COURSE : DISASTER MANAGEMENT (MA/ MSc PART I)
Paper : VI
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Topic : Types of Scientific Investigations

TYPES OF INVESTIGATIONS

Descriptive Investigation: Involve describing and/or quantifying parts of a natural system. Example – observing cells under a microscope and diagramming what is seen. Has a research question, procedures, and conclusion Used when little is known about the topic No hypothesis or prediction Key words: Observe, describe, list, identify. Descriptive Investigation: Involve describing and/or quantifying parts of a natural system. ... Comparative Investigation: Involve collecting data on collecting data on different populations/organisms, under different conditions.

The goal of descriptive investigation is to describe. It should provide factual, accurate and systematic descriptions of phenomena without attempting to infer causal relationships. It does not answer questions about the how, when, or why a particular phenomenon occurred. It should serve to provide a foundation for building new knowledge and theory (such studies should be directed at providing novel data on important and unknown phenomena, e.g., dynamics of affect, performance, or other behaviors; discovery and documentation of new, important, and meaningful phenomena); and provide rigorously conducted qualitative information on phenomena that are difficult to capture with quantitative methods.

Descriptive Investigations will be evaluated generally on:

- The originality, clarity and importance of the research question
- The appropriateness of the study design to the research question
- The size and representativeness of the sample chosen
- The robustness of the data collection process, including choice of instruments or tools
- The rigor and transparency of the analysis (including the coherence of the theoretical framework)
- The logic and coherence of the links made between findings
- The researchers awareness of the possibility of error and the steps taken to minimize or the potential for error throughout the research process

Comparative Investigation: Involve collecting data on collecting data on different populations/organisms, under different conditions (ex. Times of year, locations), to make a comparison. Has a research question, possible hypothesis, procedures, and conclusion. Can have independent/manipulated and dependent/response variables No control / control group Key words: Compare/contrast, similarity/difference, categorize. Comparative Investigation: Involve collecting data on collecting data on different populations/organisms, under different conditions (ex. Times of year, locations), to

make a comparison. Has a research question, possible hypothesis, procedures, and conclusion.

Comparative research is studying two or more similar groups, individuals, countries, events or conditions by comparing them with respect to specific characteristics. Through such comparisons, comparative research offers a mechanism to understand and evaluate the factors that shape and change our world. It can provide insight into world events, a greater understanding of the governments and systems that exist throughout the world, a means for learning from past mistakes, and a greater understanding of other cultures. To some extent, all research is comparative in nature and comparative research offers many benefits and advantages. However, as with all types of research, it has limitations as well. Following is a summary of the benefits and limitations of comparative research.

Benefits of Comparative Research:

- It may help to identify causes or explanations for existing conditions or historical events.
- It uses existing groups or cases and thereby simplifies some steps of the research process. Since it focuses on the differences and similarities, the cases or groups are typically drawn from a known or predetermined set.
- Variables are not manipulated and treatments are not applied, again simplifying steps of the research process. In comparative research, the effect of the variable has already occurred and the goal is to examine the impact or effect of the independent variable on the dependent variable. It is a commonly chosen method when variables cannot be manipulated due to ethical or practical reasons.
- Most of the data is collected from already existing sources, reducing procedural efforts and many of the ethical concerns.
- Often a wealth of existing information available to use as data.
- Less costly than most experimental studies.
- Careful selection of groups or cases that are homogeneous with respect to the extraneous variables helps to ensure the reliability of the findings by removing influence of extraneous variables.
- The analytic frame, mentioned in previous modules, can be flexible and modified as the research progresses. The flexibility makes the comparative method a good strategy for advancing theory.
- Comparative research facilitates the understanding of historical events because it focuses on the differences between cases and events the differentiation often leads to greater insight.
- These types of studies often bring together researchers from different backgrounds and disciplines.

Limitations of Comparative Research:

- It may sometimes be difficult to find the same types of data for the groups or cases for making a true comparison.
- The accuracy and source of the data may need to evaluated and verified to ensure reliable findings.

- Only true experimental research can definitively determine cause-effect relationships. Findings from comparative research should be reported as showing a “possible effect” or a “possible cause”.
- There can be several reasons why variables are related to each other and may be difficult to pinpoint the exact reason.
- Groups or cases must be carefully chosen to control for extraneous variables. It is best to ensure that the groups or cases are similar in regards to extraneous variables to reduce their potential impact.
- The groups or cases are chosen from a predetermined subset and not selected randomly. This negatively impacts the ability of the research to generalize the findings.
- Especially when working with a cross-national comparative study, gaining access to comparable data may be an issue. For some cases, the comparable data from a particular country may not exist or may have been destroyed. It may be necessary to form an international team comprised of members from all countries involved in order to gain access to the needed information. There can be many problems and challenges associated with building a managing such a team.
- Language barriers may be an issue in cross-national studies.
- Comparative research requires that the research make presumption that the independent variable has the same consequence every time.
- In some cases, the direction of causality may be disputed and must be considered by the researcher. Comparative studies also do not account for situations where multiple causation is possible.
- The correct classification of events, cases, groups, or individuals into categories for comparison is a key concern in the comparative method because the classifications developed determine the subsets from which cases or groups are drawn for comparisons.

Experimental Investigation: Involve a process in which a “fair test” is designed in which variables are actively manipulated, controlled, and measured in an effort to gather evidence to support or refute a causal relationship. Example- Testing the height of a ramp to determine how far a marble will roll. All known variables have been identified Has a research question, hypothesis, procedures, control, and conclusion Has independent/manipulated and dependent/response variables All factors can be held constant except the manipulated.

Experimental investigations involve a process in which a "fair test" is designed and variables are actively manipulated, controlled, and measured in an effort to gather evidence to support or refute a causal relationship.

Experimental investigations have a control group which does not receive any treatment.