropriate for field intervention or evaluative studies. Diagnostic or exploratory studies do not normally require hypothesis statements because they generally do not test relationships between variables.

Study hypotheses serve to direct and guide the research. They indicate the major independent and dependent variables of interest. They suggest the type of data that must be collected and the type of analysis that must be conducted in order to measure the relationship among the variables.

A single hypothesis might state that variable A is **associated** with variable B, or that variable A **causes** variable B. Sometimes a hypothesis will specify that, **under conditions X, Y, and Z,** variable A is associated with or causes variable B. A well-written hypothesis focuses the attention of the researcher on specific variables.

When writing hypothesis statements, it is important to keep in mind the distinction between **independent** and **dependent variables**. An independent variable **causes, determines,** or **influences** the dependent variable. An example of the basic relationship between these two types of variables is shown in Figure 4.1. This model shows a **direct relationship**. In other words, whenever the independent variable changes, the dependent variable changes. The dependent variable **depends** on the independent variable.

Objectives

An objective is a (relatively) shorter term goal which successful learners will achieve within the scope of the course itself. Objectives are often worded in course documentation in a way that explains to learners what they should try to achieve as they

learn. Some educational organizations design objectives which carefully match the SMART criteria borrowed from the business world.
The use of objective as a noun and as an adjective is a source of potential confusion especially when the adjective objective is applied to assessment. The noun is used in the sense of goal while the adjective is used in the sense of independent of personal judgment. Thus objective assessment and assessment of objectives have entirely different meanings. Although the achievement of objectives is usually assessed this need not necessarily rely on objective assessment. Objectives can also be assessed via subjective assessment.
Objectives vary widely in their level of specificity but generally they are more specific than their related aims. Increased specificity may be required so that they are measurable and suitable assessments can be devised. Increased specificity often means that many objectives come under the umbrella of the same aim. Some organizations prefer large numbers of highly specific objectives such that each one can map onto a single question within an examination whereas others prefer small number of objectives where each one can map onto an aspect of the marking criteria for a single assessment such as a thesis. A short categorical list of objectives may be presented in course documentation but is also split into more specific objectives for the purposes of the design of assessment.
Sometimes the achievement of one objective is required as a prerequisite for the achievement of another objective. This may lead to quite complex structures of course objectives.
In most courses objectives are set by teachers and apply to all learners who enrol on the course. Sometimes individual learners set their own objectives in collaboration with teachers. The objectives always relate to the same course aims but according to the individual's interpretation of those aims and how they relate to personal goals.

2:- Experimental Research Design.

A clear definition of the details of the experiment makes the desired statistical analyses possible, and almost always improves the usefulness of the results. The overall data collection and analysis plan considers how the experimental factors, both controlled and uncontrolled, fit together into a model that will meet the specific objectives of the experiment and satisfy the practical constraints of time and money.
The data collection and analysis plan provides the maximum amount of information that is relevant to a problem by using the available resources most efficiently. Understanding how the relevant variables fit into the design structure indicates whether the appropriate data will be collected in a way that permits an objective analysis that leads to valid inferences with respect to the stated problem. The desired result is to produce a layout of the design along with an explanation of its structure and the necessary statistical analyses.
The data collection protocol documents the details of the experiment such as the data definition, the structure of the design, the method of data collection, and the type of analyses to be applied to the data.

Defining the experimental design consists of the following steps:

1. Identify the experimental unit.
2. Identify the types of variables.
3. Define the treatment structure.
4. Define the design structure.

In our experience in the design and implementation of previous studies, often, a number of extenuating circumstances arise that require last minute adjustments to the data collection plan. Therefore, contingency plans should be available to keep the structure of the design intact in order to meet the stated objectives.