



# INTRODUCTION TO DATA COLLECTION INSTRUMENTS

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## ABSTRACT

Discovery and research have been two potent weapons in the hands of human beings for knowing the secrets of nature and getting adjusted to physical and social environment. Research is a careful investigation or inquiry especially through search for new facts in any branch of knowledge. It is a well thought scientific process involving some systematic and definite steps for arriving at something new or adding modifications to existing stock of knowledge helpful in solving the problems being confronted. Data collection is one of the most important steps of research process. It play an important role while conducting research. Data collection is the process of gathering and measuring information on variables of interest, in an established systematic fashion that enables one to answer stated research questions, test hypotheses and evaluate outcomes.

In this present paper the researcher will explain the concept of research and data collection and different data collection tools or instruments which can be used for quality collection of evidences and information in the form of data for effective research

## Concept of Research :

The word “Research” means searching again or to search for something or bringing modification to existing ones. Research is a part of our daily routine like for example, a housewife may try to know what combination of sugar, salt or food contents make a dish more delicious or a teacher may try to find out the best strategy or technique of teaching her students. Research is the defined as the systematic and objective analysis and recording of controlled observation that may lead to the development of generalization, principles or theories, resulting in prediction and possibly ultimate control of events. It is a well thought scientific process which involve some definite steps for arriving new or adding modification to the existing stock of knowledge helpful in solving the problems being confronted ( **Best and Kahn** )

According to **Young**, “Research is the systematic method of discovering new facts or verifying the old facts, their sequence, interrelationships, causal explanation and the natural laws which governs them.”

According to **Kothari**, “ The term research refers to the systematic method consisting of enunciating the problem, formulating a hypothesis, collecting the facts or data, analysing the facts and reaching certain conclusions either in the form of solution(s) towards the problem concerned or in certain generalizations for some theoretical formulations.”

Research originates with a question or problem, needing to be defined clearly by finding out its proper solution stated in terms of laid down research objectives. It then follows a well thought, systematic specific procedure by accepting certain assumptions, tentative solutions or an educated guess in the form of laid down hypotheses for getting them tested through the collected information, or controlled observations leading to some specific, objective, reliable and valid generalizations.

### **Concept of Data Collection:**

Data is the lifeblood of research as it connects all the ideas that we need about the world to practice the world. It makes research empirical which means that it represents something outside our opinions and ourselves. Research data is any kind of information that has been collected, observed, generated or created to validate original research findings. It is a set of values of subjects with respect to qualitative or quantitative variables. Data is a raw, unorganized facts that need to be processed. Data collection is the process of gathering and measuring information on variables of interest, in an established systematic pattern that enables one to answer stated research questions, test hypothesis and evaluate outcomes. It is a systematic approach to accurately collect information from various sources to provide insights and answers to research questions, testing a hypothesis or evaluating an outcome. The Data Collection component of research is common to all fields of study including physical and social sciences, humanities, business etc. While methods can vary by discipline still the emphasis is on ensuring accurate and honest collection of data. The main purpose of data collection is to gather quality information that can be analyzed and used to support decisions or provide evidences. The ultimate goal for all data collection is to capture quality evidences that then translates to rich data analysis and allows the building of a convincing, credible and authentic answer to questions that have been passed. Accurate data collection is essential for maintaining the integrity of research

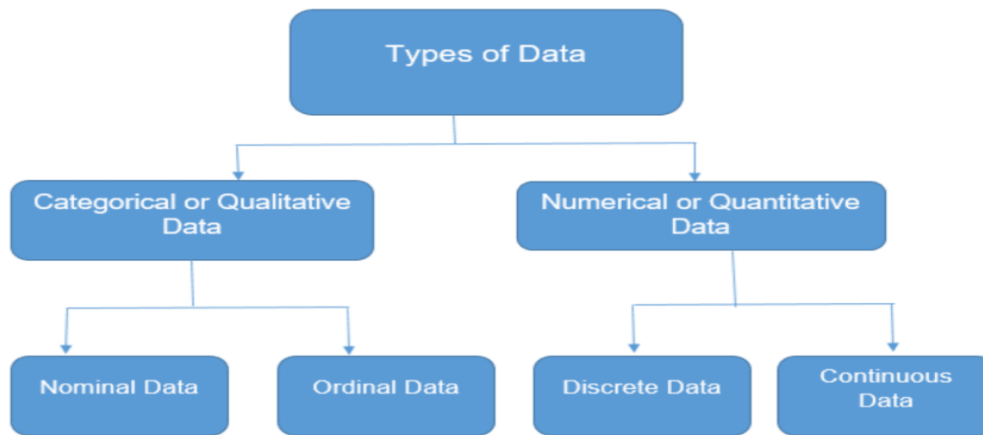
Data collection is one of the most important stages in conducting research. After selection and definition of the research problem, setting up of the objectives and hypothesis of the study and making up the decision of the participants or subjects of the study, the researcher has to focus on collection of the related information about the research problem or evidences for the verification of his hypothesis which may answer the researchers' questions. The research problem cannot be solved and the research questions cannot be answered without help of the needed information and evidences collected or gathered by the researcher. These collected evidences or information are helpful in answering the research questions are known by the term data and the techniques or tools or instruments employed for collecting the data are called data collection tools or instruments.

There are two kinds of data collected which include quantitative and qualitative data. Quantitative data is the data which is being expressed in certain quantity, amount or range. There are measurement units associated with the data for example metres, inches etc. It makes sense to set limits to such data and it is also meaningful to apply arithmetic operations to the data. Qualitative data is the descriptive and conceptual findings collected through qualitative research tools like observations, interviews etc. Analyzing qualitative data allows us to explore ideas and further explain quantitative results.

There are different types of tools or instruments and techniques of data collection available for the researchers for helping the researcher in their task of data collection. These instruments of data collection help them in extracting or obtaining data (information and evidences) from the available resources which could be primary or secondary for their respective quantitative or qualitative research studies. Each of these research instruments has its distinction to help in collection of certain specific types of information or evidences from different sources of information. A researcher requires thorough knowledge about availability, development and use of different varieties of data collection instruments. When researcher collect information or evidences, those pieces of information may be available to him in both quantitative or qualitative forms. One can have the best research design in the world but if you cannot collect the required data, you will not be able to complete your project. Data Collection is very demanding, challenging and ethical job which needs thorough planning, hard work, dedication, patience, perseverance and research ethics to complete it successfully. Data collection starts with determining what kind of data required followed by selection of sample from a certain population. After that, you need to use certain data collection instruments to collect the data from the selected sample.

**Types of Data:**

Data are organized into two broad categories: Quantitative and Qualitative.



**1. Quantitative Data:** Quantitative Data is numerical in nature and can be mathematically computed. Quantitative data measure uses different scales like rating scales and attitude scale etc, which can be classified as nominal scale, ordinal scale, interval scale and ratio scale. Quantitative approaches address the ‘ what’ of the program. They use a systematic standardized approach and employ methods such as surveys and ask questions. Quantitative approaches have the advantage that they are cheaper to implement, are standardized so comparisons can be easily made and the size of the effect can usually be measured. Some of the data collection instruments in quantitative research are:

**Quantitative Observation:** Quantitative observation implies an objective collection of data for analysis based on their numerical and statistical attributes. The primary focus is on numbers and values. It involves performing research to find information about entire population. It deals in quantifiable variables. It provides measurable data like area , weight , height etc. It is utilized for collecting ‘live’ data with the help of one’s senses of observation (watching and listening) in the controlled or naturalistic setting of the occurrence of events. According to **Young** , “ Observation is a systematic and deliberate study through the eyes of spontaneous occurrences at the time they occur. The purpose of the observation is to perceive the nature and extent of significant interrelated elements within complex social phenomenon, cultural patterns or human conduct.”

Kinds of Observation:

- Participant and non-Participant Observation
- Structured and Non-Structured Observation
- Uncontrolled and Controlled Observation
- Individual and Group Observation

**Questionnaire:** Questionnaire is the data collection tool which is in the shape of a form containing a set of appropriate questions meant for collecting necessary data from the subjects of the study by getting it filled in by the subjects themselves.

According to **Best and Kahn** , “ A questionnaire represents the general category inquiry form including data gathering instrument through which respondents answer questions or responds to statements in writing. A questionnaire is used when factual information is desired. When opinion rather than facts are desired, an opinionnaire or attitude scale is used. Of course, these two purposes can be obtained into one form that is usually referred to as a questionnaire.”

Kinds of Questionnaires:

- Close –ended and open-ended Questionnaires
- Structured and Non-Structures Questionnaires
- Self –Administered and interviewed Questionnaire
- Oral and written Questionnaires

**Interviews:** An Interview is a data collection tool which is used for collecting data from the participants directly through a verbal interaction by making them respond to the purposefully framed questions aimed at serving the objectives of the study.

According to **Cannell and Kahn** , “ A research interview is a two-person conversation initiated by the interviewer for the specific purpose of obtaining research relevant information and focused by him on content by research objectives of systematic description, prediction or explanation.

Kinds of Interview:

- Individual and group Interviews
- Face-to-face and Telephonic Interviews
- Directed and Non-Directed Interviews
- Structured and Non-Structured Interviews
- Formal and Informal Interviews

**2. Qualitative Data:** Qualitative data is mostly non-numerical and usually descriptive or nominal in nature. Qualitative approaches aims to address the ‘How’ and ‘Why’ of the research problem and tend to use unstructured methods of data collection to fully explore the topic. Qualitative questions are open-ended. Such methods include focus groups, group discussion and interviews. They are good for further exploring the effects and unintended consequences of a program. They are quite expensive and time consuming and can also include biasness. Additionally the results cannot be generalized to participants outside of the program and are only indicative of the group involved.

Qualitative data collection methods play an important role in impact evaluation by providing information useful to understand the processes behind observed results. These methods can be used to improve the quality of survey-based quantitative evaluations by helping generating evaluation hypothesis and strengthening the design of survey questionnaires and expanding or clarifying quantitative evaluation findings.

Some of the qualitative data collection instruments are:

**Qualitative Observation:** Qualitative observation is a research method in which researcher collect data using their five senses which are sight, smell, touch, taste and hearing. It is subjective method of gathering information as it depends on researcher’s sensory organs.

**Focus Groups:** A Focus group is a form of qualitative research in which a group of people are asked about their perceptions, opinions, beliefs and attitudes towards a product , service, concept, advertisement, idea or packaging. It is a research method that brings together a small group of people to answer questions in a moderated setting.

**In-depth Interviews:** It is a type of interview which deals with individual that aims to collect detailed information beyond initial and surface-level answers. It takes quite a long time to conduct such interviews.

**Conclusion:** There are different kinds of research tools or instruments available for different kinds of research but it is very important to become aware about research tools and its application. Many of the possible obstacles when it comes to gathering data can be avoided by running a pilot with the data collection tools you intend to use with a small number of informants before you start the actual data collection process. This can help to quickly identify any unforeseen problems and allowing changing any question or task that are unproductive.

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