



National Seminar on Methods of Measuring and Interpretation of Outcomes in Educational And Social research

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Abstract :

“Research is an honest, exhaustive, intelligent searching for facts and their meanings or implications with reference to a given problem. The product or findings of a given piece of research should be an authentic, verifiable contribution to knowledge in the field studied.”

- P.M. Cook A research tool is an instrument that can be used to collect or obtain facts in the form of data, measure data and analyze data that is relevant to the subject of your research.

The format of a research instrument may consist of different tools of measurement and evaluation like questionnaires, surveys, interviews, checklists, or simple tests. The choice of which specific research instrument tool is decided on by the researcher. It is usually related to the actual methods that will be used in the specific study.

Research tools usually vary in complexity, interpretation, design, and administration. Each tool has its own uniqueness and is suitable for the collection of a certain type of information. The types of research instruments depend on the format of the research study being performed like qualitative, quantitative, or mixed methodology. For example, questionnaires are utilized when a study is more qualitative while a scoring scale in more quantitative studies.

The researchers felt a need for proper documentation of research tools and their categories as per the need of the different subjects of research.

The researchers of this research focus on identifying and analyzing the tools that can help in the data collection of research.

Keywords: Research tool, questionnaire, qualitative, quantitative, mixed methodology, surveys, checklist, interviews.

Introduction:

Different methodologies may be used for data collection and analysis. mostly methodologies are supported by an identical set of basic tools. These tools are listed during this research and are described in short. The tools listed below will be used on their own or are applied as a part of wider methodologies. as an example, a survey might be designed and implemented as a standalone tool, but could even be implemented as a part of a wider methodology. Similarly, case studies or stories of change are often utilized in isolation, but can even be used as a part of a wider methodology

However, the fundamental tools listed below don't seem to be related to specific analysis methods. All may be analyzed by employing a range of various techniques and approaches. Some tools, like case studies or focus group discussions, are more often analyzed using qualitative techniques, whilst others, like surveys, tend to be analyzed quantitatively. But there are often exceptions to those rules.

Dimensions of research - Pure qualitative and pure quantitative

Pure Qualitative- Exploratory, Inductive, unstructured, open-ended, naturalistic, and freeflowing

Pure quantitative- Confirmatory, deductive, structured, close-ended, controlled, and linear.[1] Data collection is the process of gathering, measuring, and analyzing accurate data from a variety of relevant sources to find answers to research problems, answer questions, evaluate outcomes, and forecast trends and probabilities.[2]

A method of data collection is simply a technique that is used to collect empirical research data. It is how researchers “get” their information.

A researcher requires data gathering tools which may vary in their complexity, design, or interpretation. Each tool must be appropriate for the collection of a certain type of information. There are many tools of educational research, few of them are: -

- ❖ Questionnaires
- ❖ Checklist
- ❖ Observation techniques
- ❖ Interviews
- ❖ Schedules
- ❖ Rating scales
- ❖ Psychological Tests

❖ QUESTIONNAIRE:

A **questionnaire** is a research instrument consisting of a series of questions and other prompts for the purpose of gathering information from respondents.

This is the process of collecting data through an instrument consisting of a series of questions and prompts to receive a response from individuals it is administered to. Questionnaires are designed to collect data from

a group.[3]. It constructs a self-report data collection instrument which is filled out by research participants.[1]. It can be an effective means of measuring the behavior, attitudes, preferences, opinions and intentions of relatively large numbers of subjects more cheaply and quickly than other methods. Questionnaires provide a relatively cheap, quick and efficient way of obtaining large amounts of information from a large sample of people as the researcher would not need to be present when the questionnaires are completed.[7]. Questionnaires helps to find out how satisfied participants are with an offering, how much they've learned, and whether they're actually acting on their new knowledge. Questionnaires with closed questions can be quickly evaluated in bulk; whereas questionnaires with open questions generally provide useful additional information.[6]. Both open and closed questions are beneficial for collecting data as both quantitative and qualitative data can be obtained.[7].

Open Questions- These are asked when the researcher wants their respondents to express themselves in detail.

Closed Questions- These questions are asked when the researcher provides a limited set of options for the respondents to choose within.

Merits- • Questionnaires are cost effective as it doesn't require the researcher to visit each respondent for data collection instead the researcher can use email, less expensive websites etc.

- It is not only restricted to a particular area, instead the researcher can collect data nationally and internationally.
- It creates less pressure on the respondent as it can be answered at any time according to their convenience.
- If respondents' responses are treated as confidential, personal information can often be obtained more easily through questionnaires. [8]
- A dept study can be done using a questionnaire as a preliminary tool for data collection.

Demerits-

- The data collected through questionnaires may be not completely reliable as the respondents may be careless or ignorant while answering some questions.
- It cannot be applicable for collecting data from illiterate people and children.
- When the questions are difficult to understand and interpret, they are unanswered. • It doesn't allow us to interpret the respondents' emotional gesture to a particular question.
- The respondents may manipulate their responses while answering a questionnaire.

❖ CHECKLIST:

A list of items to be noted checked or remembered.

It is the most effective means of observation. Users can utilize checklist lists to obtain information and make decisions about what they should know about the outcomes. They provide a method for collecting data on certain behaviors, knowledge, and abilities in a systematic manner. [9]

Merits-

- Checklists help us in faster data extraction.
- It helps in increasing our productivity.
- It gives a sense of motivation to achieve our goals.
- It gives a simple way to keep track of your observations [11].
- It's beneficial for assessing processes that can be broken down into a sequence of steps.[11]

Demerits-

- It has a limited use in qualitative research studies.[11]
- It does not indicate the quality of performance, so usefulness of checklist is limited.[11]

❖ OBSERVATION TECHNIQUES:

Observational data is gathered by watching a person or thing do something. It's gathered by methods including human observation, open-ended surveys, or the use of an instrument or sensor to monitor and record data, such as the usage of noise sensors.

Because observational data is recorded in real time, it would be extremely difficult, if not impossible, to recreate if it were lost.[10]

Observations can be overt (everyone is aware they are being watched) or covert (no one is aware they are being watched) (no one knows they are being observed and the observer is concealed). The advantage of covert observation is that when people are unaware that they are being watched, they are more likely to act naturally. However, due to ethical concerns, you will almost always need to undertake overt observations.

Direct or indirect observations are also possible. Direct observation is when you see interactions, processes, or behaviors as they happen, such as watching a teacher teach a lesson from a prescribed curriculum to see if they are following it exactly. Indirect observations are when you see the outcomes of interactions, processes, or behaviors, such as assessing the quantity of plate trash left by children in a school cafeteria to see if a new food is accepted. [12]

The following are the several sorts of observational methods:

- **Controlled observation-** It is a type of observation that is usually structured. Using a systematic approach, the researcher determines where the observation will take place, at what time, with which participants, and under what conditions.
- **Naturalistic Observation -** This technique entails observing individuals' spontaneous behavior in natural settings. The researcher merely takes whatever notes they can about what they see.
- **Participant Observation-** A variation of the above (natural observations), participant observation involves the researcher joining in and becoming a member of the group.[13]

Merits:

- Observations are one of the crucial components for forming the bases of hypothesis.
- All sciences, whether physical or social, use observations as a common method. As a result, it is very simple to follow and accept, and it is regarded as a universal method.
- For many areas, such as providing verbal information for behaviour, feelings activities, or simply because they cannot communicate, such as infants or animals, observation is the only appropriate tool.
- It necessitates less active participation and willingness on the part of responders.[14]

Demerits:

- Because observations are time-consuming operations, they result in a delayed study. [14]
- The researchers' personal bias influences their observations in a variety of ways. This also makes it difficult to make accurate generalizations. [15]
- Phenomenon like love, affection and feelings are abstract in nature hence, cannot be observed all the time.[16]

INTERVIEW:

The widespread format of an interview is where the interviewer asks the interviewee to answer a set of questions which are normally asked and answered verbally.

An interview is a conversation between two people, i.e interviewer, and the interviewee where questions are asked by the interviewer to obtain information from the interviewee.

Interviews are a tool mainly for the collection of qualitative data and are popular as a datacollection tool because of their flexibility.[5]. Using this method for collecting the data, the interviewer establishes a rapport and asks the interviewee a series of questions. The interviewer must always remain nonjudgmental so as to reduce its potentially biasing effect.[1]

Different types of interview research instruments that may exist.

A structural interview- In structural interview there are a specific number of questions that are formally asked of the interviewee and their responses recorded using a systematic and standard method.

An unstructured interview- Unstructured interview is based on the same common theme of questions but here the person asking the questions (the interviewer) may alter the order the questions are asked in and the particular way in which they're asked.

A focus interview -It is one in which the interviewer will adapt their line or content of questioning based on the responses from the interviewee.

A focus group interview -It is one in which a group of volunteers or interviewees are asked questions to understand their opinion or thoughts on a specific subject.

A non-directive interview is one in which there are no specific questions agreed upon but instead the format is open-ended and more reactionary in the discussion between interviewer and interviewee.

Merits;

- It is a direct method of collection of data.
- Data collected with face-to-face contact with interviewee.
- Confidential information can be obtained.
- It can be written or oral type.
- Examination of known data.
- Knowledge of past and future can be derived.

Demerits:

- Information might be misleading. ● Biasness gets involved.
- Emotional interference

- Impact of differences of mental outlook of interviewee and interviewer.

SCHEDULE:

Schedule is a type of tool with is z combination of many questions set by the interviewer for purpose of interview, formulated with specific purpose of testing an assumption.

Merit:

- Samples can be large.
- Personality factors can be studied
- Face to face interaction with interviewee.
- Confusion regarding the questions can be resolved as face-to-face interaction happens
- Emotional impact.
- Biasness
- Subjective approach.

Demerits:

❖ RATING SCALES:

Rating is a phrase used to express one's opinion or judgement about a situation, an object, or a person. Opinions are frequently expressed on a scale of values; rating procedures are tools for quantifying such assessments. It enables the respondents to measure their interests, perceptions, feelings, preferences etc. Following are some types of Rating scales

Numerical Rating scale- It is the type of rating scale where the respondents need to send their feedback in the form of numeric values.

Likert Scale- It allows the respondents to express themselves in term of agree and disagree for a statement

Radio frequency scale- It is a type of rating scale that is used to measure the number of occurrences of an assertion or statement. It allows the researcher to know how often the respondent performs a particular action.

Star rating scale- It is a type of rating scale which enables the respondent to express his satisfaction or dissatisfaction by giving a number of stars.

Heart rating scale- It is the type of rating scale denoting ranked parameters, represented as hearts instead of check box or numbers.

Merits-

- Helps as a tool in finding the needs of students
- Stimulating effects on the rates
- It has wider range of application and can be used for tutor ratings, personality ratings, school appraisal etc.

Demerits-

- Immediate emotional reactions may affect the ratings.
- There's no way to tell how much of a difference there is between each rating's levels of relevance.
- A rater's tendency to rate others in the opposite way (contrasting) from themselves or herself in a trait is known as the contrast error.

❖ TESTS-

Tests help to collect Quantitative data in research. It is a systematic procedure for observing a person's behavior and describing it with the aid of a numerical scale or a category system. A

Psychological Test is essentially an objective and standardized measure of a sample of behavior.[4]

Achievement Test: A test designed to measure the knowledge or proficiency of an individual in something that has been learned or taught. Eg: Arithmetic or Typing.

Aptitude Test: It assumes that individuals have inherent strengths and weaknesses, and are naturally inclined towards success and failure in certain areas based on their inherent characteristics. It is used to determine an individual's propensity to succeed in a given activity.

Intelligence Test: A standardized test used to establish an intelligence level rating by measuring a subject's ability to form concepts, solve problems, acquire information, reason and perform other intellectual operations.

Personality Test: A test usually involving a standardized series of questions or tasks used to describe or evaluate subject's personality characteristics.

Merits-

- In light of the flaws discovered, the tool's structure and contents are revised.
- Offensive, intrusive, or invasive inquiries are addressed as measurement issues.
- . Used for checking and evaluating thus providing students a border scope and higher objectivity.

Demerits -

- It may disclose the final answers to the students thus students tend to change their answers leading to solutions.
- It's possible that it's biased against certain types of test takers.
- It may be oversimplified and superficial

There are many complex instruments that can be used to collect data and analyze information. Mostly many if not all are based on the same core set of tools and methods described in this conceptual paper by the researcher. The above mentioned data collection tools allow us to build up strategies thus forming the bases of the research work.

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